

Conceptualization of Indian Trade in Silver and Textiles*

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Initial version does not contain pages of references, yet

I. Unified Economic Theory and Prominence of Inventory Demand

It is understandable that scholars might wonder whether an essay on global silver dovetails with a group of essays focused on the history of textiles. Yet, I maintain that inclusion of the study of silver – the main item for which Indian textile exports were swapped – can strengthen understanding of the histories of both Indian textiles and world trade in general. Conviction regarding interdependence between textile trade and trade in silver stems from my co-development of a theoretical model that calls into question a fundamental dichotomy of mainstream economic theory – namely, treatment of “monetary economics” with theoretical devices that are distinct from those applied to “non-monetary economics.” I contend that the prevalent Neoclassical monetary-versus-non-monetary dichotomy is the root cause of enormous misunderstandings of historical events (in addition to current events). By way of contrast, the “Doherty-Flynn [D-F] model” featured in this essay treats particular monetary substances with the identical demand-and-supply apparatus that is applied to non-monetary items.¹ In other words, the D-F model is a “unified theory” that eschews the conventional distinctions

* This preliminary draft is offered for discussion purposes only at this point, in the hope of stimulating discussion of conceptual approaches to monetary and non-monetary trade issues throughout the world, including India. Uninhibited criticisms and suggestions are welcome.

¹ The unified, pre-1870s value theories of Classical economics also offered a unified approach to monetary and non-monetary topics; for example, labor theories of value applied equally to gold as well as non-monetary commodities. In this sense, the D-F model is Classical.

such as “the monetary sector” versus “the real sector” and even “macroeconomics” versus “microeconomics.”

Any analyst of a product mined today, such as silver or gold, would be expected to utilize microeconomic – not macroeconomic – tools in order to describe profit-maximizing production on the supply side and utility-maximization behaviour on the demand side. I know of no one who disputes that study of today’s silver market requires application of microeconomic supply and demand tools.² But silver was produced for a profit throughout the 16th-18th centuries – as it is today – using land, labour, and capital as factors of production. So, how can one justify analysis of the exact same white metal with microeconomic tools for the twenty-first century, while switching to macroeconomic tools when studying silver during the 16th-18th centuries? One answer is that silver was used as money during the 16th-18th centuries, while paper and electronic monies dominate nowadays. I am sceptical of this line of reasoning for two reasons: (1) silver monies were commonplace long after monies became relegated to specialized treatment as objects of macroeconomic analysis (I worked with people in the early 1970s who combed through piles of U.S. Quarters in search of ones made of silver); and (2) I argue that the fundamental microeconomics-macroeconomics dichotomy confuses more than it elucidates. Moreover, today’s conventional monetary theory is inherently incapable of elucidating the global histories of commodity monies such as silver. Insights gained from modern monetary theory must be joined together in a unified theory

² This statement does not imply endorsement of conventional microeconomic demand-and-supply theory. Indeed, the D-F model extends conventional microeconomics in that it recognizes inventory supply and inventory demand concepts explicitly. In fact, conventional microeconomic supply-demand is a subset of the D-F model (as will be clarified below).

capable of incorporating monies into the same supply-and-demand framework that applies to all non-monetary products.

A fundamental concern is that modern monetary theory aggregates diverse monetary substances into a catch-all term called “money,” whereupon this aggregated lump called “money” is considered a foundational unit of analysis. The smallest level of aggregation found in economics textbooks today is “M1”; M1 includes component coins made of a variety of substances (e.g. copper, nickel, and alloys), paper monies, and certain checking accounts. But thinking of M1 as the base-level of aggregation wreaks havoc in monetary history because each of the four main monies of the early-modern world – silver, gold, copper, and cowry shells – failed to behave as an interdependent whole. Each substance was produced in distinct locations throughout the globe and each gravitated to distinct end markets worldwide.³ These four monetary substances dominated world monetary history for centuries, in other words, but they *never* travelled in tandem anywhere and should not be considered components of a single unit of analysis. An essential requirement of global monetary history is to explain how and why, in terms of unique supply and demand characteristics, each monetary substance exhibited unique trajectories in terms of global market forces. Modern monetary theory is incapable of elucidating the unique global paths of each monetary substance throughout history because its methodology requires amalgamation of distinct monetary substances into a single mass called “money.” Indeed, the D-F model was developed because conventional monetary history could not explain the markets for individual monies, because application of

³ For general discussion of source areas, end markets, and transit routes for each of the globe’s four main monetary substances throughout the 16th-18th centuries, see the introductory essay in Flynn and Giráldez (199?).

conventional monetary theory precluded adequate analysis of specific monetary markets.⁴ The D-F model applies equally to monetary and non-monetary items alike, since it requires conceptual dis-aggregation to the maximum extent possible. Each substance's unique supply and demand functions are viewed distinctly, a principle that applies to all commodities according to the D-F framework. Just as Classical economists realized the futility of subjecting a jumble of diverse monies to a single, united analysis via labour theories of value – since congealed labour requirements per unit of product differed for each substance – so we too must avoid indiscriminate scrambling together of monetary substances. Inherent in each substance are unique supply-and-demand characteristics. No historian of fabrics would be so naïve as to insist upon rigid and universal aggregation of all fabrics into a single category “textiles,” while ignoring the extent to which textiles in general were composed of silks, cottons, linens, woollens, synthetics and so on. Specific textiles were produced in distinct locations and tailored for special markets around the world. Not only are historians forced to analyze cotton textiles separately from, say, silks; it is necessary to specify particular types and styles of cotton textiles destined for specific market areas. It is unnecessary to mention that each type of textile requires separate demand-and-supply analysis, of course, but my point is that it is just as foolish to conceptually aggregate diverse monies as it would be to insist upon universal aggregation of all textiles into a single unit of analysis. The D-F

⁴ Concerned primarily with fiduciary monies today, modern monetary theory assumes the existence of an initial monetary stock determined by *exogenous* policy decisions. But this amounts to starting in the middle of the story. Actual monetary stocks during our period were determined *endogenously* – including involvement of profit-maximizing mining entrepreneurs – via each substance's supply and demand conditions (that themselves must be explained). The D-F model considers end-market demand for each monetary and non-monetary substance, as well as supply-side production and other market considerations. The D-F model starts at the beginning, not at mid-stream.

model permits application of a unified theory – on both the supply-side and the demand-side – that applies to monies such as silver as well as to non-monetized goods at the same time.⁵

Mathematical underpinnings of the D-F model appear in Doherty and Flynn (1989). A brief outline of the model's main features is perhaps appropriate here. The D-F model permits simultaneous discussion of three interrelated sets of supply-and-demand functions. While conventional microeconomic models generate a single set of supply-and-demand functions – compared with three interrelated sets of supply-and-demand functions in the D-F model – the D-F model is much simpler because it dispenses with the need for separate macroeconomic supply and demand functions. And the D-F model should be intuitively appealing to the professional historian because archival materials routinely refer to specific and unique monetary and non-monetary items (as opposed to abstract aggregations such as monetary stocks, gross domestic product, and other familiar macroeconomic constructs). I hope to convince the reader that a relatively-short initial learning curve – required to become familiar with the three sets of supply-and-demand functions of the D-F model – leads rather quickly to a more straightforward and simplified view of interrelationships among textiles, silver, and other items of trade.

