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This paper contains preliminary findings from research work still in progress and should not be quoted without prior approval of the author.

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Money and Inflation in the American Colonies: Further Evidence on the Failure of the Quantity Theory

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In this, as in all of my work on the colonies, I am indebted to John McCusker for his assistance and encouragement. I have also benefitted from correspondence with Joseph Ernst and Ed Perkins and discussions with Valerie Bencivenga and Tom Sargent. I alone am responsible for any errors or omissions, however.

Smith (1985a,b) noticed two facts about the history of the British colonies in North America. (a) There were repeated episodes, across most of the colonies, in which dramatic secular (and short-term) increases and decreases in the supply of (domestically issued) money occurred. In some of these episodes, prices and sterling exchange rates changed approximately in proportion to the change in the (per capita) money supply. In most of these episodes, however, these monetary changes produced almost no price or exchange rate changes. (b) In a large body of historical literature, the explanation given for the lack of association between movements in the money supply, prices, and exchange rates is that the value of money was preserved by fiscal policy actions that accompanied the monetary changes. These actions would make such monetary changes approximately pure open market operations in the sense of Wallace (1981), or Sargent and Smith (1986, 1987).

It may be useful to illustrate with two examples.[1] (i) In the colony of South Carolina, from 1710 to 1720 the per capita stock of money increased by a factor of slightly more than 4.5. From 1710 to 1723 the sterling exchange rate in South Carolina increased by a factor of exactly 4.5.[2] (ii) Later in South Carolina history, the per capita stock of money increased by a factor of 4.3 over the period 1749-1760. Taylor's (1932) price index fell over this same period, and South Carolina currency appreciated against sterling.

Why do two periods of similar length, in the same location, and with very similar per capita monetary changes, look so different in terms of exchange rate (and presumably price) movements? The explanation given in Smith (1985a,b), which simply reflects the opinion given in a wide range of historical literature, is that in example (i) the colony of South Carolina

was engaged in pure monetization of deficits. However, in example (ii) the colony undertook monetary actions that were analytically equivalent to open market operations. In particular, fiscal policy was held approximately constant, in the sense of Wallace (1981) or Sargent and Smith (1987). Hence models of money that imply irrelevance of open market operations, like the models of Wallace (1981) and Sargent-Smith (1986, 1987), explain why the immense monetary increase of example (ii) had no apparent consequences, even for nominal magnitudes. On the other hand, monetization of deficits should lead to declining currency values.

In arguing that underlying fiscal actions prevented declining currency values in South Carolina (after 1727) and elsewhere, Smith (1985a,b) simply followed a large existing literature on the history of money and currency values in the colonies.[3] Moreover, Smith (1985a,b) was hardly the first to notice the absence of co-movements between money and currency values in the colonies.[4] Smith's contribution was to notice that facts (a) and (b) above were consistent with models of money, like those of Wallace (1981) and Sargent-Smith (1986, 1987), that give rise to sufficiently broad Modigliani-Miller Theorems for open market operations. Moveover, once three additional facts are taken into account, facts (a) and (b) are inconsistent with standard models of money, i.e., ones that make velocity a stable function of income, interest rates and perhaps expected inflation and currency depreciation. These facts are as follows:

(c) Over periods of the length examined by Smith (1985a,b), it is widely accepted that per capita output was roughly constant in the colonial period. [Egnal (1975), p. 199, or Letwin (1981), p. 466.] Thus a focus on per capita money stock movements takes adequate account of the possibility of underlying changes in income.[5]

(d) Nominal interest rates were apparently free from major variation. [See Letwin (1981), p. 466, and the references he provides.]

(e) A number of the colonies examined were free from major variation in prices or exchange rates.

Thus the huge variation in velocity in South Carolina from 1749-60 cannot easily be explained by models of money that have velocity depend (in a stable manner) on income, interest rates, and expected inflation/currency depreciation.

Observations similar to example (ii) above abound during the colonial period, as will be indicated below. Moreover, there is a growing body of evidence that American colonial experience was replicated elsewhere. Sargent (1982) interprets the experiences that occurred at the ends of four inter-war hyperinflations in the same way that Smith interprets colonial evidence. White (1986) provides similar interpretations of Spanish experience in the late 18th and early 19th centuries, and Redish (1985) suggests the existence of similar evidence for Canada after 1812.

