Globalization and the European Economy: Medieval Origins to the Industrial Revolution

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1. Introduction

Any consideration of "The Europeanization of the Globe and the Globalization of Europe" must confront the problem of how to specify the spatio-temporal coordinates of the concept of Europe. When does "Europe" begin as a meaningful cultural, social and political expression and how far east from the shores of the Atlantic and the North Sea does it extend? In this paper I will begin with Charlemagne, which is to say around 800, and go not much further east than the limits of his empire. Thus I shall take "Europe" to be what is conventionally regarded today as Western Europe. This is purely for convenience and should not be taken to imply any desire to exclude peoples and nations further to the east on historical or cultural grounds.

The paper will concentrate on Europe's contacts and trading relations with other parts of the world, in keeping with the theme of globalization. This does not mean that I regard internal developments as necessarily any less significant in the overall evolution of the European economy.

2. The Pirenne Thesis

The following quotation is from Henri Pirenne (1939:234):

"---- without Mohammed Charlemagne would have been inconceivable."

This juxtaposition of the prophet of Islam with the Frankish founder of the revived Holy Roman Empire was the stroke of genius achieved by the great Belgian historian in his celebrated thesis. If the "founding father" of Europe as we know it today cannot even be conceived without recognition of the founder of Islam we surely cannot consider "Europe" to be a wholly autonomous cultural, political and economic entity independent of developments beyond its geographical limits. The argument, advanced more than two generations ago, is well known.

Against the conventional view that the Roman Empire fell as a consequence of the Germanic invasions in the fifth century, followed by the long decline of the "Dark Ages" before revival under the influence of the Italian cities, Pirenne argued that the socio-economic system of the Empire in the west was preserved in essentials during the Frankish dynasty of the Merovingians, the key link with Byzantium across the Mediterranean not having been broken so that long-distance commerce and urban civic traditions continued. It was only the conquests of Islam in the seventh century that made the Mediterranean a Muslim lake, and converted Western Europe to becoming a land-locked economic and cultural backwater. The economic system regressed to become a self-sufficient manorial economy, with the imperial bureaucracy replaced by the feudal institutions of fief and vassalage. The center of growth was pulled north away from the Mediterranean and the empire of Charlemagne was erected on the basis of an enserfed peasantry presided over by a feudal nobility, with the cultural traditions of antiquity tenuously preserved by the clergy. In Italy the pope could no longer rely on Byzantine protection and so became dependent on the Carolingian emperors.

The evidence for this startling thesis was summed up by a distinguished commentator, Robert Lopez (1943), as the "four disappearances" – of papyrus, luxury fabrics, spices and gold coins. Pirenne of course had to show not only that these items were absent, or at least scarce, in Charlemagne's time but that their disappearance coincided with the Muslim conquests in the seventh century and not before or too much later. Papyrus was used in the western empire for most administrative, judicial, commercial and ecclesiastic purposes and as Pirenne (1939:92) says "whole cargoes of this commodity must have been unloaded upon the quays of the seaports". The sole source of supply was Egypt, a province of the Byzantine empire before the Arab conquest. Pirenne claimed (1939:169-176) that the use of papyrus ceased for Merovingian documents in 677, and also that there is no evidence of continuing use by merchants or monks from this time in Gaul, although the situation in Italy was somewhat better. Luxury fabrics such

as silks and brocades, were also extensively used at the Merovingian court and the churches. Fashions in the west were said by Pirenne (1939:87) to have been set by Constantinople, which was the source of silk from China and its own recently established domestic industry. Again, Pirenne claims that all mention of silk or luxury Oriental fabrics disappears from the West after the late seventh century. The plain Flemish woolen cloth of the Carolingians replaced the silks of the Merovingians, just as parchment was substituted for papyrus. Spices, wines and Oriental foodstuffs also disappear by the late seventh century while the silver pennies of the Carolingians circulated instead of the gold coinage of the Merovingians.

Lopez (1943) casts at least some doubt on each of the "four disappearances" and thus on the direct evidence in favor of the Pirenne thesis. His main argument is that papyrus, gold coins and luxury fabrics were all state monopolies in the surviving Byzantine empire and the Islamic Caliphate after the conquest of Egypt. On papyrus he says that its use continued, particularly in Italy, until it was replaced by paper three centuries later. In the barbarian west, however, he attributes the decline in the use of papyrus to the "melting away" of Roman law that required the use of papyrus for legal documents. A restriction in the supply of papyrus by the Arab state monopoly in the last decade of the seventh century led to the substitution of parchment, which remained in use even after the supply restriction was later removed. On luxury fabrics Lopez appeals to a shift in tastes of the barbarian west to home products, as well as Byzantine restrictions on the highest quality fabrics, such as the imperial purple, to deny the upstart rulers of those former imperial regions the symbols of legitimate authority. In any case he says that the flow of oriental cloths to the west was maintained, on the basis of research by one of Pirenne's own students. In the case of gold coins he argues that the Muslim kingdoms in Spain went on to a silver standard, causing the later Merovingians to imitate it, rather than giving up gold because it was unavailable from the east. In any case gold was used for coinage by Charlemagne's son

Louis the Pious. On spices Lopez again claims that tastes may have shifted, but also that supplies continued to flow westwards.

Another major critique of the Pirenne thesis was by the Orientalist Dennett (1948). He points out that Pirenne's assumption that Islam would (a) want to and (b) had the power to blockade Christian navigation across the Mediterranean is entirely unwarranted on both counts. The Caliphate traded actively with infidels of all kinds and from all points of the compass – Chinese, Indians, Russians, Swedes and even their great rivals the Byzantines. Why would they not trade with the Franks of Gaul? Even if they had wished to, they simply did not have the power to blockade western trade until they captured Sicily, which only happened as late as 850. If the volume of trade was limited this could have been due to the relative backwardness of Frankish Gaul from 650-850 for the traditional internal causes associated with the disruptive aspect of the barbarian invasions. All of Gaul's neighbors, including Spain, Italy and northern Europe were actively engaged in eastern trade so why should not Frankish Gaul itself have participated to the extent permitted by its resources and level of development?

In all of the extensive literature stimulated by the Pirenne Thesis the most original and far-reaching contribution was by the Swedish historian and numismatist Sture Bolin (1953). The very title of his paper, "Mohammed, Charlemagne and Ruric" widens the scope of Pirenne's already breathtaking juxtaposition of the first two historical figures by adding the name of the possibly legendary founder of the Swedish Viking dynasty in ninth century Russia, an area completely outside the terrain covered by Pirenne. Bolin starts (1953:8) by noting two key points:

"Firstly, whether or not trade ceased between Western Europe and the Arab world during the Carolingian period, it is quite certain that, within the Caliphate, trade, industry and a town economy flourished as never before. Secondly, whether the internal trade of western Europe increased or decreased during this epoch, the ancient connections between western Europe and the northern and Baltic countries became very much more important, especially in the first part of

the Carolingian age. If these two accepted facts are set in juxtaposition, however, the main problem again thrusts itself forward. One is led to ask whether the communications between the Frankish empire and the North became more lively in consequence of reduced communications between the West and the Orient, or whether the same factors were responsible for the prosperity of trade both in the Caliphate and around the North Sea".

Bolin argues strongly in favor of the second of the two possibilities mentioned above – that the prosperity of the Carolingian empire on its northern frontiers was a consequence of the prosperity of the Arab world, even if only indirectly through the mediation of the Swedes in Russia. The evidence that he provides is chiefly numismatic, the extensive hoards of coins, mainly Arab, that have been unearthed by archaeologists in Scandinavia and Russia. In this sense he argues that Pirenne's proposition of no Charlemagne without Mohammed is true, but for exactly the opposite reason. Rather than impoverishing Western Europe by blockading the Mediterranean and making Charlemagne emerge as the ruler of an isolated rural economy with no towns or trade the Arabs enriched it through indirect trade links with the Swedes in Russia and made possible the resurgence of Western Europe in the Middle Ages. Whatever the final verdict of the evidence for this remarkable argument it should be noted that it is intuitively more plausible from a strictly economic point of view than Pirenne's presumption that the Arabs wanted and were able to establish and maintain an economic blockade over several centuries that would make both parties permanently worse off.