The most distinctive feature of the D-F model is its generation of an inventory-demand function via utility-maximization assumptions that are both reasonable and intuitively appealing. The D-F model describes the process through which individuals decide to hold inventories of any specific good. And once derived, individual inventory demand functions can be aggregated

⁵ Fiduciary monies fit into the D-F framework as well, but commodity-monies are the focus of this essay. There is brief discussion of fiduciary monies in Flynn and Warner (), an essay concerned primarily with modeling relationships between bullion markets and money markets.

to any market level the analyst may wish to consider (for example, to the level of the family, a building, a city block, a county, nation state, or a 'region' defined in any manner the analyst sees fit). A product's inventory supply function is vertical because inventory stocks are fixed at any point in time (in practice, for example, retailers often schedule inventory recordation after store closure, in order to ensure that inventories neither grow through new deliveries nor shrink through additional sales).⁶ The D-F model describes conditions under which inventory holdings (i.e. inventory supply) match up with *desired* inventory holdings (i.e. inventory demand) at a point in time. In actuality, people continuously adjust inventory holdings to desired levels of inventory holdings; the D-F model formally describes this normal, commonplace adjustment process. Figure 1 below shows price determination for a particular product resulting from supply-and-demand equilibration of inventory holdings at the market level.

⁶The vertical money supply function of conventional macroeconomics provides the most common analog to the D-F model's vertical inventory supply function. But money supply and money demand are unique in being viewed from an inventory-theoretic point of view within conventional economic theory, while I maintain that (a) all goods should be viewed in inventory-theoretic terms, and that (b) monetary and non-monetary goods are best viewed through a single, unified supply-and-demand apparatus. Commodity monies were produced for profit as much as were non-monetary items, and I argue that Classical economists were correct in applying uniform analytical devices to monetary and non-monetary products alike. Theoretical segregation of monies off into a distinct world called 'macroeconomics' has led to profound confusion in economic theory since the late-nineteenth century.

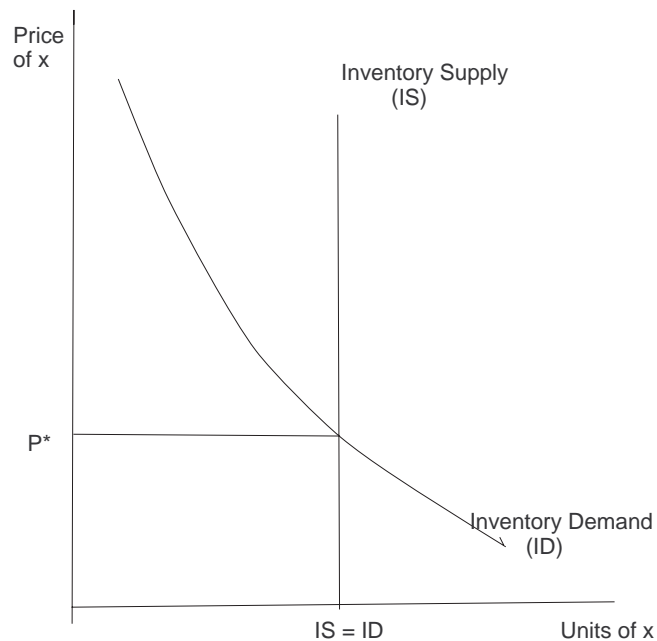


Figure 1: Inventory Supply and Inventory Demand at the Market Level

The second set of supply-and-demand functions – production supply and consumption demand – is nearly a clone of the conventional supply-demand apparatus reproduced in every college microeconomics textbook.⁷

⁷ The D-F notion of ‘consumption demand’ is more restrictive than is conventional textbook microeconomic ‘consumption demand’. In order to qualify as ‘consumption’ under the D-F model, an activity must both (a) generate utility as well as (b) deplete inventories in the process. The act of drinking a soda qualifies as consumption under the requirements of the D-F definition, for example, because imbibing the soda produces satisfaction while soda holdings are simultaneously depleted in the process. Textbooks in microeconomics will at times allude to the consumption of ‘services’ that emanate from a painting hanging on a wall, on the other hand, even though the same quantity of painting exists both before and after the viewing occurred. The D-F model focuses on accumulation through time, while conventional microeconomics does not. This conclusion is certain for the following reason: If it is assumed that a product cannot be stored – that is, the product is a service rather than a good – the three distinct sets of demand and supply functions of the D-F model automatically reduce to the single set of conventional microeconomic consumption

In terms of conceptual combination of consumption demand and production supply with the inventory supply/demand concepts shown in Figure 1, the salient point is that production supply (PS) raises the level of inventory supply (other things equal), while consumption demand (CD) lowers the level of inventory supply (other things equal). In common parlance, production of new units raises the number of units in existence (IS), while consumption reduces the number of units in existence (IS). Figure 2 portrays demand and supply functions of an individual decision unit.⁸ Note an interesting feature depicted in Figure 2 below: in contrast to conventional microeconomic analysis, PS and CD need *not* be of equal magnitude under equilibrium conditions (neither for an individual actor, nor for the market as a whole). For example, at market price P^* in Figure 2 – a price above the level that equates production supply and consumption demand – PS^* exceeds CD^* on an ongoing basis. PS need not equal CD because storage of certain items – say, grains – can be accumulated in ever increasing amounts over time. Innumerable example exist whereby more and more of specific storable products have been accumulated over time at both individual and market levels, so a realistic model should allow explicit description of such a common real-world phenomena. Neoclassical microeconomics does not integrate inventories into analysis at the basic supply-and-demand level, while the D-F model does explicitly analyze process of accumulation of specific items.

demand and production supply. In other words, conventional microeconomics offers a relatively complete description of the supply and demand for all products except everything that one can see; conventional microeconomics describes services that cannot be stored, but has nothing to say about goods (which require inventory analysis).

⁸ Note that inventory supply and inventory demand in Figure 1 refer to the market level of aggregation for a distinct product; this allows us to show determination of market price. Inventory supply and inventory demand in Figure 2, on the other hand, refer to a specific individual decision unit, one that takes market price as determined at the market level.

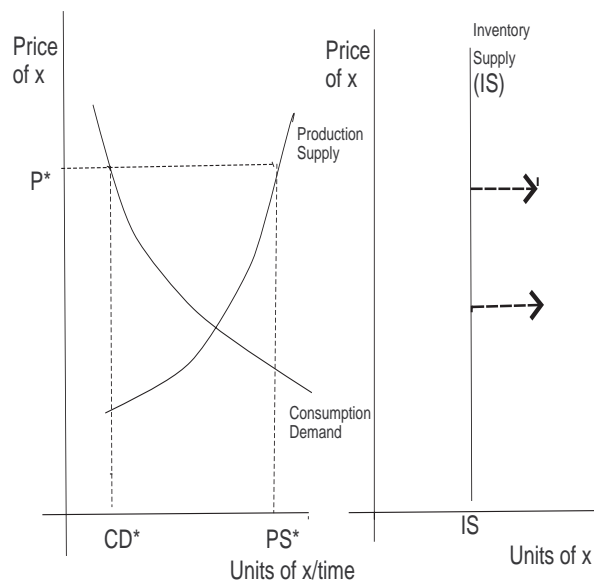


Figure 2: Production Supply, Consumption Demand, and Inventory Supply for an individual

In order to keep things simple, the Inventory Demand function (ID) portrayed in Figure 1 is intentionally omitted from Figure 2, in order to focus on the fact that production supply of Good X exceeds consumption demand of Good X (i.e. “excess production” = $PS^* - CD^*$ at P^*). Assuming for the moment that the individual in question is not permitted to trade with the outside world, excess production of Good X would necessarily accumulate in that person’s individual inventories at the rate of $PS^* - CD^*$ per time period (as indicated by the rightward-pointing arrows attached to Inventory Supply).