Since the appearance of Smith (1985a,b), an alternative explanation of colonial experience has been offered by Bordo (1986), Bordo and Marcotte (1986), and Michener (1986). This explanation is that the monetary changes discussed by Smith were, in fact, illusory. In particular, these authors argue that the money stock of the colonies consisted of more than just the paper currency discussed by Smith. They further argue that it might be expected that paper currency movements were offset by sympathetic movements in other components of the (properly defined) money stock.[6] Thus, the fact that no inflation or currency depreciation occurred in example (ii) above, for instance, would be no mystery, since under this view there were no real changes in the money stock.

At this point such suggestions could be dismissed as purely speculative, since none of these authors has produced evidence of a single case of "offsetting" movements in some other component of the colonial money supply. However, Bordo, Bordo and Marcotte, and Michener go further than earlier authors, and hang their arguments on specie flows that offset movements in the paper currency stock. This is surprising, since there is substantial evidence on the relation between movements in colonial paper currency stocks and specie flows. The purpose of this paper is to assemble some of this evidence. As will be clear, there should be no ambiguity that existing evidence suggests that Smith (1985a,b) was correct in arguing that specie flows could not change the picture he presented of movements in the money stock of the colonies.

Bordo, Bordo and Marcotte, and Michener also make the novel claim that the American colonies are best understood as having fixed exchange rates against sterling. Because of the potential for this claim to create confusion, I will document that the colonies are best understood as having flexible exchange rate regimes, as Smith (1985a,b) and all earlier authors have studied them.

The paper proceeds as follows. In order that the discussion be self-contained, section I contains an overview of colonial monetary arrangements and a discussion of other components of the money stock that could have conceivably changed so as to offset paper currency movements. Section II discusses the evidence on how specie flows were related to movements in the paper currency stock. Section III reviews why the colonies are naturally understood as having flexible exchange rates against sterling. Section IV concludes. In addition, since questions have been raised about the relation between fiscal actions and currency values in the colonies,[7] it will be useful to review conventional historical wisdom on this issue. However, since this material is not central to the questions discussed here,it is relegated to an appendix.

I. An Overview of the Monetary Arrangements of the Colonies

The term "money" has been used in a variety of ways when discussing the colonies. Potential candidates for components of the money supply include paper currency (also called bills of credit) issued by colonial governments, specie, commodity monies, bills of exchange (described below), and book credit extended by merchants to customers. During the colonial period discussed by Smith (1985a,b), with only brief exceptions in Massachusetts, there were no privately operated banks.

Each of the colonies had its own unit of account: in the period under discussion here pounds in the currency of the colony in question.[8] As described by Lewis Morris, the governor of New Jersey, "the collonies on the continent very much differ in [the] proportion [that] their currency bears to sterling, and each collony dayly alters." [Quoted by McCusker (1978), p. 116.] Before the colonies printed their own paper monies, these units of account were purely abstract accounting units: almost no money existed denominated in these units. However, the colonies each gave a legislated value to coins of various types in terms of these accounting units, which could be taken as definitions of colonial currency.

Once paper money appeared, it was denominated in the unit of account of the colony issuing it. Then the legislated values given to coins by each colony defined a "par of exchange," which McCusker (1978, p. 21) describes as "the comparative value of the monies of account [in the relevant colony and England]... based on the price in each for a Spanish piece of eight." However, this par of exchange did not fix an exchange rate. Rather, as put by McCusker (1978, p. 21), "par was only a benchmark; the commercial rate of exchange fluctuated around par ...." In particular, colonial governments made no effort to enforce or maintain the par of exchange

as an exchange rate, and commercial rates of exchange could deviate substantially from par. To rely once again on McCusker's (1978, p. 23) description, "the final and most important influence on the commercial rate of exchange was the state of the market for bills of exchange. Here, of course, the laws of supply and demand were at work ...." With these remarks in mind, it is now possible to discuss each of the candidates for inclusion in the money supply.[9]

As indicated, each of the colonies discussed by Smith (1985a,b) printed its own paper currency, denominated in the unit of account of the issuing colony. This was the only currency denominated in this unit of account. Moreover, for the purpose of this discussion, it is reasonable to view each colony as able to formulate an essentially independent monetary policy.[10]