There can be little doubt about the prosperity of the Islamic world for at least its first five centuries. In space it extended from Spain and North Africa to Afghanistan and Central Asia, dominating the southern and eastern shores of the Mediterranean. While there was never a single political authority across this entire realm there was undoubtedly a cultural unity achieved by the religion of Islam and the Arabic language, though Greek and Persian were used for some time after the original conquests of the Byzantine and Sassanid Persian empires. Administrative and

cultural models from both of these sources, blended with Arabic traditions, formed the basis of a brilliant and flourishing civilization. The cultural unity meant that goods, people and ideas could move freely over the entire area. As Watson (1981) has established there was an Arab agricultural revolution during the years 700-1100 in which plants and crops from India and other eastern regions were introduced into Iraq, Syria, Egypt, Sicily, North Africa and Spain. Examples are rice, cotton, sugarcane, citrus fruits and coconut palms. New varieties of known plants were also developed in royal botanical gardens. Irrigation works were built and extended. The resulting higher agricultural productivity supported an extensive urban population in a string of major cities from Damascus and Baghdad to Cairo, Kairouan and Cordoba. Luxury manufactures of all kinds were produced in these cities such as silks, brocades, leather and metal products and many others. Non-Muslim peoples, including Jewish traders and craftsmen were free to pursue their livelihood and practice their religion on payment of taxes that were not onerously high. The Hellenistic learning was inherited from Byzantium with the original Greek works translated into Arabic and new discoveries made in mathematics, astronomy, medicine and other sciences.

It is clear that such a wealthy and brilliant civilization would have an extensive array of products to tempt the still relatively backward, mainly rural economy of Western Europe. The question is what could it offer in return. The answer from a variety of both western and Arabic sources is clear. Primary products such as furs from the northern forests were obtained through France. “Frankish” swords, much admired for the strength and resilience of their steel blades, were a major manufactured product. The main import however was slaves, male and female, mostly Slavs who were still heathen and thus regarded as fair game as opposed to fellow Christians. These slaves should not be regarded as purely intended for heavy manual labor as in the case of the African slave trade across the Atlantic in later centuries. These slaves were often trained and educated to perform services as entertainers, craftsmen and even as soldiers. The furs and slaves, it should be noted, were not products originating in Western Europe but rather in

northern and Eastern Europe, and thus had to be paid for either by precious metals or exports such as woolen cloth and wine. When re-exported to the Islamic world they balanced imports of precious metals, manufactured products such as luxury fabrics, and re-exports from further east such as spices. A prominent role in this trade was played by the so-called “Rhadanite” Jews whose exact origins has been a source of controversy for a long time. The trade with the north was mediated through the Frisians at the estuary of the Rhine, principally through the port of Dorestad (near Utrecht) and another site known as Quentovic. Verdun was the main center for processing and channeling the trade in slaves to the Muslim world.

In contrast to Pirenne, Bolin thus claims that the late Merovingian and early Carolingian period in western Europe was one of concurrent prosperity with northern and eastern Europe on the one hand, the source of furs and slaves, and the Islamic world on the other, the source of luxury consumer goods and spices from the Far East. The west thus played the role of *entrepot* or middleman between the two regions up to the early ninth century. From then on, however, the Swedes increasingly go to the source of the furs and slaves in the northern lands, moving them down the Russian rivers to exchange for oriental products and an abundance of silver coins from the Caliphate and other Muslim dynasties such as the Samanids of Bukhara. The metal for the prolific silver coinage came from two great mines, one in the vicinity of Tashkent and the other in the Hindu Kush in Afghanistan. Various nomadic tribes such as the Khazars and the Volga Bulgars were also intermediaries between the Swedish “Varangians” on the one hand and Byzantium and the Islamic world on the other. The silver coins they obtained were retained as jewelry and in hoards, as well as exchanged with Western Europe for weapons, woolen cloth and wine. The Islamic silver coins the Franks obtained were melted and re-minted under their own seals by the Carolingian rulers, according to Bolin, which explains why finds of the original coins are plentiful in Scandinavia but rare in western Europe.

Bolin compares this influx of silver from the Islamic world in the ninth cetury to the much better known influx from the New World beginning in the sixteenth century. He even compares the Varangians to the conquistadors. As in the latter instance, the impact on the Carolingian economy was apparently a predictable inflation, indicated by the setting of price controls for grain and even for luxury items such as certain types of furs. The weight of the silver coins was also adjusted in line with the depreciation of silver relative to gold.

Bolin's bold and arresting hypothesis of the transmission of Islamic silver to the Carolingian empire through the medium of the Vikings was skeptically examined by the distinguished numismatist Karl Morrison (1963). He finds strong evidence of a plentiful circulation of Carolingian coins within the realm but no evidence of Islamic imports. Bolin, of course, argued that the Islamic coins would have been melted and re-minted before entering circulation in the west, but Morrison questions whether such a policy, even if it existed, could have been so uniformly implemented as to leave only negligible traces of the originals.

The Bolin hypothesis was enthusiastically embraced in an interesting study by the archaeologists Richard Hodges and David Whitehouse (1983). They stressed the role of the Frisians as intermediaries through whom the silver obtained by the Vikings from the east reached the Carolingians. The key site was the trading emporium of Haithabu (Hedeby) at the western end of the Baltic established by a Danish chieftain to exploit these opportunities. Here, and at other sites in the Baltic area such as Birka in Sweden, western products like wine, pottery and weapons were exchanged for furs, amber and silver. There was even a mint where the conversion could have taken place. The site was captured from the Danes by Charlemagne in the early ninth century. He took with him on this campaign an elephant that had been presented to him by an embassy from the Abbasid Caliph Haroun-al-Rashid, of Arabian Nights fame. The elephant itself could serve as an emblem of the "globalization" of the ninth century since it was sent to Baghdad by an Indian maharaja before it's journey west to Charlemagne where it died on the shores of the

North Sea during the campaign against the Frisians. Charlemagne even undertook an assault on Barcelona against the Ummayad rivals of the Abbasid Caliph, to whom he sent three embassies, receiving two in return.

To conclude this section we could say that while it is undoubtedly an exaggeration to say that "Charlemagne would be inconceivable without Mohammed" the connections between them, mediated by the possibly mythical Ruric, are nevertheless of considerable interest to students of globalization and its origins.

3. Emergence of the European Economy

There is little doubt that Western Europe in the year 1000 was substantially backward relative to the Byzantine Empire, the Islamic world and China. There were no cities that could remotely approach such behemoths as Constantinople, with a population of 800,000 at its peak, the Abbasid capital of Baghdad, with a population of about half a million and the Sung capital of Kaifeng, even larger at about three-quarters of a million. The foreign and internal trade of these non-European empires was also much greater and more diverse than that of Europe. The ninth century also saw Europe disrupted by the raids of the Vikings in the north, the Muslims in the south and the Hungarians in the east. The empire of Charlemagne was broken up in the bitter civil wars that broke out between his successors.