The third set of supply-and-demand functions – sales supply and purchase demand – are derived directly from interaction between the two sets of functions described immediately above (PS/CD and IS/ID) [assuming that the ID function has been mentally reinserted into Figure 2]. Consider an individual producer of, say, corn who also consumes corn, stores corn, and is allowed to buy/sell corn in the marketplace. If the person produces a

larger quantity of corn than s/he consumes, then s/he could choose to boost personal inventories with “excess production” (as in Figure 2), or s/he could sell off the “excess production” in the marketplace instead. In the case of a relatively high price such as P^* in Figure 3, however, the person depicted is already holding a larger quantity of the product (IS^*) than s/he wishes to maintain in inventory at that price (ID^*); which is to say that the party is already holding excess inventories ($IS^* > ID^*$). Since it makes no sense to add further units to personal inventories that are already held in excess, the individual would sell off excess inventories ($EI^* = IS^* - ID^*$) in addition to selling off excess production ($EP^* = PS^* - CD^*$). Sales supply (SS) is therefore simply defined as excess production plus excess inventories: in symbolic terms, $SS^* = EP^* + EI^*$ at P^* . By repeating this process for every price (P), the complete sales supply function for the individual can be derived directly from inventory supply/inventory demand and production supply/consumption demand functions.

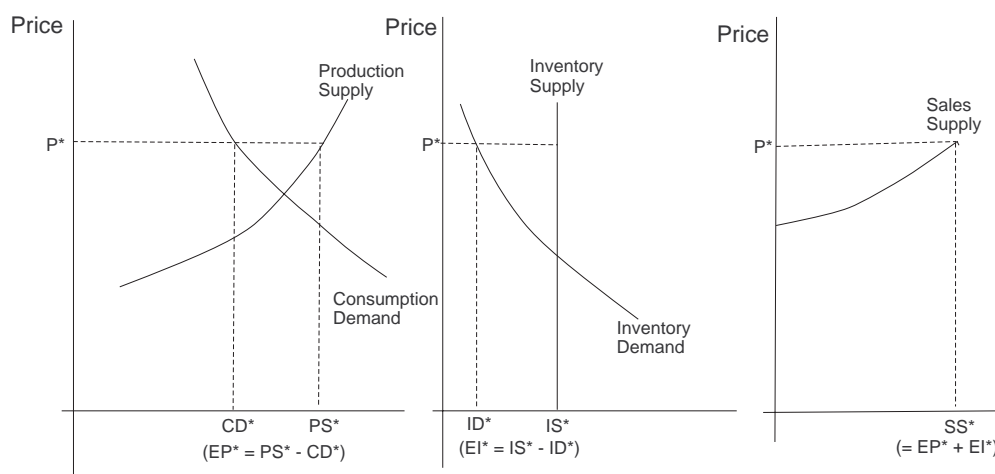


Figure 3: Production Supply/Consumption Demand, Inventory Supply/Inventory Demand, and Sales Supply for an Individual

Keep in mind that the three supply functions and two demand functions projected thus far are shown at a point in time; in other words, time has been stopped in the same sense that a “freeze frame” permits point-in-time viewing of a motion picture temporarily at rest. But the dynamic mathematics underlying this model allows us to run the clock and view a series of freeze frames over time. Figure 4 continues the story begun in Figure 3 by allowing the clock to run for one time period. “One time period” means that sufficient time has elapsed to allow the individual to sell off all of her/his excess production (EP^*) and excess inventories (EI^*) at price P^* . Other things equal (including the given price P^* , which is determined by market-level forces), the individual continues to generate excess production EP^* during period 2. Inventory Supply and Sales Supply functions do not remain fixed, however, because excess inventories EI^* were sold off while the clock was running during period 1. The selling of EI^* inventories results in a leftward shift of the Inventory Supply function from IS^* to $IS^{*\wedge}$, since the individual no longer owns the inventories sold off during period 1. The individual is in personal “inventory equilibrium” ($ID^* = IS^{*\wedge}$), in the sense that excess inventories (formerly $= EI^*$) have fallen to zero by the time another freeze frame is portrayed at the beginning of period two. Remember that sales supply has already been defined such that $SS^* = EP^* + EI^*$; now that $EI^{**} = 0$, the new sales supply function (SS^{**}) will have also shifted left by an amount equal to EI^* (the excess inventories sold off) at every price. A noteworthy aspect of individual equilibrium in the D-F model concerns the fact that inventory supply is required to adjust to inventory demand. Thus, Inventory Demand (ID) “rules the roost.” In the absence of trade restrictions, all parties (and all societies) hold the level of inventories that they desire to hold (given preferences and a level of wealth). The conclusion of this model applies to historical trade items such as textiles and silver as much as to

soda pop and gasoline today. This is a particularly interesting conclusion in light of the primary role of stock demand reasoning in the evolution of monetary thought.⁹

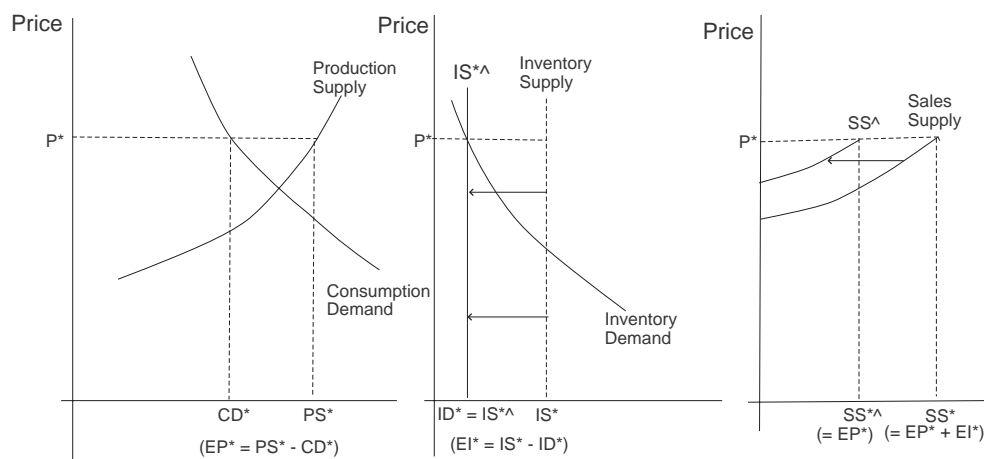


Figure 4: Individual Equilibrium at the Beginning of Period 2

Notice that the positively-sloped Sales Supply function is connected to a negatively-sloped Purchase Demand function in Figure 5. Actually, Purchase Demand is the mirror image of Sales Supply ($PD = -SS$). The nature of this mirror-image reflection can be demonstrated by imagining a lowering of the price of Good X from P^* to P^{**} (as shown in Figure 5). At the relatively low price of P^{**} in Figure 5, the individual would hold a smaller quantity of a good (IS^{**}) than s/he would wish to hold (ID^{**}), which means that excess inventories would be negative ($EI^{**} = IS^{**} - ID^{**} < 0$). Negative excess inventories is just a round-about way of saying that there is an inventory inadequacy [$(II^{**} = -EI^{**} = -(IS^{**} - ID^{**}))$] at P^{**} , requiring purchases in the marketplace in order to satisfy inventory inadequacy (II^{**}).