Except in Maryland, which is discussed below, paper currency issues in the colonies were supposed to occur in one of two ways. (i) Currency could be printed to monetize deficits, and was used to purchase goods and services directly. When currency was issued in this way, its issue was supposed to be accompanied by future tax levies. These taxes could be paid in either paper currency or specie, with specie accepted at some defined rate in lieu of paper currency, and were meant to constitute a source of funds to retire the currency issued. Notice that, if applied properly, such a system would in effect convert government decisions about whether or not to monetize deficits into decisions purely about the timing of taxation. Thus the considerations raised by Barro (1974) are relevant in this context. Also, monetary issues could be accomplished (ii) through the creation of loan offices (or land banks). Colonial loan offices were simply an institutional mechanism by which a colony could print some currency, and use it to make mortgage loans (presumably at non-market interest rates). Currency issued in this way

was "backed" by the mortgage purchased, and was supposed to be retired upon repayment of the loan.[11] In colonies with reputations for "efficient use" of these land banks, interest income of the government was effectively rebated to the population through tax reductions: in Pennsylvania and New Jersey essentially all normal government expenditures were funded not by taxes, but by using the interest proceeds of these loans. Thus currency issues accomplished in this way were open market operations in which the government engaged in de facto rebating of excess earnings on its portfolio. Such rebates are an important part of holding fiscal policy "constant" in Wallace (1981) and Sargent-Smith (1987).

In addition to these methods of issuing currency, Maryland issued currency in the form of lump-sum transfers. It backed this currency with a sinking fund invested in Bank of England stock, and used this fund to retire its paper currency stock in part in 1748 and entirely in 1764. Maryland also engaged in currency issues through loan offices and engaged in some monetization of deficits.

To summarize, the features of colonial monetary systems that make them of particular interest to monetary economists are as follows. (i) When money was issued to finance deficits, in fact such issues were accompanied by promised future taxation (if the colonies adhered to their instructions from England). If the timing of taxation is irrelevant (within certain limits), such money issues would have no consequences, even for nominal magnitudes. (ii) When money was issued through land banks, fiscal policy should have been held roughly constant in the background, in the sense of Wallace (1981) or Sargent-Smith (1987). Thus, again such money issues should have been approximately irrelevant, even for nominal magnitudes.

In addition to bills of credit, gold and silver coins circulated in the colonies. These were almost entirely of Spanish and Portuguese origin, and

were not denominated in the units of account of the colonies. Moreover, while colonial legislation and royal proclamations gave legal values to these coins in terms of the colonial units of account, in practice "the proportion that their currency beares to stirling ... dayly alters," as pointed out above. Thus, in fact, gold and silver circulated along with paper currency at a rate that was de facto market determined. To drive this fact home, the following statement in Brock (1975, p. 31) is instructive:

> in general it may be said that, ceteris paribus, paper currency in the colonies depreciated in reverse proportion to the relation that it bore to the amount of silver or gold in circulation in the colony at the time it was issued.

While below it will be argued that this statement is wrong, it does make explicit that the specie value of paper currency has been viewed by students of the period as determined by market forces. This is what Smith (1985b) had in mind when he stated that "there were flexible exchange rates between the currency of each colony and sterling." This will also be the approach followed here.

Some recent literature[12] has adopted the view that the colonies are best understood as having fixed exchange rates against sterling. To my knowledge, this claim has never been made in all of the (large) previously existing literature on money in the colonies. However, this issue will be taken up below. It will be argued that there is no support for such a claim. Moreover, even if one believed it, the colonies would still provide a wealth of evidence against standard models of money.

As a final point that seems worthy of note, a good deal of the specie in circulation appears to have been in relatively large denominations. This limited its usefulness in a number of transactions. This issue is taken up at some

length in Hanson (1979, 1980) and in McCusker and Menard (1985, p. 339).

Another candidate for inclusion in the "money supply" is bills of exchange. Bills of exchange, which are familiar to readers of Smith (1776), for instance, were circulating privately issued liabilities, and thus in some sense resemble circulating liabilities issued by modern intermediaries. However, bills of exchange circulated only in quite large denominations; "the usual value [of a bill of exchange] was £100 sterling ...."[13] Since McCusker and Menard (1985) estimate per capita colonial incomes to be between £10 and £13 sterling, and estimate the average net worth of a "free white person" to be £74 sterling (in 1774), anyone who wanted to include such items in the colonial money supply would have to explain why this is appropriate when equally liquid large denomination liabilities are not included in modern money supply measures.