Despite all these difficulties, however, there were strong underlying upward trends that eventually began to manifest themselves. The most important was agricultural productivity. Important innovations such as the heavy plough, the horse-collar and the three-field rotation system, combined with the widespread availability of land relative to the population, generated a high and rising level of output that sustained a substantial rise in population from the ninth to the thirteenth century. Regional specialization led to a growth of internal trade, especially through the systems of fairs. Monasteries also made important economic contributions through the organization of their own productive activities and the movement of pilgrims, Cathedrals and

castle building stimulated the construction industry. Wool from sheep reared in Spain and England was woven into cloth in Flanders and finished and dyed in Italy. Population figures based on Russell (1972, Table 1) show the population of Italy doubling from 5 to 10 million, Britain going from 2 to 5 million and France and the Netherlands more than tripling from 6 to 19 million over the period from 1000 to 1340, while Germany – Scandinavia almost tripled from 4 to 11.5 million.

The most remarkable aspect of the general European expansion in this period was the rise of the trading cities of Italy, particularly Venice and its great rival Genoa. They represented a quite unique phenomenon in world history. The city-state itself, of course, goes back to the beginnings of civilization in Mesopotamia and was the basic form of social and political organization in classical Greece. What then was special about Venice and Genoa?

One essential feature was their political *autonomy*. Unlike Basra or Canton they were not contained within large territorial states but were sovereign entities. Unlike Athens and Sparta, which of course were sovereign, they were *trading* cities, living by long-distance trade. The classical Greek city-states were all based on ownership and exploitation of the surrounding land. Trade was left to resident aliens, the *metics*, who were completely excluded from political activity. Thus it was only in the *maritime* Italian city-states that mercantile or "capitalist" interests were not just one element or faction in a polity that had to compete with other powerful groups for recognition. They simply *were* the state, and state policy was tantamount to maximizing the long-run advantage of the commercial interests. Of course differences were bound to develop within the general mercantile community between individual sectors, and so state policy had to strike a balance between them. But overall, economic objectives predominated, to an extent unmatched in history, except perhaps by the Dutch Republic after it won independence from the Hapsburgs.

Before launching on its spectacular career as “Queen of the Adriatic”, Venice was a community of boatmen confined to the lagoons at the mouth of the River Po. The people made a modest living by fishing and making salt from the sea, which they traded up-river for grain and other products. They were under the administration of a Byzantine duke or “doge”, supplemented by a few tribunes. Their advantageous location at the head of the gulf, close to the Alpine passes, was beneficial for trade in timber and there also grew up a flourishing traffic in Slav captives from the Balkans. Both slaves and lumber found ready markets in the Islamic world as well as Italy. Politically, Venice became independent of the Byzantine Empire but served as a loyal ally in the conflicts of the empire with the aggressive Normans of southern Italy. The reward for Venice was trading privileges and customs tariff reductions within the lands of the eastern empire. These formed the basis of profitable re-export trade to the hinterland of Italy, and also brought German merchants to Venice where they were housed in the famous Fondaco dei Tedeschi. They exchanged metal products and silver for eastern wares that they took north.

Venice’s location would have meant little if other ports on either coast of the Adriatic were allowed to compete on equal terms. In order to be able to extract the maximum rents on the east-west and north-south flows of trade, Venice had to have command of the Adriatic, so that all the trade could be channeled through her. In other words, an effective monopoly over exports and imports could only be maintained by naval power. From the eleventh century to the sixteenth, Venice became and remained a major naval power in the Mediterranean. Most of her merchant vessels were armed, and substantial fleets of warships were always maintained for combat and convoy duties by the famous Arsenal.

The launching of the Crusades created vast new opportunities for Venice as well as other maritime city-states in Italy, particularly Genoa and Pisa. While the troops themselves were mostly northern knights and men-at-arms, the Italians provided indispensable transport services,

finance and military assistance in the form of siege-engines and other instruments of war. In return they were granted substantial territories and rights in “Outremer” or “Beyond-the-Sea” as the Crusaders called the eastern lands that they were allegedly liberating from the infidel. The shrewd Venetians declined substantial territorial possessions on the mainland, preferring to take their reward in strategically located islands and other points where they could control and defend the trade routes. They also had no compunction about raiding Byzantine territory if they felt dissatisfied with whatever commercial privileges they were granted. They also fought regularly with their commercial rivals, the Pisans and Genoese.

The Venetian plunder of the Byzantine Empire culminated in the infamous Fourth Crusade of 1204. Instead of attacking the Muslims, the Venetians and their northern allies found it more profitable to sack Constantinople itself and to install a so-called Latin emperor. Venice’s share of the loot was three-eighths of the land and treasure of the Byzantine Empire. Once again she chose well, taking the island of Crete and the famous bronze horses that still adorn the cathedral of San Marco. She was also now able to enter the Black Sea and take advantage of the profitable trade in grain, furs, fish and yet more slaves.

Despite all the warfare of this turbulent period, it is interesting to note that commercial relations continued, with only momentary interruptions due to papal injunctions or political instability. In addition to importing silk and other luxury products from Constantinople for resale to the West, the Venetians obtained Eastern spices, medicines and perfumes through the familiar channel of the Red Sea. Since most of the Indian Ocean merchants were Muslims, they frequently unloaded their goods at Jiddah, the port serving the holy cities of Mecca and Medina. From there caravans took the goods to Damascus and acre, the port held by the Crusaders. In return for these goods the Venetians sold the traditional wood, metal and slaves but also an important new product, the woolen cloth of Flanders and other European manufacturing towns.

Some trade also took place at Alexandria, of eastern goods that were shipped through Egypt from ports on the western coast of the Red Sea.

Genoa, at the western corner of the Italian peninsular, had a somewhat symmetric location to Venice, with the western instead of the eastern Mediterranean as her natural outlet. She took an active part in the Christian resurgence of the eleventh century, raiding the North African coast and engaging the Muslims at sea. This militant tradition also led her, together with Pisa, to participate more energetically than Venice in the First Crusade. The triumph of Venice in 1204 cut her out of the eastern Mediterranean but Genoa made a strong comeback in 1261, when the Byzantines recaptured Constantinople with substantial naval assistance from Genoa. As a reward, she obtained access to the Black Sea and key strategic colonies at Pera, opposite Constantinople itself, and the island of Chios. In the Black Sea she established outposts at Caffa and at Tana on the Sea of Azov. This opened up lucrative trade in grain, fur and slaves with Southern Russia and also enabled her to take advantage of the overland trade with China. New export items from the Byzantine and Syrian territories were cotton, alum, an important input for woolen manufacture, and mastic from Chios, used in preserving paint and cosmetics. Venice continued to compete with Genoa in the Black Sea area. It was during this period that the Venetian Marco Polo made his famous journey overland to China. While the Genoese were in favor with the Byzantines at Constantinople, the Venetians became the closest trade partners of the Mamluk sultans of Egypt, who had checked the westward advance of the Mongols in 1260 at the Battle of Ain Jalut, near Nazareth in Palestine. The Mamluks, slave soldiers of mostly Turkish and Slav origin, relied on the Venetians and Genoese to provide them with a steady supply of potential new recruits in the form of young captives from the Black Sea region, in exchange for spices from the Red Sea trade, over which Venice was controlling the lion’s share of re-exports to the West.

Both Venice and Genoa were involved in a major revolution in nautical technology during this era. Ships become substantially larger and more maneuverable because of the adoption of the sternpost rudder. More importantly, the adoption of the mariner's compass made possible sailing by "dead reckoning", without the necessity of having to observe the stars in order to steer. As Frederick C. Lane (1963) pointed out in a brilliant article on "The Economic Meaning of the Invention of the Compass", this made it possible to sail in winter, during which time ships had been idle because clouds and fog obscured the stars and coastal landmarks. With two voyages a year instead of one, shipping tonnage was effectively doubled.