⁹ Discuss the Cambridge K folks, the MABOP, etc.

In addition to inventory considerations, the individual also consumes the good faster than s/he produces it ($PS^{**} - CD^{**} < 0$) at P^{**} ; that is, excess production ($EP^{**} = PS^{**} - CD^{**}$) is negative. Since “negative-excess production” is cumbersome terminology, the more intuitive term [positive] “excess consumption” EC^{**} is substituted (where $EC^{**} = -EP^{**}$). In short, both an inventory inadequacy [$II^{**} = -EI^{**} = -(IS^{**} - ID^{**})$] and excess consumption [$EC^{**} = -EP^{**} = -(PS^{**} - CD^{**})$] exist at P^{**} . Each shortage requires the individual to make purchases in the marketplace; thus, purchase demand is depicted as the sum of the two shortages: $PD^{**} = EC^{**} + II^{**}$. In straightforward words, again, Purchase Demand (PD) is just negative Sales Supply (SS). The individual is a seller at high prices and a buyer at low prices.

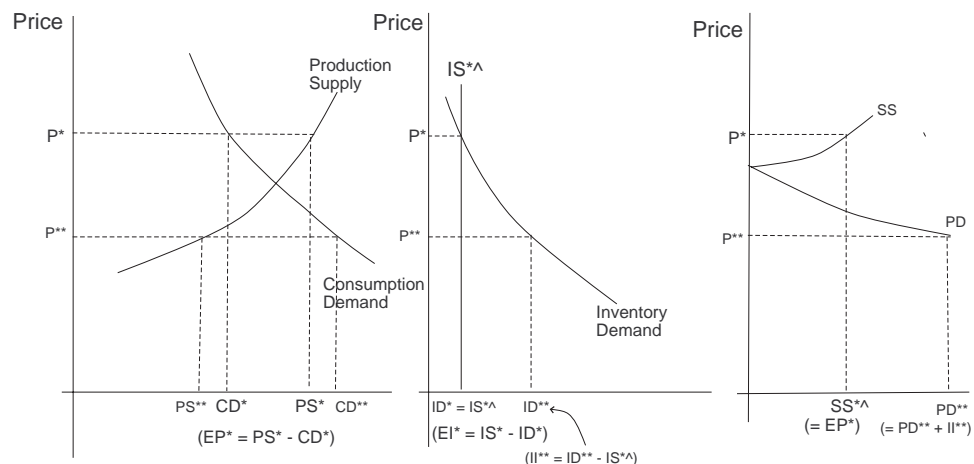


Figure 5: Individuals as both Sellers and Buyers

The conclusion that normal people could sell a product into the marketplace when price is sufficiently high (P^* in Figure 5) and also to buy the same product from the marketplace when price is sufficiently low (P^{**} in

Figure 5) seems unsurprising to me. It is commonplace in reality for people to alternate as buyers and sellers of the same good, depending upon whether market price is relatively high or relatively low. Nonetheless, conventional microeconomic assumptions require strict separation of profit-maximizing supply-side actors (firms) from utility-maximizing demand-side actors (households). One is permitted to be a player on the supply side or a player on the demand side, but not both simultaneously under conventional assumptions. One reason for restriction of a particular party to either supply-side production or demand-side consumption, but not both – under neoclassical assumptions – is probably due to the fact that inventory holdings are not integrated into the basic building blocks of microeconomic supply and demand. The producer is not allowed to accumulate its own product, so currently produced items must be sold off into the marketplace immediately. In other words, “production supply” and “sales supply” become synonymous ($PS = SS$) under the assumption that producers are assumed forbidden to accumulate their own products (in the form of what the D-F model calls “inventory supplies”). Without an allowance for inventory accumulation (IS), in other words, the three supply functions of the D-F model boil down into a single supply function ($SS = PS$). Two-thirds of the supply side of the D-F model evaporates when inventories are ignored, and what we are left with is conventional production/sales supply. Similarly on the demand side, the consumer is also precluded from accumulating inventory holdings, so that the D-F model’s “purchase demand” is necessarily identical to “consumption demand” under neoclassical assumptions.¹⁰ As was true on the supply side, failure to address the issue

¹⁰ Since consumption is assumed to be the sole source of utility in conventional microeconomic theory, actors on the demand side are routinely called “consumers.” There can be no motivation to buy a product except to consume it – since, by assumption,

of inventory accumulation also leads to boiling away of two of the three D-F demand concepts: inventory demand is ignored from the start, and purchase demand cannot differ from consumption demand because the product cannot be held in inventories.

Under neoclassical assumptions, in summary, production supply is identical to sales supply, and consumption demand is identical to purchase demand. All actors are required to reside either on the supply side or on the demand side, but not both sides simultaneously. Inventories are ignored. Two the three sets of D-F supply-side functions disappear under restrictive neoclassical assumptions, the same fate that awaits two of the three D-F demand-side functions as well. Conventional assumptions leave us with production supply and consumption demand functions only. Accumulation is ignored. When the restrictive assumption that a product cannot be held in inventories under the D-F model is invoked, all but one of the three sets of D-F supply and demand functions immediately vanish, and only production supply and consumption demand remain (i.e. the same result obtained from the start with neoclassical assumptions). After initially puzzling over why mathematics dictated that the D-F model essentially collapsed into the neoclassical model under the assumption that the product cannot be stored in inventories, the logical necessity of this result finally became clear to us. Economics terminology “goods and services” is so commonplace that we, presumably like many analysts, had never thought seriously about what key characteristic distinguishes a “good” from a “service.” The answer comes

consumption is the sole source of utility – so purchase of a product must occur simultaneously with its consumption. “Buyers” and “consumers” become synonyms because inventory holdings do not generate utility and therefore cannot exist. The D-F model presents an entirely different story: purchase raises inventory holdings and consumption depletes inventory holdings. Purchase demand and consumption demand serve distinct roles in the D-F model, so the two demand terms cannot of course be considered synonyms.

quickly in the context of the D-F model presented above: A good can be accumulated in inventories, while a service cannot be accumulated in inventories. (One cannot, for example, store haircuts.) This basic distinction left us with a surprising conclusion: conventional neoclassical economics provides a relatively complete description of supply and demand principles for all products, *except those that can be seen*. Every manmade good – including the building structure in which we find ourselves today – was produced in the past and is owned by some legal entity (that is, it has accumulated). But these ubiquitous manmade goods are not amenable to conventional economic analysis because neoclassical microeconomic analysis can only describe supply and demand conditions for services (i.e. items that cannot be stored). No wonder there is a more or less permanent state of tension between the disciplines of economists and historians. The subject matter of history necessarily involves accumulation from the past. Modern economic theory is incapable of describing accumulation because there is no place for inventory analysis at the building blocks level of supply and demand analysis. Thus, modern economics is necessarily a-historical. The D-F model avoids this a-historicism criticism because inventory analysis is a critical component of its supply and demand analysis at the building-blocks level. Inventory thinking must be incorporated into our consciousness if economic history (and economics proper). The limited purpose of this particular essay, however, is to convince the reader that a much clearer view of early-modern trade in silver and textiles can be constructed via the D-F model as opposed to conventional economic analysis.