Yet another component of the "medium of exchange" was book credit that merchants extended to their customers. Ernst (1973) and West (1978), for instance, have suggested that movements in book credit (and other measures of net indebtedness) account for the failure of the "quantity theory" in the colonial period. However, to my knowledge no argument has been constructed as to why book credit should be included in any "accurate" measure of the colonial medium of exchange, while trade credit, credit card balances, etc., are excluded from modern money supply measures. In the absence of such an argument, it seems reasonable not to be excessively concerned about lack of data on book credit when considering the colonial money supply.

Finally, there were commodity monies and commodity notes that had a monetary aspect. However, these appear not to have circulated sufficiently widely to be of concern here.[14]

In summary, then, it appears consistent with standard practice in monetary economics to take the colonial money supply to be specie plus paper

currency. This was certainly what contemporaries meant by money. In Smith (1985a,b), data on movements in the per capita stock of paper currency were used to measure movements in the money stock, since no data on the specie circulation in the colonies exist. Smith, of course, found very large movements in the per capita stock of paper currency which appeared to have no consequences for prices or exchange rates. Since Smith wrote, Bordo (1986), Bordo and Marcotte (1986), Michener (1986), and White (1986) have raised the question (in a purely speculative way) of the possibility of specie flows sufficiently large that Smith's monetary measures were not accurate. The next section reviews, on a colony-by-colony basis, some of the evidence presented by Smith (1985a,b). Evidence on specie flows is then reviewed. It will be seen that specie flows offsetting the monetary movements discussed by Smith are not a possibility.

II. Monetary Movements and Specie Flows

Because there is no data on the quantity of specie in circulation in any of the colonies, the only information available on specie flows is literary evidence. Fortunately, there is a great deal of such evidence, and it is unambiguous. In this section, two kinds of evidence will be offered on this issue.

(i) Bordo, Bordo-Marcotte, and Michener have argued that there could have been specie flows that "offset" movements in the stock of paper currency. In a number of instances enough is known about specie stocks so that upper bounds can be placed on specie flows. In other instances it is apparent that specie inflows occurred while the stock of paper currency was rising, and that outflows occurred while the stock of paper currency was falling. Thus the notion of "offsetting" specie flows will clearly be incorrect.

(ii) In a number of instances it is known that the amount of specie in circulation was very limited over long periods. Hence specie flows "offsetting" large paper currency movements would be out of the question. It will be seen that this was the situation throughout the period in which paper money circulated in New Jersey, North Carolina, and Virginia.

All of the colonies discussed by Smith (1985a,b,) are reviewed below on a case-by-case basis, except for the New England colonies. "Offsetting" specie flows in New England are not at issue in any of the literature mentioned above.

A. South Carolina

The history of currency movements in South Carolina can, for the purposes of this investigation, be divided into four periods. In the first of these periods, which ends roughly in 1727, South Carolina engaged in a major monetary expansion. As seen above, from 1710 until 1720, the per capita stock of paper currency rose by a factor of 4.5. (These movements can be followed in Table 1.)

The period of South Carolina history that ends in 1727 was also one of sustained currency depreciation, as can be seen in Table 1. In fact, currency depreciation over sufficiently long periods occurred in approximately the same proportion as increases in the stock of paper currency. For instance, in 1723 the sterling exchange rate in South Carolina was higher than in 1710 by a factor of 4.5. Thus, over long periods, paper currency movements were associated with approximately proportional currency depreciation.

This fact would not surprise the adherents of any model of money. Until the late 1720's, paper currency movements in South Carolina were not accomplished with fiscal policy held "constant," rather they can essentially be

regarded as pure monetization of deficits.[15] Thus the proportional currency depreciation comes as no surprise here.

1. 1727-1749

After 1727, matters in South Carolina were entirely different. After 1727, the exchange rate between South Carolina currency and sterling was quite stable, never varying by as much as 10% from year-to-year. Moreover, such stability was maintained in the face of major variation in the (per capita) stock of paper currency. For instance, in the year 1731 the stock of paper currency doubled. The sterling exchange rate, however, merely returned to its 1729 level, and thereafter was constant for several years.

From 1731 until 1749, South Carolina experienced a sustained reduction in its per capita stock of (paper) currency. In fact, from 1731 until 1749, the per capita stock of paper currency fell 69%. In the face of this secular contraction in the per capita currency stock, one might expect some increase in currency values. However, the sterling exchange rate did not fall, and price levels (available from 1732 on) rose, in fact being 21.5% higher in 1749 than in 1732.