The Genoese in this period were at the peak of their maritime and commercial activities. In addition to their exploits in the Black Sea to the east, they continued their earlier combination of raiding and trading with the North African cities. They were eager purchasers of the gold that continued to enter the Mediterranean from the Saharan caravans, and they even ventured deep into the interior, to the oasis city of Sijilmasa, in the attempt to get closer to the source. They also explored the Canaries and other Atlantic islands, and pioneered the sea routes from the Mediterranean to England and Flanders. Their ships took raw materials such as alum and cotton, as well as spices and other luxury products from the east, to the ports of the English channel and the North Sea, bringing back wool and woolen cloth for Italy as well as re-export to the east. The Venetians, not to be outdone, followed suit.

Thus the period from 1260 to 1350 saw the emergence of a genuine "world-economy", as Janet Abu-Lughod (1989) has emphasized. The links of trade and exchange extended from the British Isles to China, Indonesia and Africa south of the Sahara. The Italian cities were at the center of this system and Italy was, with Flanders, the most highly developed part of Europe at this time. Venice, Florence, Milan and Naples, with populations of over 100,000, were the largest cities in Europe. This is why the testimony of Marco Polo, on the wealth and magnificence of China, was so significant as an indication of the primacy of the east in his time.

The economic progress made by Western Europe as a whole during this period was effectively symbolized by the return to gold coinage after a lapse of centuries since the fall of the Roman Empire. In 1253 both Genoa and Florence introduced gold coins, followed by the Venetian ducat in 1284.

4. The Pax Mongolica and the Unification of the Eurasian Continent

The Mongols are still perhaps best remembered for their ferocity. There is no doubt that they did much to deserve this, from one end of the then known world to the other. A strong case can be made, however, that the long run consequences of their conquests were favorable to the progress of the world. How can such an apparently paradoxical conclusion be reached?

The basic argument is that the extent of their conquests across the Eurasian land mass created for the first and indeed only time in history, a single regime presiding over the entire length of the overland trade routes linking China and the Near East. This made it possible for merchants and goods to move safely over these vast distances, facilitating the transmission of ideas and techniques. Since China was substantially ahead of both Islam and the West in the general level of its technology this flow chiefly benefited the lands at the western ends of the trade routes and beyond.

Joseph Needham (1954:140), the great historian of Chinese science and its influence on the west, states that:

> "China under the Yuan (the Mongol dynasty) became better known to Europe than at any previous or subsequent time until the twentieth century. This was because the region under Mongol control extended for the full breadth of the heartland; it was the first and last time in history that the whole area north of the Himalayas from Shanhaikuan to Budapest and from Canton to Basra was under one political authority. The roads across Central Asia were busier and safer than ever before or since."

Their own mobility and lack of commitment to any particular location or mode of production made them highly “rational” or “universalistic” in their attitudes toward economic activities. They were willing to use the talents of any foreigner who was best for the job. Thus we have instances of their using Arab and Persian generals and administrators in China, and Chinese siege engineers in their assaults on Baghdad and other Muslim cities. They were also highly tolerant in matters of religion and were natural supporters of “free trade”, benefiting from the free flow of goods and factors across their domains, since this enhanced the wealth that they could extract for themselves as the privileged caste of their empire. In this they resembled their predecessors the Romans and their successors the British.

The slaughter and destruction they unleashed in China and particularly on Baghdad when they overthrew the Abbasid Caliphate in 1258 made it plausible to consider them as the exogenous force that terminated the spectacular expansion of the Sung Dynasty in China and the golden age of Islam, leaving the field open for the Western Europeans, who got off lightly, to eventually overtake these initially much more advanced civilizations. The balance of current expert opinion, however, does not support this view. Bernard Lewis (1993, ch.15) points out that the Abbasid Caliphate had long been in decline before the Mongols killed the last Caliph of Baghdad. Classical Islam was not able to work out a stable political succession and power passed to mercenary and slave soldiers with the Caliphs themselves as figureheads. The Seljuk Turks, in the eleventh century, were effective rulers in Iraq and Syria. Economic difficulties also preceded the impact of the Mongols, which was particularly devastating in Iran and Iraq. The center of gravity of the Islamic world passed to the Egypt of the Mamluks. This gave Cairo and Alexandria the benefit of the lucrative Indian Ocean spice trade. On the question of the Sung, the historian Ray Huang (1990) is skeptical of claims that they had launched a true “renaissance” or “revolution” comparable to what was achieved later in the West. He says (1990:133): “In the experience of Europe, such a breakthrough came at a moment when the influence of commerce

outweighed that of agricultural production by some margin. China in the early modern era did not come close to this jumping-off point. Commerce, even though large in volume by world standards, was spread thin over the mass of peasants". The Ming who ruled China from 1368 to 1644 as a purely native Chinese dynasty, were unable to achieve this breakthrough almost three hundred years after the Mongols.

The volume of trade across the overland routes does not appear to have been great, despite the greater safety. Probably it could not compete in terms of cost with the overseas route. Nevertheless there was considerable exchange of ideas due to the visits of papal envoys to he courts of the Khans, as well as the travels of merchants such as the Polos. The fact that technological change in Europe accelerated so rapidly during this period is ascribed by Sinologists such as Needham, but not only by him, to the transfer of ideas and techniques westward from China. The evidence, perhaps inevitably, is of a "circumstantial" nature. Thus we know that the Chinese had already invented movable type, gunpowder, the mariner's compass and so on before the West. Now that a *possible* channel of communication had been opened, and the innovations appear in the West with a substantial lag, Chinese influence is certainly possible and plausible. Direct evidence, however, is mostly lacking. Despite the authority of Needham's awesome erudition it is possible to make a case for independent discovery by Europe. As Hudson (1961:168) argues, however, the burden of proof should be on those who claim independence, not on those like Needham who assert Chinese influence.

The other side of the coin of the Mongols' flexibility and pragmatic readiness to use whatever people or methods was best was that they tended to be absorbed by the more advanced civilizations that they conquered. Unlike the Arabs, whose own language and religion were generally taken over by their subjects, the reverse was the case with the Mongols, despite their attempts to maintain themselves as an aloof ruling class. The societies they ruled and parasitically exploited were deprived of any internal dynamic and thus the burden of their exploitive policies

eventually proved insupportable. It was Western Europe that received, as an “externality”, the benefit of trade and the transfer of Chinese technology from the Pax Mongolica, without having at the same time to endure the burden of the “Tartar Yoke”, which allegedly pressed so heavily on the Chinese, the Iranians and the Arabs, as well as on the Russians under the Golden Horde.

When did “globalization” begin? This is a familiar question that is being debated extensively today. A strong case be made that it began with the unification of the central Eurasian landmass by the Mongol conquests and the reactions this aroused in the sedentary civilizations that they were launched against. Each civilization previously had been aware of the others but only as isolated entities, not interactive components of a unified system. In Europe even the legends of “Prester John”, the mythical Christian hero in the east who was so wrongly identified with Genghis Khan and other non-Muslim nomad conquerors, served to provide a unified geopolitical framework, with the thought of taking Islam in the rear and so arousing the desire to establish contact, by sea or land, with thase realms beyond Islam for religious, military and commercial purposes. Frustrated by their Venetian rivals on land the Genoese thought about an end run around Africa in the late thirteenth century, leading to the lost voyage of the Vivaldi brothers in1291. Another Genoese succeeded in spite of himself two centuries later. As the Central Asian historian Adshead (1993:77) puts it “If Europe came to dominate the world, it was possibly because Europe first perceived there was a world to dominate. There is a straight line from Marco Polo to Chritopher Columbus, the eastward-looking Venetian to the westward-looking Genoese”.