II. Application of Inventory-Theoretic Reasoning to Indian Textile Exports and Silver Imports into India

It is easy to picture early-modern Indian textile exports – to Europe, for example – in inventory-theoretic terms. People throughout Europe wished to have, on hand, textiles of Asian origin: silk and cotton fabrics of specific design depending upon fashions in a particular location. Success for producers in India, as well as for European merchants who transported textiles to European distribution centres such as London or Amsterdam, was of course critically dependent upon the willingness of end-market buyers to stock wardrobes with specific pieces of Indian clothing. Needs and fashions differed by end-market, of course, which is why strikingly distinct types of clothing were shipped via European *entrepôts*, depending upon specific end-market conditions in African, American, Asian, and European locations. Fortunately for suppliers in the global marketplace for textiles, clothing wore out relatively quickly and styles changed over time. Thus, it was necessary to restock personal inventories of textiles the world over on a continuous basis. To me it is clear, therefore, inventory-theoretic reasoning should be as central to discussion of global histories of textiles as it ought to be for monetary substances as well.

The global trade in cowry shell money is an easy analogy through which to envisage inventory-theoretic reasoning as applied to a specific form of money. Europe-bound ships carried massive volumes of cowries from the Maldivian Islands, near India's coast, to European ports for the obvious reason that it was highly profitable to do so. An excellent ballast item, cowries sometimes provided spectacular profits in their own right. European marketplaces were not the final destinations for Maldivian cowries, however, since there was no substantial regions of inventory demand for cowries within Europe. Rather, Maldivian cowries were quickly re-exported to West

African markets where immense inventory demands for cowry monies were widely recognized. And lest one doubt the significance of the one million pounds of cowry shells that annually passed through European ports and on to African markets during the early-18th century, consider that one million pounds of Maldivian cowries was equal in market valuation to approximately one third the value of the 20,000 African slaves exported annually during 1720s (at an apex of the slave trade). Not only were Maldivian cowries indirectly swapped for African slaves heading for the Americas (and elsewhere), but American silver was also linked to the cowry trade by virtue of the fact that the Persian *larin* (a coin minted from New World silver) formed the basis of the monetary system of the Maldivian Islands. I contend that inventory analysis is essential for full understanding of these trends. Moreover, global analysis of linkages between cowries and silver reveals that conventional descriptions of Atlantic trade triangles are overly simplistic and misleading. Huge numbers of trade triangles (as well as non-triangular geometries) were in fact interlinked at a global level from the 16th century onward. And disentanglement of the histories of these multifaceted global trade networks requires recognition of all three sets of supply and demand forces – a) production supply/consumption demand, b) inventory supply/inventory demand, and c) sales supply/ purchase demand. The D-F model provides basic tools for analysis of global trade networks, and does so in a fashion that requires the analyst to disaggregate products as much as possible. Each product must be viewed independently, in other words, while at the same time recognizing interdependencies among products. This dictum applies to all individual products, whether used for monetary purposes (e.g. silver, gold, copper or cowries) or not (e.g. textiles).

Evidence of the re-export of silver from India to China

the key to [the Arab geographer c. 980] al-Maqaddasi's thinking lies in the use of the phrase 'Sea of China' [in reference to the Red Sea]. Muslim geographers were not ignorant of the military might of the rulers of Hindustan or the world of islands and seas of Indonesia. Yet the Indian Ocean derived its identity from an unspoken role assigned to the Celestial Empire. They could see, as we can, that the sea which washed the desolate beaches of the Suez or the marshes around Basra provided an unbroken means of travel all the way to China, beyond which lay an un-navigable ocean, the Pacific. Islamic Near and Middle East, Hindu India, and China constituted zones of separate cultural identity. Geographical and economic ties between them strengthened an invisible sense of unity. (Chaudhuri, 1985, pp.2-3)

During and since the sixteenth century, observers and historians have repeatedly stated that much of the silver that entered India was re-exported to other Asian markets, particularly China. In *Trading World of Asia*, K.N. Chaudhuri (1978, p.160) states:

Europe was only part of her [India's] total foreign trade, the missing piece in the puzzle is the size of movements in the trade of other areas.... There is ample evidence that American silver flowing into India was re-exported to China and South East Asia to be exchanged for the economic products of these regions.

Chaudhuri goes on to explain that, like other products, precious metals simply flowed to markets that offered the most attractive prices for a particular metal. Specifically, he states that:

The relative value of gold and silver and the cost of extraction in the mines producing the two metals were indeed the two permanent components in the spectrum of causes that determine their supply. (Chaudhuri, 1978, p.161)

The role of China is amplified in Chaudhuri's (1985, p.62) *Trade and Civilisation in the Indian Ocean*: "by the sixteenth century European newcomers, both Portuguese and Spaniards, made it possible for China's silver-hungry economy to acquire the metal through a quadrilateral extension of trade between India, Japan, China itself, and the New World. The silver mines of Mexico and Peru joined those of Japan to provide indispensable monetary liquidity to the whole of Asia."

Countless 16th through 18th century observers speak to China's seemingly insatiable appetite for silver imports. Among many scholars who could be cited, Frank Spooner's (1972, p.77) archival research reveals a number of European merchant-participants who recorded their activities within Asia:

The avidity of the Chinese for silver established a commercial epoch for the international economy. Without this avidity, wrote [the Florentine merchant Filippo Sassetti] on January 20, 1586, 'the [Spanish] reals would not have risen so much in value as they now are. The Chinese, among all the peoples of Asia, are

wild about silver as everywhere men are about gold.' From Goa in 1588, the Portuguese Duarte Gomez also reported that China kept silver 'at a higher price than all the powers of the world.'

The relative values of gold and silver are mirrored by bimetallic ratios that changed over time. Following the logic of Chaudhuri – and fortified with the D-F model – Arturo Giráldez and I have argued that changes in bimetallic ratios are symptomatic of fundamental trade cycles that affected markets throughout the globe. Specifically, we identify two “cycles of silver” that we use for periodization of global trade from the 16th through the 18th centuries. The Potosí-Japan silver cycle (1540s to 1640) gave birth to globalization (according to our definition of the term).¹¹ Bimetallic ratios show clearly that the market price of silver was twice as high in China (c. 1:6) as in Europe (c. 1:12) early in the 16th century. Since silver was more valuable in China than in Europe, and gold was simultaneously more valuable in Europe than in China, it is natural that silver flowed through Europe and into China, while gold simultaneously flowed out of China and into Europe. And since the same sort of premium price for silver existed between China vis-à-vis Japan, as well as between China vis-à-vis Spanish America, it is natural that gold also flowed out of China into those markets (while silver counter-flowed into China). Broad outlines of these flows are not in dispute, although considerable problems arise in terms of archival documentation of magnitudes involved. It is also clear that this first silver cycle – the Potosí-Japan cycle – ended around 1640 when bimetallic ratios converged throughout the world.

¹¹ For a recent debate on the historical origins of globalization, see a 2004 debate in the *European Review of Economic History* between Flynn and Giráldez (2004, who argue that globalization began in the sixteenth century) and O'Rourke and Williamson (2004, who claim that globalization began in the 1820s).