The fact that these quite large monetary movements did not produce sympathetic movements in currency values would not surprise someone familiar with the models of Wallace (1981) and Sargent-Smith (1986, 1987), since these monetary changes appear to have occurred while fiscal policy was held roughly constant.[16] It might be asked, however, whether there is any evidence of "offsetting" specie flows, making the above events consistent with conventional models of money. The specie flow issue is now taken up.

The period of sustained currency depreciation early in South Carolina's history appears to have resulted in an essentially complete loss of specie.

Ernst (1973), for instance, says (p. 6) that (before 1731) "in instances such as South Carolina and Rhode Island, runaway prices seem to have driven coin out of circulation." Thus there could have been no specie to produce any significant (much less offsetting) outflows against the doubling of the currency stock in 1731.[17]

From 1731 to 1749, as the paper currency stock declined in per capita terms by 69%, were there offsetting specie inflows? Apparently there were not; as the per capita paper currency stock declined, there were apparently no specie inflows sufficient to prevent increasing monetary stringency. For instance, according to Jellison (1959, p. 564), by the late 1730s and early 1740s the currency stringency was acute:

> After 1739, South Carolinians returned to the problem of increasing the amount of currency in circulation ... using the old argument that there was not enough currency in circulation to conduct the business of the province. During the early 1740s the Commons House received several petitions from planters, local merchants, and others complaining about the currency shortage.

Thus this period was exactly as it appears based on movements in the paper currency stock: a period of monetary contraction.

The bottom line, of course, can be viewed as the situation in 1748-49 at the end of the period of monetary contraction. Was there a significant amount of specie, representing even approximately offsetting specie flows? The answer, according to existing literature, is no. As stated by Brock (1975, p. 455-6),

> in the years from the close of King George's War [which ended in 1748] until the opening of the French and Indian War, during which there were no new paper issues and the last of the old public orders [paper currency] were retired, the province was forced to place greater reliance upon specie to circulate its trade. At the beginning of the period [1748] specie appears to have been relatively scarce. [my emphasis]

Moreover, Brock (p. 456, footnote 76) quotes the following notice in the South Carolina Gazette of December 11, 1749: "as gold and silver is now become scarce here ...." Thus the specie situation in 1748-49 does not appear to be markedly different than it was circa 1730, much less what would be required to offset a reduction of 69% in the per capita stock of paper currency.

Finally, there is some issue as to whether specie should even be viewed as an important component of any "medium of exchange" in colonial South Carolina. According to Brock (1975, p. 166)

> As a committee of the [South Carolina] assembly expressed it in 1739, after the introduction of bills of credit in the year 1703, gold and silver had "for the most part been dealt for as a merchandize, and not as a currency in payments, or a medium of trade."

Apparently, this opinion had not changed by the early 1750s, since a resolution of the Commons House of South Carolina stated that "the plenty and scarcity of Silver and Gold in [the] Province [is] altogether casual, and therefore not at all to be relied on as a Medium of Trade." [Quoted by Brock, p. 447.]

2. 1749-1760

The period 1749-1760 is one of dramatic monetary expansion in South Carolina. The per capita stock of paper currency rose by a factor of 4.3 in eleven years. (Table 1.) Most of this increase was accomplished after 1755: from 1755 until 1760 the per capita paper currency stock more than tripled.

Movements in prices and exchange rates are not what one would expect

based on standard models of money, however. From 1749 to 1760 prices fell slightly (prices rose only 7% from 1755 until 1760) and the sterling exchange rate rose (South Carolina currency appreciated). This is not a surprise based on the analyses of Wallace (1981) or Sargent-Smith (1986, 1987) however. These monetary increases were well backed by future tax increases, which according to these models would have prevented significant effects on even nominal magnitudes.[18]

What about specie flows during this period? Contrary to what Bordo, Bordo-Marcotte, and Michener assert should have happened, South Carolina experienced inflows of specie during this period, which may have been quite large. To begin, it has been seen that specie was "relatively scarce" in 1748-49. However, "by the middle of the [next] decade the [specie] stock must have increased somewhat over that in the province at the close of the last war [1748] ...." [Brock (1975), p. 457.] In fact, after the "relative scarcity" of specie in the late 1740s, Brock (p. 447, 457) presents some evidence that specie may have made up one-half to three-fifths of the total money stock by the mid-1750s (although Brock clearly regards these figures with some deserved skepticism). Thus, at least according to Brock, there were specie inflows during this period, which may have been very sizable. In other words, a focus on the paper currency stock likely presents a (possibly severe) underestimate of the monetary expansion in South Carolina at this time.