5. From the Black Death to the Bullion Famine of the Fifteenth Century

The integration promoted by the Pax Mongolica also had the unfortunate consequence of promoting what Le Roy Ladurie (1984,chapter 2) called “the unification of the globe by disease” or the formation of a “microbian common market”. There was not only the conceptual unification of the world along with the economic, as pointed out in the previous section, but also a biological

unification. Bacteria and viruses, long localized to particular regions, were transferred and mingled by the movement of humans and animals over long distances, as for instance occurred with the operations of the Mongol cavalry. According to McNeill (1977) the plague germs were transmitted from the Burma-Yunnan border by Mongol troops to Central Asia and eventually to the Genoese trading station of Caffa on the Black Sea in 1347. It is alleged that the Khan of the Golden Horde ordered infected corpses to be catapulted into the station during the siege that he laid to it in that year. From Caffa the plague was transmitted by a Genoese vessel to Messina in Sicily from where it rapidly spread to ports around the Mediterranean and eventually all across Europe. The death rate was close to a third. Cipolla (1994:131) states that it killed about 25 million out of a population of 80 million in Europe as a whole during the period 1348-1351. It recurred in waves of mostly diminishing intensity until the end of the sixteenth century. It was undoubtedly the greatest catastrophe to strike the western world in the second millennium, not even excluding the two world wars of the twentieth century.

As might be expected from a shock of such magnitude the consequences were complex and far-reaching. Before attempting to look at the facts it is would be illuminating to first derive the implications of an economic model to provide some insight into the patterns of response that we should expect. First let us consider a one-sector model in which output is a decreasing function of labor, with fixed inputs of land and capital. Labor is proportional to population, which in Malthusian fashion has fertility as an increasing function of per capita income and mortality as a decreasing function. This determines a critical level of per capita income at which population would be constant. This enables us to deduce from the production function the size of population and labor force that can be supported by the given state of technology and the fixed inputs of land and capital and hence the level of output. The marginal products of all three inputs being determined we could also obtain the distribution of income to the extent that we believe it to be based on competitive market principles. Suppose now that population and labor now decline

instantaneously by a third as a result of the Black Death. Output will fall by less than a third, because of diminishing returns, and so per capita income and the marginal product of labor will rise, while the marginal products of land and capital will fall. Real wages would rise and the position of serfs would improve to the extent that they have any bargaining power at all, while rents would decline and feudal lords would be worse off. The initial rise in per capita incomes would increase fertility and reduce mortality so that population will begin to recover. With technology, land and capital unchanged the economy will eventually return to the original state, with population and all other variables unchanged.

Thus even this simplest of all possible models provides us with some very strong implications that we can confront with the historical evidence. Before that, however, we consider a second model with more structure that will enable us to consider the implications of the Black Death for the relative prices of different classes of commodities. This model has land and labor as inputs and two outputs X and Y, with the land-labor ratio used in production being higher in X than in Y. We can therefore identify X as the land-intensive and Y as the labor-intensive good. Let us also suppose that the labor-intensive good Y is a 'luxury' good with an income-elasticity of demand greater than unity, while the land-intensive good X is a 'necessity', with an income-elasticity of demand less than unity. What happens when the Black Death occurs? By the well-known Rybczynski theorem the output of X will rise and of Y will fall at constant relative product prices. The rise in per capita incomes associated with the higher land-labor ratio for the economy as a whole and the demand hypothesis for the two goods implies that there will be an excess demand for Y and an excess supply of X if relative prices are held constant. Market clearing requires the price of the labor-intensive good Y to rise relative to that of the land-intensive good X. By the Stolper-Samuelson theorem this change in relative product prices will lead to a rise in the real wage of labor and a fall in the rent per unit of land. Thus the implications of the two-sector model for wages and rents are the same as for the one-sector model but we get

in addition the prediction that relative prices will shift in favor of labor-intensive and against land-intensive goods. If we make the same Malthusian assumptions as before population and hence labor and all other variables will eventually return to their original levels before the occurrence of the Black Death.

Finally we turn to the third and most ambitious model, one that will enable us to trace what will turn out to be the momentous *monetary* consequences of the Black Death. The full details of the analysis are presented in Findlay and Lundahl (2002). What follows is only a brief sketch intended to give the flavor of the method and the results. The production structure corresponds to the Viner-Ricardo model, with one sector, "Goods", in which the specific input is capital and the other "Silver", with a specific input of "land" or "mines". Labor is a common input for the two production sectors, and its supply is endogenous in the same Malthusian fashion as in the two previous models. Capital, of the same stuff as the output of the "Goods" sector, is an accumulated stock that can be augmented or reduced over time. The main extension is to introduce the demand and supply for an endogenous stock of commodity money, which can be thought of as an amount of pure silver coins. The demand for this money is purely for transactions purposes, with a constant desired ratio between the money stock and the flow of national income, as in the Fisher Equation of Exchange MV=PQ. In the model V is a constant while M, P and Q are all endogenously determined. M is the stock of money, instantaneously equalized to the demand by the movement of P, the price-level of goods in terms of silver, while Q is real national income in terms of goods. The stock of silver coins, M, depreciates at a constant rate due to "wear and tear". Consumers spend their income on domestic goods or imported "Eastern luxuries", which they have to purchase at a fixed relative price in terms of silver. To close the model it is assumed that there is a long-run ratio of capital to money that the agents wish to hold as a function of the real rate of interest, equal to the marginal product of capital in the goods sector.

We begin with the model in long-run stationary equilibrium. The real wage w* is determined at the level necessary to maintain the Malthusian equilibrium, which also determines the marginal product of capital and therefore the real rate of interest r* from the production function in the goods sector. This pins down the desired long-run ratio of capital stock to money supply. The price-level P* equates the demand for money to the endogenously determined supply M*. The supply of labor L* and capital stock K*, together with the fixed supply of silver deposits defines a production-possibilities frontier between the flow supplies of goods and silver, with the marginal rate of transformation between them equal to P* as necessary for perfectly competitive equilibrium. This determines the equilibrium flow supplies of goods G* and silver S*. For long-run equilibrium the flow demand for silver, which is the sum of the amount necessary to offset 'depreciation' and to pay for the desired amount of Eastern luxuries, determined by real national income Q* and their relative price in terms of goods, which is a constant times P*, must be equal to the flow supply S*. Real national income Q* is equal to G* plus 1/P*S*.The budget constraint and flow equilibrium in the silver market imply flow equilibrium in the goods market, by Walras' Law. This describes the full long-run stationary equilibrium of the system.

The immediate impact of the Black Death is to reduce real national income and hence the demand for money. Since M and V in the Fisher Equation are unchanged the drop in Q must lead to a rise in P, an inflationary spike. The reduction of the labor force shifts both flow supply curves to the left, while the relative price of silver in terms of goods l/P falls. Thus the flow supply of silver must definitely fall. Since per capita income and wealth of the surviving population have increased the demand for "Eastern luxuries" increases because their relative price in terms of goods also falls. The "depreciation" of the money stock remains unchanged and so there is a net excess flow demand for silver which cannot be cleared by a movement in P since P is determined already in the money market. The excess flow demand for silver must therefore result in a decline in M*, the initial stock of silver coins. The real wage rises above w* because of

the decline in the labor force so population starts to increase after the initial drop. National income and the demand for money also begin to rise as a result. With Q now increasing and M falling P must now also start falling from the level to which it rose at the initial inflationary spike, which will therefore be followed by a long *deflationary* spiral as M shrinks because of the drain to the east for luxuries and Q rises because of the recovery in population and the labor force.

The relative price of silver l/P is rising steadily during this deflationary process and the increase in the labor force is pushing the flow supply curve of labor to the right, while "depreciation" of the money stock is falling in proportion to M and the relative price of Eastern luxuries in terms of goods is rising. The excess flow demand for silver therefore narrows until it is reduced to zero and then becomes positive, so that M begins to rise back towards M*. The price-level P, which jumped instantaneously upward at the impact of the Black Death, falls thereafter until it reaches P* again when M and Q have both fallen in the same proportion, as implied by the Fisher Equation. Thereafter, with M continuing to fall or rising more slowly than Q, the price-level falls below P*, but then rises back again towards P* as M and Q both approach their initial stationary levels M* and Q* from below as population, the labor force and the real wage also reach their Malthusian equilibrium levels. The key monetary consequences of the Black Death is therefore an initial inflationary spike in the price-level, followed by a long deflationary contraction that takes it below P* after which its movement is reversed with an inflationary approach back toward P* from below. Eventually the system returns back to exactly the same stationary state as before the onset of the Black Death, assuming no change in the underlying exogenous circumstances such as technology, the stock of silver deposits and behavioral parameters. It should be noted that the model simultaneously endogenizes both population and money, thus resolving a long-standing debate among economic historians between 'Malthusians' and 'Monetarists' over which is the causal factor in the study of long-term movements.