Conceptualization of monetary flows during the second half of the seventeenth century is a considerably messier matter than was the systematic exchange of gold for silver that occurred during the 1540s-1640 Potosí-Japan cycle. And this makes perfect sense in terms of bimetallic ratios, since neither silver nor gold was any longer systematically over- or under-valued in any particular region throughout the second half of the 17th century. That is, there was no longer a persistent/consistent economic incentive to exchange silver for gold on the basis of gains from arbitrage. Silver and gold sometimes entered the a given region (e.g. the subcontinent) simultaneously during the second half of the 17th century; these flows of silver and gold, however, were **not** determined by the sorts of arbitrage considerations that determined precious metals flows during the arbitrage-dominated cycles of 1540s-1640 and 1700-1750. An advantage of the D-F model is its applicability to "non-arbitrage trade," in addition to its usefulness in describing periods of arbitrage trade. So long as inventory demand is sufficiently robust to justify importation of a given product, arbitrage and/or non-arbitrage motivations can be clearly described via the D-F model.

Although personally frustrating in terms of my repeated calls for abandonment of the habit, it is not surprising that monetary historians often conceptually aggregate silver and gold into a category labelled 'precious metals' for the second half of the 17th century; gold and silver did indeed enter (and perhaps significant portions of each remain within) India simultaneously during non-arbitrage phases such as 1640-1700. But our two arbitrage phases spanned 100 years (1540s-1640) and 50 years (1700-1750) respectively, and conceptual combination of those two metals is clearly impermissible in light of precious metals flows during those lengthy and crucial cycles. The following conclusion of K.N. Chaudhuri is an apt, general reference to cycles-of-silver premiums in the Chinese marketplace:

The usual pattern of trade with the Far East was to transship some of the silver imported either from Europe or from Mexico via the galleon trade on the China-bound ships and exchange it for gold or commodities in China which were then imported back to India, and the proceeds used to purchase return cargo for Europe. The conclusion to be drawn from such evidence of bimetallic movements in the international trade of Asia is that the current concept of India acting as an unlimited reservoir of silver in the structure of world trade may need drastic revision. The role of silver in the commercial life of India may appear on closer examination to have been fundamentally determined by the same type of considerations as elsewhere. (Chaudhuri, 1978, p.182)

Detailed archival documentation of overall precious metals flows into and out of early-modern India is nonexistent, according to Chaudhuri (1978, p.156); nonetheless, abundant non-detailed archival evidence supports the contention that India was not the main end-market for silver during much of the 16th-18th centuries. The same conclusion was reached by Souza (2004/1986, p.48) with respect to Portuguese involvement with Indian exports and imports: "Owing to the loss of Portuguese archival records, Portuguese trade with India cannot be analysed." (Souza, 2004/1986, p.48) Protracted study of archival sources, however, leads Souza (2004/1986, pp.47, 74) to state unequivocally that:

South China imported large quantities of spices...and aromatic woods...but silver, in specie and bullion, was the item in

greatest demand. The Portuguese catered to China's voracious silver appetite with large-scale imports from Japan, the New World via Manila and a circuitous route from Mexico and Peru via Europe and the Estado da India....At Malacca, silver imported from Manila and the Estado da India, in conjunction with Indian cotton textiles, was disseminated throughout the archipelago to procure spices.

As for countervailing flows of gold into India during the Potosí-Japan silver cycle of 1540s-1640, Souza (1986, p.54) observes that "Portuguese trade in gold, from China, directed towards India, where higher profit margins were apparently enjoyed, was very active in the 1620s and 1630. The Dutch in Surat in 1632 reported very competitive and aggressive Portuguese trading in gold supplied from China." Souza (1986/2004, pp.5-6) refers repeatedly to the export of gold from China to India, as well as the simultaneous export of silver from India to China:

China's major exports, as well as her imports, in the late Ming were divided into three categories: precious metals, textiles and ballast goods. Gold bullion...was exported in significant quantities to Japan, India and the Philippines....China's major imports in the late Ming may also be divided into three categories: metals, spices, and ballast commodities....the merchants of south China imported and purchased tremendous quantities of silver from Japan and the New World via the Philippines, India and Europe.

In short, long-term archival research efforts by scholars such as Chaudhuri and Souza support my theoretical proposition that China must have been the main end-market for silver, since the white metal was systematically exchanged for gold during the 1540s-1640 and 1700-1750 cycles. The Indian market for silver was exceedingly important – and some of the silver no doubt remained within India – but Indian ports were often routes for the white metal’s voyage onto the Chinese marketplace.

In addition to India’s prodigious exports, India was a prolific importer as well. China was India’s exclusive commercial source of seaborne alum, according to Souza (2005, p.4), the price of which tripled during the 18th century. Souza (2005, pp.5-6) concludes that “seaborne Chinese alum played a significant role in maintaining and expanding important segments of traditional Indian textile production in the late eighteenth century.” Huge quantities of sappanwood were likewise required as dyes for India’s vast textile production. Prakash (1985, p.5) refers to significant Indian imports from the Malay peninsula and the Indonesian archipelago, including spices and drugs, elephants, non-precious metals such as tin, and copper, as well as cauris from the Maldivian islands. All of these imports were purchased via Indian exports of silver.

A number of statements by Prakash support my theoretical contentions regarding the global trade in silver. Prakash (1985, pp.67-68) explains that almost 90% of late-17th century imports into Bengal were precious metals; imports of precious metals took the form of gold prior to 1675, however, and overwhelmingly silver after 1687. This makes logical sense because the “result was that at the turn of the eighteenth century, Bengal emerged as the most important supplier of goods for Europe (48.4 percent in 1700-1701, according to Prakash, 1985, p.75). This periodization coincides with the unprecedented disgorgement of Spanish-American silver

at the beginning of the 1700-1750 Mexican Silver Cycle. Japanese silver mines had essentially been played out by the early-18th century, so it is understandable that portions of the inter-Asian trade would suffer as a result: “About this time [early 1690s], the general profitability of intra-Asian trade was declining, while trade with Europe – particularly in Bengal goods – was becoming increasingly more important.” (Prakash, 1985, p.172) China’s appetite for silver grew considerably during the 18th century. Indian merchants purchased American silver from western Eurasia and resold it to China. I do not wish to diminish the many important non-silver developments in terms of exports from Bengal to the European marketplace, of course, but rather to emphasize that one must also pay attention to the product for which Indian exports were swapped. American silver imports via Europe were plentiful, while Japanese silver imports were no longer so plentiful during the 18th century. Indian trade with Europe could not have flourished in the absence of supplies of (mostly Mexican) silver, and much of that silver continued on toward Chinese marketplaces.

Prakash (1985, p.139) provides other evidence consistent with my contention that silver must have continued on its journey to the Chinese marketplace, since he finds profits on the sale of European silver bar, Spanish reals, and mark reals in Indian markets to have maintained in the lucrative 20%-30% range in 1688-89; less than 20 years later (in 1706) profit on the sale of bar silver in India had fallen to only 1 or 2 percent, and by 1714 the ubiquitous silver *dukatons* actually sold at a loss of 1.6 percent (Prakash, 1985, p.140). Now, why would one suppose that silver would remain in such an uninviting environment? Indian merchants were as profit-motivated as any, and it is certain that there was vigorous growth in demand for silver in the Chinese marketplace. Indeed, I have previously cited bimetallic ratios that indicated a 50% premium for silver in the Chinese

marketplace vis-à-vis Europe around 1700. The white metal would obviously gravitate to its most favourable market location, like any other commodity.