1760-1770

The final episode studied by Smith (1985b) in South Carolina monetary history was the massive monetary contraction of 1760-1770. Over this period the per capita stock of (paper) money was reduced by 63%. In the face of

this marked secular contraction in the money supply prices rose (after 1762), and the sterling exchange rate similarly rose (South Carolina currency depreciated).

The Bordo, Bordo-Marcotte, and Michener explanation for this is apparently that the contraction of the paper currency stock was "offset" by specie inflows. Such a claim gathers little support in the historical literature, however. For instance, Ernst (1973, p. 89) says the following:

> Within a year of the passage of the Currency Act of 1764, the rapid contraction of wartime paper money issues and a growing shortage of specie [my emphasis] led New York, Pennsylvania, and South Carolina to instruct their colonial agents to lobby for the law's repeal.

This "shortage of specie" apparently persisted throughout the period. According to Ernst (1973, p. 216).

> in August 1769 the Commons House [of South Carolina] authorized yet another reprint [of paper currency] in an effort to return the full supply of lawful currency to the monetary stream. The reissue was prompted by the desperate shortage of cash.... "The situation of the Province is very distressed for want of a Medium of Trade," was the way one of the leading debt collectors, Peter Manigault, put it in the spring of 1768: "we have but little Currency and all the Gold and Silver is swallowed up by the new Duties."

Thus the period 1760-1770 was exactly what it appears on the basis of examining paper currency movements; a period of severe monetary contraction. Moreover, there were apparently specie outflows rather than inflows.

B. New York

The discussion of New York here will be confined to periods for which I am aware of information on background specie movements. This limits the discussion of New York to the period beginning in about 1755.

1. 1755-1760

As was the case in all of the colonies, the years 1755-60 were ones of large increases in the paper currency stock of New York, as the deficits created by the French and Indian War were financed via money creation. Over this period, the per capita paper currency stock of New York rose 89% (Table 2). As Table 2 indicates, however, over this same period the price level in New York city rose less than 20%, and New York currency depreciated by only 7% against sterling.

Over these years (and in fact until about 1762 or 1763), there were massive inflows of specie (and other sources of funds) into New York for two reasons. First, New York received large Parliamentary grants (some of which were in specie) for its role in the war. Second, much of the British expenditures on the war flowed to New York. Thus the increases in the paper currency stock cited above certainly understate the degree of monetary expansion in New York from 1755 to 1760.

To get a picture of the magnitude of specie inflows, it is useful to begin by noting that from 1756 until the end of the French and Indian War, over £3.5 million sterling flowed from Britain to North America, not including the payment of officers, expenditures for provisions, or ordnance charges. New York itself received Parliamentary grants with a value in New York currency of about £195,000 (not all of which was specie).[19] By way of comparison, the colony issued about £485,000 in paper currency over the years 1755-60. Thus the effects of Parliamentary grants were substantial.

However, this only begins to scratch the surface of the sources of specie inflows into New York.

Valuable as the parliamentary grants were in providing specie and exchange, they were in New York's case small in comparison to the sums of specie

brought into the colony's (sic) and the bills of exchange sold there as a result of the fact that large numbers of his majesty's forces were located in the colony. [Brock, p. 348.]

In short, as summarized by Brock (p. 350), "there were sizable importations [my emphasis] of specie into New York, both from England and from the other colonies."

Finally, there were apparently other sources of specie inflows than these. According to Brock (p. 351),

The role of the West Indian trade in supplying specie and exchange during the war is difficult to appraise with any certainty. It seems, however, that trade with the Spanish islands during the later years of the war constituted a not unimportant source of specie.

To summarize, the paper currency movements studied by Smith (1985a) probably substantially understate the monetary increases in New York during 1755-60. Inclusion of specie flows does not make matters better for conventional models of money.

2. 1760-1770

This period saw a reduction of 86% in the per capita paper currency stock of New York (Table 2). At the same time, the price level in New York city, fell 2%, and the sterling value of New York currency did not rise.