We now turn to a brief examination of the historical evidence in relation to the implications derived from our models. Restrictions of space make it necessary to refer readers to Findlay and Lundahl (2002) for details and sources. On real wages the evidence is scattered but indicates a substantial increase wherever it exists. In England real wages rise by 75% between 1300 and 1450, when it attains a peak not to be reached until centuries later. Data on real wages in the construction industry in Florence show that they rose by 50% between 1360 and 1420 after which they fell slowly back to pre-plague levels by 1600. Population and real wages move inversely to each other, with both taking several centuries to arrive back to the vicinity of their pre-plague magnitudes. This aspect of the models is thus strongly borne out.

There is also strong evidence that labor (and skill) – intensive goods rose sharply in price relative to land-intensive goods. Wool, wheat, wine, beer and other products with resource-intensive inputs fell relatively, while luxury manufactures of all kinds and luxury resource products such as northern furs all rose, Italy, with a strong comparative advantage in luxury products, enjoyed great prosperity during this period, providing the economic base for the cultural efflorescence of the Renaissance. Medieval economic historians engaged in a long debate about whether this era was one of depression or expansion. The resolution of the debate would seem to turn simply on whether one looks at totals or per capita figures, with the latter clearly being the more appropriate. As Bridbury (1962:91) put it, with a dash of dark humor, the Black Death amounted to “a sort of Marshall Plan on a stupendous scale”, for those who were fortunate enough to survive and their successors for at least a few generations.

The prediction of the monetary consequences of the Black Death is also remarkably in conformity with the facts. In a famous article the monetary historian John Day (1978) documents “The Great Bullion Famine of the Fifteenth Century” without any link to the preceding Black Death of the fourteenth century. The analysis above, however, demonstrates the bullion shortage as a direct *consequence* of the Black Death in an entirely unexpected way. The collapse and then

recovery of silver mining in the European economy is documented by the work of the leading authority on this subject John U.Nef (1987). He first notes (1987:721) that after the Black Death there was a “long slump lasting for several generations” then followed by (1987:735) “a boom in mining and metallurgy” from 1460 to 1530, with silver production rising more than fivefold during the decade from 1526-35. The stock of silver in circulation starts to rise again after about 1460. The drain of silver to the east, both through the Baltic for northern products such as furs, amber and wax, and through Venice and Genoa for spices and other oriental products follows the pattern of the “Eastern Luxuries” in the model. Day (1978) and Fischer (1996) present scattered data on secular price-level changes conforming to the pattern predicted by the model.

As noted above the system eventually returns to its initial position if all behavioral parameters remain unchanged. In other words there is no ‘hysteresis’. The late Harvard medievalist David Herlihy (1997) argued persuasively, however, that the Black Death was such a profound shock that it permanently altered behavioral patterns, social values and institutions in a direction conducive to material prosperity and economic growth, since people wished to maintain the windfall increases in their well-being that the demographic catastrophe inadvertently bestowed upon them. Thus, in his view, the system never returned to the pre-plague equilibrium but instead the Black Death resulted in nothing less than the “Transformation of the West’.

6. The Overseas Extension of the European Frontier

The idea of the “frontier” as an organizing concept for historical interpretation was introduced by the American historian Frederick Jackson Turner in his famous work on the westward extension of settlement in the United States. It has been fruitfully applied to other times and societies. The eminent historian of medieval Europe A. R. Lewis (1958:475) stated that “—few periods can be better understood in the light of a frontier concept than Western Europe between 800 and 1500”. In its “external” aspect the European frontier in this period was exemplified by the *Drang nach Osten* of the Germans to the east of the Elle at the expense of the native Slavs and Balts; the

Norman invasion of Britain and Ireland and, perhaps above all, the long struggle between the Iberian Christian kingdoms and the Muslim realms of Andalusia ending in the *Reconquista.* The "internal" frontier was the reclamation of arable land by the clearing of forests and the draining of swamps and fens that raised agricultural productivity to such high levels. The extension of the plough, supported by and in turn supporting the "stirrup" in Lynn White's formulation, not only reclaimed land but also pacified and civilized the pagan peoples at the margins of European society. Accompanying the warrior and the peasant was the priest and the townsman, adding learning and trade to the emerging social fabric.

Lewis sees the period from 100 to 1250 as an expansive one in which both "internal" and "external" frontiers were successfully extended. The 1250-1350 period, however, he regards as being marked by "the closing of the medieval frontier" in which this process apparently reach its economic and geographical limits. The early fourteenth century saw the outbreak of devastating famines and there were other signs of diminishing returns and Malthusian pressure on the land. The Black Death therefore struck a society stasis, much as we have modeled it in the previous section. Removing a third of the population at a stroke was a catastrophe, of course, but as we have seen it created the "space" for a long boom in production and trade as population recovered, even though it was accompanied by deflation of the price-level in terms of silver. By the middle of the fourteenth century, however, the frontier resource limits began to be approached again.

As Herlihy argued in his stimulating little book values and institutions were fundamentally altered by the experience of the "windfall" gains associated with the aftermath of the Black Death. With the limits of Europe itself becoming binding once again an increasingly restless and acquisitive people looked further afield. With the eastern frontiers blocked by the powerful Ottoman Empire the brighter horizon was in the west, into and eventually across the Atlantic.

Not surprisingly it was Spain and Portugal that led Europe on the way to this "New" or "Great Frontier". It was they that had fought and eventually expelled the Muslims from the Iberian peninsula and the islands of the Western Mediterranean, and harried their North African bases. It was they who colonized the Canaries and the Azores. And it was there that Genoese merchants and sailors went in search of profit and employment, bringing their old ambition of outflanking the Venetians and the Mamliks in their stronghold on the lucrative spice trade. The *conquistadores,* impoverished adventurers from Estremadura, sought fame and fortune in the Indies in much the same way as their ancestors had against the infidel, with titles and land grants as the reward for military success.

The frontier thesis that Turner applied to the nineteenth century United States was adopted and extended sweepingly to the entire western world for the period beginning in 1492 by the Texas historian Walter Prescott Webb (1952). As Webb put it, Europe in 1500 had a population of 100 million and an area of about 3.75 million square miles. To this was now added at a stroke another 20 million square miles of potentially enormously productive land and natural resources of all kinds, a fivefold increase in per capita terms. Exploiting this potential would keep European busy for centuries to come, providing them with limitless opportunities for wealth and power. Even more important than the wealth itself was the associated mobility, both geographic and social, and its effect on altering traditional barriers and rigidities.

It is important to realize that the "discovery" of America did not immediately put Europe ahead of the Islamic world or China. The former was still immensely powerful on land, with the three great "gunpowder empires" of the Ottomans, Safavids and the Mughals. The Ming Dynasty in China launched its great fleets of ocean-going junks into the Indian Ocean under the admiral Zheng He as far as the Red Sea and the Persian Gulf, well before da Gama and Columbus sailed, and China clearly had the technological capacity to engage in overseas commerce and colonization. The *incentive,* however, was missing. The court faction that launched the voyage

lost out to the traditional emphasis on defending the borders against invasion by the steppe nomads. Thus all the great non-European empires were engaged in the essentially zero-sum game of pushing and preserving their land frontiers against each other and remaining "barbarian" enemies. Only Europe had opened up for itself a "New World" of unbridled opportunity.