111. Would Chinese Silver Dominance Imply Diminution of India's Role in World History? Winners and Losers in the Global Silver Market

The Spanish Hapsburgs and Tokugawa Shogunate benefited immensely due to protracted demand-side forces emanating from Chinese silver markets. Chinese demand contributed mightily to high global silver prices, while relatively low-cost mining centres were located in Japan and Spanish America. High silver prices in conjunction with low cost of production implied lucrative profits for those who controlled the world's most prolific mines. There could have been no Spanish Empire in the absence of silver mine profits (Flynn ; Flynn and Giráldez). Also, profits from Japanese silver mines financed the unification of Japan under Tokugawa rule at the dawn of the 17th century (Flynn).

Regions, countries, companies, and merchants throughout the world also profited mightily from their roles as intermediaries connecting supply-side mines and end-market centres of demand. Europeans shipped practically nothing but silver eastward, through virtually every active trade route with which they were engaged.¹² The Ottoman Empire was a major thoroughfare for silver heading eastward; it has indeed been argued that silver-trade profits helped finance Ottoman expansion during the sixteenth and seventeenth centuries (Flynn and Giráldez). If my contention turns out to be correct that India was mainly a transit zone for silver heading eastward

¹² See de Vries () for an insightful summary of overall European silver exports to Asia via the Cape of Good Hope.

toward the Chinese marketplace, then it stands to reason that many Indian merchant interests (including governmental agencies) must have benefited handsomely via profits linked directly and indirectly to the global silver market.

The global silver trade generated losers as well as winners throughout the early-modern period. Indigenous Americans, devastated by Afro-Eurasian diseases and overwhelmed by European technological and military superiority, were obvious losers. Many would argue that millions of Africans sent in slave chains to the Americas must be counted among the losers. And others would point out that indigenous Europeans (including ordinary Spaniards) suffered reductions in real wages of up to 50% during the so-called 'golden age' of Spain. Many Filipinos did not fare well either.

But the most prodigious economic losses in the world may have been sustained by the Chinese themselves. This statement may initially sound strange, since a long list of scholarly works contend that the multi-century influx of silver into China *stimulated* the Chinese economy (for prominent example, see Atwell, 1977, 1982, 1986, 1988a, and 1988b). One of the main conclusions of Andre Gunder Frank (1998, especially ch. 3) is that Japanese and American silver stimulated the Chinese economy (while simultaneously failing to stimulate economies in Europe). And in a thorough literature search of this topic, von Glahn (1996, p. 142) concludes that:

The influx of foreign silver coincided with rapid advances in the commercialization of China's domestic economy.... By 1550, the population was growing in virtually every region of the empire. Current scholarly opinion tends to view silver imports as the key stimulus to commercialization in the late Ming.

On the other hand, there is also a long tradition that claims that accumulation of silver (or gold) within a country is enormously costly to the recipient society; that is, surface benefits are illusory. Adam Smith (1776, p.324) is doubtless the best known anti-bullionist critic of the notion that society benefits through accumulation of precious metals. Smith recognized that non-mining nations had to export immense volumes of products in exchange for imported gold or silver, and that domestic resources were tied down in the process.

My favourite anti-bullionist argument is based upon a 'money and growth' literature that stems from late-19th century experience (See Flynn and Giráldez 2000 for application to the case of Ming China). According to money-and-growth reasoning, the nineteenth-century replacement of commodity monies by paper monies should, other things equal, enhance economic development in paper-issuing countries. Under a gold-standard, a stereotypical 19th-century country would need to devote considerable resources to the production of gold for use as money. If the country could substitute paper monies for gold monies, then domestic resources would be freed up to be used in the non-monetary segment of the economy. Moreover, even if this country were devoid of domestic gold mines, significant resources would still have to be devoted to production of items produced domestically; it is just that these domestic items would then be exported in exchange for foreign-produced gold. In either case – whether gold is produced domestically, or instead other domestic products are exchanged for foreign gold – a fraction of the country's resource base would have to be allocated for production of the gold that comprised the intrinsic content of the country's gold coin. The resource cost of gold money is relatively easy to visualize when domestic gold mining involves direct application of domestic resources. The resource cost of gold money is

trickier to visualize when the gold is produced overseas, but the resource cost is there in either case.

Substitution of a paper-money regime in place of such a gold-money regime would avoid expenditure of resources previously devoted to gold production. Since paper money is relatively costless to produce – compared with resource-intensive production of gold coins – the paper-money regime frees up domestic resources for usage in the non-monetary sector of the economy

By the nineteenth century, commodity money was almost exclusively limited to metals like silver and gold.... Because money had intrinsic value, there was no need for the government to guarantee its value, and the quantity of money was regulated through supply and demand for gold and silver. But metallic money has shortcomings because scarce resources are required to dig it out of the ground. (Samuelson and Nordhaus 1995, p.480)

It is through this resource-freeing mechanism that standards of living would rise in countries that issued paper monies in substitution for commodity monies; resources previously tied up in gold production could be redeployed to non-monetary sectors of the economy. It is the freeing up of resources previously bound to the gold money regime that facilitates augmented domestic development. A benefit of paper-money systems, then, is that they mimic the creation of new resources. Existing resources are simply freed up, of course, rather than being newly created, but positive effect in terms of domestic development is the same.

It is instructive to view the ‘silverization’ of late Ming China in terms of the money-and-growth logic just outlined. The nineteenth-century case (transition to paper money and away from gold money) is the reverse of our silverization of China case (transition to silver money from paper money), but the logic is the same. In the case of Ming China, over-issue rendered the paper currency worthless – i.e. there was a hyper-inflation – and a powerful private-sector (and eventually public-sector) surge in the demand for silver resulted. It was this surge in demand that caused silver’s value in China to exceed silver’s value in the rest of the world. As stated earlier, it was the premium price for silver within China that caused massive Chinese imports of silver; divergent bimetallic ratios furnish the most straightforward (but not only) indicators silver’s price premium within China.¹³

Importation of tens of thousands of tons of silver required equally massive exports of silks, ceramics, (later) tea, and many other items of Chinese origin. Resources tied to Chinese exports could have otherwise been devoted to production of goods for the domestic marketplace. As it was, exports (such as silks) embodied resources lost to Chinese society as a result of its transition from paper-based to silver-based monetary and fiscal regimes. Resources previously available to the non-monetary sector under China’s earlier paper-money system, in other words, were diverted and bound-up by monetary and fiscal sectors subsequently lying upon a silver foundation. In other words, silverization of the Chinese economy required that resources previously available for production of myriad non-monetary industries be diverted to a monetary/fiscal sector that now required a vast stock of (resource-hungry) silver.

¹³ Silver continued to be imported into China even when bimetallic ratios converged worldwide (i.e. when arbitrage profits vanished), but non-arbitrage motivation for the importation of silver into China can also be explained with the aid of the Doherty-Flynn model. (See Flynn)

In summary, if it makes sense to state that substitution of paper-monies for commodity monies freed up societal resources during the nineteenth century – a proposition that makes logical sense to me – then the reverse process of substituting silver in place of paper-money in late Ming China must have bound up an immense volume of Chinese resources. It is as if Chinese society had lost a portion of its resources, in the sense that resources were diverted from the non-monetary segment of the Chinese economy to feed silver requirements. China seems to have experienced plenty of economic growth, in other words, but China simultaneously endured enormous costs in terms of stunted development. This discussion brings back into focus the stocks-flows distinction that is the cornerstone of the Doherty-Flynn model outlined earlier. It is perfectly consistent to claim that China may have experienced surges in Gross Domestic Product, in other words, while simultaneously suffering a protracted decline in Gross Domestic Wealth. I believe that the most glaring weakness of modern, neoclassical economics is its nearly exclusive emphasis on time-dimensioned flows – such as GDP – while it all but ignores components of wealth – assets, liabilities, and net worth – that are essential variables. Consider modern-day analogies, such as earthquakes, hurricanes, volcanoes, tornados, wars and other calamities that destroy immense volumes of wealth worldwide today. Our common sense tells us that such events are highly negative, yet the economics profession often depicts such disasters positively in the sense that production is sometimes enhanced as a result of the destruction. But according to this logic, production can also be enhanced in the wake of riotous destruction of household windows too. No sensible person would thereby conclude that riots are generally beneficial to society as a whole. Replacement of destroyed items does not increase societal wealth. Production of new windows without this destruction, on the

other hand, could constitute an accumulation of social wealth. There is production in either case, but one should not lose sight of different implications in terms of society's wealth in each case. And massive exports – through which a country amasses silver holdings – can similarly lead to a reduction in resources available for non-monetary purposes. Stocks and flows operate in tandem, but modern economic theory mostly ignores the critical stocks part of the equation.

I claim, along with many others, that India was the penultimate destination – rather than final end-market – for most silver within Asia throughout the 16th-18th centuries. If this conclusion is correct, then it stands to reason that India (or at least substantial interests within India) may have benefited mightily from the multi-century global trade in silver. Just as other Asians, Europeans, Ottomans, and middlemen elsewhere benefited through participation in the global silver trade, so too middleman India could have achieved gains in wealth through the re-export of silver toward the Chinese marketplace. The silver re-export business may have boosted Indian society in general.¹⁴

On the contrary, if much of world silver production remained within India – perhaps roughly equivalent to the inventory stocks held within Ming-Qing China – then there would have been immense negative social costs associated with accumulation of such Indian silver inventories. Although I am unaware of any move away from paper monies in India that compares with its Chinese counterpart, accumulation of vast quantities of foreign silver (for whatever reason) would have nonetheless implied a significant resource

¹⁴ As with trade in general, plenty of Indian residents could have suffered deleterious effects as a result of silver imports. Still, society could nonetheless be said to have gained overall in the sense that a surplus would have still remained, even if winners are assumed to have compensated losers. There is no reason to believe that such compensation actually occurred, but such distinctions are necessary in order to consider the issue of 'social' gains as distinct from individual gains that arise whether society benefits or suffers.

drain on Indian society. That is to say, prodigious volumes of resources were imbedded in Indian textile (and non-textile) that were exchanged for foreign silver and gold imports. If a preponderance of gold and silver imports did remain inside of India, then the societal cost of these accumulated stocks can be viewed as the land, labour, and capital imbedded in the Indian exports for which they were exchanged. There was no need to replace a huge hunk of India's monetary/fiscal system through destruction of its monetary system – as happened in Ming China – but growth in India's economy could have nonetheless resulted in considerable binding-up of domestic resources as a result of exports-in-exchange-for-silver-and-gold.

The reader might note that the main point of this essay directly contradicts the proposition of Andre Gunder Frank and others who contend that imports of American silver acted as a positive and powerful stimulus for the Chinese economy. Utilizing Irving Fisher's equation of exchange, Frank (1998) contended that American silver failed to stimulate European commerce (since mere price inflation was the result within Europe), while China experienced protracted real stimulation throughout the early-modern period. Unfortunately, such arguments simply restate crude Bullionist positions long-denounced in painful detail by Adam Smith and practically every subsequent economist. Absent models that simultaneously integrate time-dimensioned flows and point-in-time stocks simultaneously – such as the Doherty-Flynn model, however – it is perhaps unsurprising that Bullionist logic is unwittingly repeated over and over in the trade history literature. There is no doubt that explosive silver production throughout the 16th through 18th centuries was a dynamic force in stimulating global trade. Economic historians correctly see remarkable stimulation of world trade and (implicitly) GDP growth around the world. One task of the economic historian, however, is to decipher winners and losers during and after the

birth of a true global marketplace. I believe that most of the world's silver ultimately migrated to China prior to the twentieth century, and that there were immense economic costs for China in the process (China's elevated GDP notwithstanding). And I believe that India absorbed far less world silver than did China during those centuries; to the extent that this is the case, India may have been spared social-resource costs on the scale of those born generally by residents of China.

IV. A final note

In the most recent survey of Indian monetary history, Sanjay Subramanyam asks South Asian specialists for analyses with visions than those traditionally restricted to India or even the Indian Ocean region broadly defined.

In the present essay, a modest attempt is made to extend the ambit of the discussion somewhat by focusing systematically on two areas which are seldom studied together: namely, west Asia and south Asia. One part of the analysis will be aimed at seeing southern and western Asia together in a conjunctural fashion, focusing, in particular, on the issue of flows of coinage metal, while the other will be aimed at a comparative discussion of the principal building-blocks of the historiography in the two cases. The underlying idea, it should be stressed, is not to construct a Braudelian 'super world-economy', which embraces the two regions while at the same time seeing them apart from the 'Rest of the World'. Rather, one wishes to argue that there is more to the 'external relations' of these two regions than their

‘integration into the European world-economy’. As such then, this paper may be seen in part as a plea to widen the comparative perspective rather than an attempt to narrow it down. (Subramanyam, 1994, pp.186-187)

The current essay is an attempt to follow in the spirit advocated by Subramanyam, in an attempt to offer a global view of Indian monetary history. I offer at best a rough sketch of certain aspects of Indian monetary history, and also hope to simultaneously offer a fresh perspective on Indian exports such as textiles. I am convinced that what is most needed is a unified theory that is applicable to monetary and non-monetary components simultaneously.

Numerous economic historians of India have bemoaned the lack of primary-source data with which to falsify or validate this or that theoretical point of view. Assuming that the paucity of reliable primary-source data is unlikely to be resolved in our lifetimes, I would like to offer a few suggestions for potential research options to deal with this issue of India’s absorption of gold and silver. Something resembling a full account of imports and exports of silver and gold are unlikely to appear, but it may be possible to assemble reasonable estimates of the amounts of gold and silver held by groups of Indian society by region. I am thinking here of comments by Deyell (1994, p. 126) regarding Patterson’s estimate that silver holdings may have totalled some 15 grams per capita in parts of Europe and the Muslim world around 800 AD, compared with 100 grams of silver per capita in the Roman world, and 164 grams of silver per capital in 20th-century USA. I personally cannot judge the accuracy of such estimates, but the general approach of estimating per capita inventory holdings of silver (and other items) by region and time might be a useful place to start. If reasonably accurate estimates

of silver holdings could be compiled by occupation and by region, then one could generate estimates of the amounts of silver and gold imports that would be required to sustain regional inventories of certain magnitudes. Reasonably accurate estimates exist for global production of silver, although estimates for gold production seem to be considerably more problematic. Estimates can be constructed for wear and tear of silver holdings, as well as stocks lost via sunken ships and other catastrophes. Population estimates throughout the world are contested vigorously, of course, so the historian of silver flows would have to be quite explicit concerning her/his demographic and other assumptions. We could end up with a set of simulations that provide alternative views of trade history. Simulations most consistent with historical data sets would be given closer scrutiny, while some common interpretations would presumably require simulation-assumptions that appear implausible.