Economic relations between "Europe" and "America" in this formative period of an emerging "Atlantic Economy" are analyzed in the "Christopher Columbus" model of Findlay (1993). The key feature of this model is an endogenous land frontier, the extent of which is determined by the rate of return linking the yield of a marginal acre brought into production with the rising marginal cost of reclaiming this additional acre from the wilderness. Europe provides the capital and the labor supply for the general equilibrium model, which endogenously determines the extent of the frontier and hence the productive land area of America, along with the allocation of the labor force between the two continents. Extensions of the model could readily incorporate indigenous American labor as well as imported African slaves as in the "triangular trade" between the three continents. With the high cost of transport across the Atlantic the first phase of the economic exploitation of the New World is dominated by silver mining using native labor, with the output loaded on to the galleons bringing the silver back to Seville or across the Pacific to Manila.

7. From the Price Revolution to the Seventeenth Century Crisis

The initial impact that the New World made on the Old was the remarkable surge of silver imports from the great mines of Potosi and Zacatecas. The rise in prices that contemporaries observed in sixteenth century Spain and Europe generally was ascribed to the silver influx, in early statements of the Quantity Theory of Money by Spaanish writers of the school of Salamanca and by Jean Bodin. The most systematic and controversial statement of the relationship was by the Chicago economic historian Earl J. Hamilton (1934). The literature since then has grown to enormous proportions but the controversy has continued more or less unabated

to the present day. Historians critical of the Quantity Theory approach have tended to associate the inflation with population pressure, to the exasperation and scorn of economists. Thus we have another example of the "Monetarists vs. Malthusians" debate that we noted in the earlier section on the monetary consequences of the Black Death. Again we attempt to resolve the issue through the application of the Findlay-Lundahl model in which both population and the supply of commodity money are endogenous variables. The reader may also be referred for other interesting treatments of this subject to Jurg Niehans (1993) and Dennis Flynn (1996).

We begin once again from a position of long-run stationary equilibrium. The silver mines of the New World will simply be added to the existing deposits in Europe, so that there is an exogenous upward shift in specific input to the silver-producing sector of the European economy. For present purposes the native labor force in the Americas can be ignored so that population and capital stock are initially constant. The increase in silver-mines shifts out the production-possibility frontiers, thus raising real income Q. With the money supply M initially given and V a constant P must fall. Thus the initial impact of New World silver is a *deflationary* spike, raising the relative price of silver in terms of "goods". The flow supply curve of silver shifts to the right and this combined with the rise in l/P means an increase in the flow output of silver. Despite an increase in the demand for "Eastern luxuries" there will be a net excess flow of silver so that M will increase. The influx of American silver into Europe therefore begins. The rise in silver output pulls labor out of the goods sector, raising the real wage and therefore stimulating the growth of population and the labor force, further raising real income.

Thus, after the initial deflationary spike, the increase in M will run ahead of increases in Q due to the expanding labor force, leading to a sustained rise in P, the price-level of goods in terms of silver. It is this increase in the European price-level during the sixteenth century that has been dubbed the "Price Revolution".

As we saw in the case of the deflation of the fifteenth century, however, each initial long swing in the price-level sets in motion a process of reversal. In this case the falling price of silver in terms of goods, l/P, both reduces the flow supply and increases the flow demand for Eastern luxuries, while the “depreciation” requirement for increasing M also increases the flow demand for silver. Eventually the excess flow supply of silver must turn into an excess flow demand, so that M will contract and P will start to fall. Inflation will therefore be followed by deflation.

The final long-run stationary equilibrium at which the system settles down will be one in which the real wage w* and price-level P* will be unchanged but M*, Q*, L* and K* will all increase in the same proportion as the stock of silver deposits. This is because of the constant returns to scale assumption about the production functions for the two sectors. The silver deposits are the only exogenous variable in this system and so any increase in this productive input will increase K*, L* and hence Q* in the same proportion. Thus the greater the magnitude off the additional natural resource inputs that the discovery of “America” implies the greater will be the induced increase in the endogenous “European” variables L* and K* and the Q* generated by the new Atlantic economy brought into being by Christopher Columbus. The model also accounts endogenously for the drain of part of the New World silver to the east in payment for the additional oriental luxury imports that the expansion of “Europe” to absorb the resources of “America” gives rise to.

In principle it ought to be a simple matter to collect the relevant data on the money stock and the price-level and confront the predictions of the model with this evidence. This, however, is far easier said than done. All the relevant figures, from production of precious metals in the Americas and within Europe, shipments to Europe from the Americas and out again to Asia have been the subject of long and acrimonious controversy, preventing any generally accepted figures for the amount of money in circulation in Europe, in silver equivalent for example, from being available. Price indices have been if anything even more controversial, involving the separation

of “nominal” changes in terms of the unit of account from the relevant “real” change in terms of silver. What does seem agreed, however, is that the increase in world production of precious metals, particularly silver, from the Americas was very large, both absolutely and relatively; that substantial quantities were retained in Europe as well as transmitted to Asia; and that the price-level of goods in terms of silver did rise markedly in the course of the sixteenth century, particularly for agricultural products and raw materials, before abating in the seventeenth century.

Hamilton’s original estimates of the arrival of “American treasure” into Europe were based on official Spanish records based on imports coming through Seville. These showed a sharp deceleration in the seventeenth century. Recently the work of the French scholar Michel Morineau has shown that unofficial silver imports greatly increase the total and continue well into the seventeenth and even the eighteenth century. This is felt to cast doubt on the Quantity Theory interpretation of the sixteenth century Price Revolution by Hamilton since prices stagnated in the seventeenth century. On these and related statistical issues the reader is referred to Barrett (1990).

An elementary but persistent logical error in the literature on the Price Revolution is to look at the correlation between the imports of silver during a particular period and inflation during that period. The relevance of the Quantity Theory is then supposed to turn on the tightness of this relationship. Those in favor point to big arrivals before 1550 and a sharp rise in the price-level, while those opposed point to even bigger arrivals in the second half of the sixteenth century and even in the seventeenth century, with little or no impact on inflation. As is obvious, however, what has to be looked at is not the absolute flow of increments to the money stock, but the *proportionate* difference that they make to the existing stock. On this basis there is no contradiction whatsoever between continuing substantial quantities of imports and the deceleration of inflation. Equal increments have a smaller proportionate effect on a continuously rising money stock. In addition, as our model predicts and is well established, the increase in

population and the labor force raises real income Q, which mitigates the inflationary impact of new monetary injections as well.

A second persistent error is to suppose that the Quantity Theory must require all prices to rise in the same proportion in response to a monetary expansion. This will of course only happen in the familiar text-book "thought experiment" of what will happen if M is doubled overnight, leading to a doubling of all money prices with relative prices of the different goods unchanged. Over time, however, with Q changing in response to movements in the labor force and other "real" variables relative prices are bound to shift according to the relevant elasticities of supply and demand.

Associated with this error is the totally egregious one of asserting that rising population causes "inflation" by raising the "price of food"! Increases in population, and therefore the labor force, are of course *deflationary*, since other things being equal they raise Q and hence lower P. Yet it is amazing to see up to this day the repeated assertion that population increase, which undoubtedly occurred, was more responsible for the Price Revolution of the sixteenth century than increase in the quantity of money.

A more cogent criticism of the Hamilton argument was that the rise in the European price-level began in the late fifteenth century and continued in the first third of the sixteenth century before any substantial inflow of American silver had taken place. The explanation in terms of the present analysis is that this earlier rise in the European price-level, coinciding with the expansion of silver production in Germany and Central Europe, was the culmination of the monetary adjustment to the Black Death. Restoration of the stationary equilibrium required the great deflation of the "bullion famine" of most of the fifteenth century to be reversed by a period of monetary expansion and inflation of the price-level back to their original pre-plague levels, along with the population and the labor force. Once again the association of population increase with

inflation of the price-level presents an opportunity to detect a totally spurious correlation, but one that historians untutored in economics continue to make.

Hamilton also argued that increases in money wage-rates lagged behind the increase in the price-level, giving rise to what he called a 'profit inflation' that financed capital accumulation and hence the 'rise of capitalism'. Whatever the merits of this argument it should be clear that it is not a necessary implication of the Quantity Theory of Money. Keynes adopted the hypothesis enthusiastically in the *Treatise on Money* but it was severely criticized on empirical grounds by J.U.Nef and other scholars and finds little support today. It is important to realize that the explanation of the rise in the European price-level in terms of an increase in the money supply due to the sustained influx of American silver is by no means affected by the refutation of this auxiliary thesis of Hamilton's.

The upward trends in population, money supply and prices flatten out in the first half of the seventeenth century. These facts form the background to the famous "Crisis of the Seventeenth Century" formulated by the Marxist historian Eric Hobsbawm (1954), reprinted in Aston (1967). We cannot do justice here to his subtle and complex arguments. He does note, however, the significance of the discovery and conquest of the Americas and the associated influx of silver, and observes cogently that "The benefit which Europe drew from these initial conquests was thus in the nature of a single bonus rather than a regular dividend. When it was exhausted, crisis was likely to follow" (Aston, 1967:23). This is of course exactly the argument made here.

The population of Europe rose from 60 million in 1500 to 68 million in 1550 and 77 million in 1600, falling slightly to75 million in 1650 and then rising to 83 million in 1700 and 97 million in1750 [see De Vries, 1994:13,Table1]. Earlier we cited Cipolla's figure of 80 million as the population of Europe on the eve of the Black Death in 1350. Thus it seems to have taken 350 years for the population to be fully restored to pre-plague levels before rising by another 20% or

so by 1750. Real wage-rates in England, according to Hatcher (1977:71,Figure 2) which peaked in the first half of the fifteenth century, had fallen back to just above their pre-plague levels by the first half of the *eighteenth* century. Thus, despite the fluctuations induced by two massive exogenous shocks, the Black Death and the discovery of America, the European economy had barely raised its levels of population and real wage-rates after three centuries!

8. Globalization and the Industrial Revolution: Cause or Consequence?

Despite its seemingly "one-shot" character, as depicted in the last section, the extension of the overseas frontier to the Americas caused profound changes within Europe itself and subsequently in Asia and Africa as well. The locus of what Kindleberger (1996) calls "economic primacy" shifted from the Mediterranean to the Atlantic, with Venice and the Italian cities going into decline and being replaced by Amsterdam after the brief flowering of Antwerp. The Hapsburg rulers of Spain and Austria were the initial beneficiaries of the American bonanza but the more permanent gains were reaped by the Dutch and later the British. The two East India Companies used the American treasure to balance their imports of Indonesian pepper, clove and nutmeg, Indian cotton textiles and Chinese silk and porcelain for profitable re-export to consumers in Europe. Steensgaad (1995) shows that exports of treasure (mainly silver) to Asia were three times more than commodity exports in the middle decade of the eighteenth century. The New World also had a notable impact on China, with the introduction of new crops such as maize, peanuts and the sweet potato which substantially increased agricultural productivity and total output, stimulating the growth of population and further output growth. This increased the demand for silver in China for monetary purposes, which were financed by the export of silk, porcelain and tea. Japan before the seclusion by the Tokugawa Shogunate around 1640 was also actively "involved in world trade through the Dutch as intermediaries.

The next phase of the exploitation of the American discoveries after silver was sugar. This commodity had been introduced into the Mediterranean world by the Arabs from India and its

cultivation was taken up by the Iberian powers, who extended it westward to the Canaries and Madeira in the Atlantic as well as to Sao Tome off the African coast. Here began the practice of using African slave labor on sugarcane plantations. After the Atlantic was crossed cultivation was begun in the Caribbean by the Spanish and later the British and the French and by the Portuguese and the Dutch in Brazil. Other plantation crops were tobacco and indigo. Eventually the famous "triangular trade" developed, linking Europe with Africa and the Americas with the exchange of manufactures for slaves and for sugar and other plantation products. Rising demand in Europe during the eighteenth century as a consequence of the growth of population and real incomes for tropical products raised slave prices and exports from Africa, with the Europeans engaged in the carrying trade across the Atlantic. The raiding for and capture of slaves in the African interior was undertaken by African coastal states such as the kingdom of Dahomey.

The prominence and magnitude of the slave trade led to the famous thesis of Eric Williams (1944, reprinted 1966) that profits from the slave trade was the source of finance for the Industrial Revolution. More broadly his contention can be interpreted as emphasizing the role of the plantation economies of the New World as an indispensable source of raw materials and markets for cotton textiles and other manufactured products of the Industrial Revolution. He states (1966:71):

"Manchester received a double stimulus from the colonial trade. If it supplied the goods needed on the slave coast and on the plantations, its manufactures depended in turn on the supply of the raw material. Manchester's interest in the islands was twofold".

The more "Eurocentric" mainstream of historical scholarship was represented by the views of Engerman (1972) and O'Brien (1982). In a pioneering calculation Engerman estimated profits from the slave trade as about half a percentage point of British national income in 1770, 8% of total investment and about 39% of commercial and industrial investment. Even after adding profits from sugar plantations Engerman felt that these numbers were too small to support

the Williams thesis, O'Brien (1982:18) made the much-quoted remark that "--- for the economic growth of the core the periphery was peripheral".

The Williams thesis was vigorously defended by Barbara Solow (1985, 1987), who found Engerman's numbers sufficiently high to support it and by Darity (1982), who formulated a quantitative general equilibrium model of the relationships involved. My own analysis of this problem in Findlay (1990) was inspired by the work of these two staunch defenders of the Williams thesis. Collectively, our defense of Williams seems to have led to a concession by O'Brien and Engerman (1991:181) where they state :

"Without the enforce and cheap labor of Africans, the rate of growth of transnational commerce between 1660 and the abolition of the slave trade in 1808 would have been far slower".

And (1991:182):

"It is difficult to envisage an alternative path of development that might have carried both international and British trade to the level attained by the early nineteenth century".

Footnote 16 to the first quotation acknowledges Solow (1987) and footnote 17 to the second acknowledges Darity (1982).

Furthemore,(1991:187):

"The significance of exports is derogated by using national income as the sole point of reference. Foreign trade needs to be considered in the context of a dynamic general equilibrium model that considers exports (and other sources of changes in demand) to the cycles of growth achieved by the British economy from1607 to 1802".

Footnote 29 at the end of this quotation is to the working paper version of Findlay (1990).

More recently Engerman appears to have relapsed into his previous position, judging from Eltis and Engerman (2000). On the other hand O'Brien (1995) maintains the position taken in their joint article. He says (1995:172) that "The validity of their (Darity's and Findlay's)

claims in relation to cotton textiles should be conceded" and also (1995:173) that "—expressing the value of output produced within any sector of an economy as a percentage of national income seems almost calculated to create an impression of insignificance". It is difficult to disagree with his conclusion to a valuable paper when he says (1995:177) that "For the British Industrial Revolution the significance of foreign commerce should not be denied, denigrated or exaggerated. It was obviously important". While conceding on Britain he argues that the spread of industrialization to the continent of Europe was much less dependent on the stimulus of foreign trade. There is no denying that Britain was first, however, and that there is a long line of opinion from Veblen and Gerschenkron to David Landes (1969) which maintains that after Prometheus was first unbound in Britain his eastward migration across the continent was only a matter of time.

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