In addition, there were obviously net specie outflows during this time. It has been seen that a great deal of specie flowed into New York in the late 1750s and early 1760s. However, "by the end of 1763 ... the tide had turned. On December 2, 1763, the New York merchant John Watts wrote ... we have nothing remaining but Paper Currency." [Brock, p. 352-3.] Brock further argues

(p. 535) that "New York entered the period of [paper] currency restraint and trade regulation ... with her specie exhausted and her paper medium contracting rapidly." Further, Ernst (1973) has already been quoted to the same effect. Apparently the situation was essentially the same later in the decade. As Ernst (1973, p. 259) says in discussing 1766-68, "because of the critical shortage of coin [my emphasis] in this area, the customs official in New York had customarily either accepted paper money in lieu of specie or extended long-term credit." Further, Ernst (1973, p. 251-2) argues that

> the major complaint in 1768 as in 1767 was the stringency of money .... Merchant John van Cortlandt was only expressing a widespread feeling in the period when he informed his London supplier that "there is not enough money circulating to do business." .... Common opinion held that additional amounts of paper money were necessary ....

Thus, the period at hand was exactly what it appears to be on the basis of examining movements in the paper currency stock -- a period of severe monetary contraction. Moreover, at the beginning of the decade specie was apparently present in New York in large quantities. This was not the case later in the decade. Hence the monetary contraction was accompanied by specie outflows.

C. Virginia

1. 1753-1760

Virginia had no paper money before 1754. However, after this date Virginia printed paper money at a rapid rate until 1762 (Table 3). From 1755 to 1760, the per capita stock of paper money in Virginia rose 749%.

In the face of this increase by a factor of nearly nine in the (per capita) stock of paper money, the exchange rate between Virginia currency

and sterling depreciated 9%. (There are no price indices for Virginia.) In light of the fact that Virginia paper currency issues were apparently well-backed by future tax proceeds,[20] this is not surprising in terms of the models of Wallace (1981) and Sargent-Smith (1986, 1987). In terms of conventional models of money, however, the above seems possible only if there were substantial counteracting changes in other components of the "money supply."

It is interesting to examine the issue of specie flows in Virginia, since in all of the arguments about specie flows given by Bordo, Bordo and Marcotte, and Michener, Virginia during this period is the only time and place identified as a specific candidate for offsetting specie flows. In particular, Michener (1986, p. 28) quotes the English traveller Andrew Burnaby, who wrote in 1759, as follows: "the use of paper currency in this colony has intirely banished from it gold and silver." Michener then interprets this as evidence of offsetting outflows of specie from Virginia in the late 1750s.

Burnaby's report that there was essentially no specie in Virginia in 1759 was probably correct. It is not evidence of offsetting outflows of specie, however. There are two reasons for this. First, Virginia was essentially drained of specie before most of its paper currency issues occurred. Hence these issues did not lead to the absence of specie in Virginia. Second, there was not enough specie in Virginia at the time of these paper currency issues to produce any "offsetting outflows" of specie.

On the first of these points, it is clear that coin was quite scarce in Virginia by 1754, before any paper currency issues had occurred. According to Brock (1975, p. 468), "on March 18 [1754], Governor Dinwiddie wrote ... 'money is scarce, and I have been much disappointed by the Treasurer, who says

he has none, nor can he borrow any." (Recall that there was as yet no paper money, so this is a statement about specie.) Brock then quotes a series of countemporary private citizens to the same effect.[21]

This scarcity apparently did not improve in the next two years, since Ernst (1973, p. 49) says that "heavy emissions of treasury notes provided Virginia's only circulating medium" (i.e., there was no specie), and says in his discussion of the year 1755 that "[Governor] Dinwiddie admitted that for the present the lack of specie in Virginia made wartime paper currency issues expedient." [Ernst (1973), p. 48-9.] Thus the conclusion of Brock (1975, p. 350-1) that Virginia was "drained" of silver by early 1756 appears entirely warranted.[22] Since the bulk of Virginia paper money issues occurred after this (Table 3), they were hardly responsible for the absence of specie. And, of course, the absence of specie by early 1756 makes offsetting specie outflows out of the question.

On the latter issue, the historical literature is in complete agreement. For instance, Ernst (1973), p. 15 says that "the normal dearth of coin [my emphasis] in Virginia meant that any extended external drain quickly reduced specie stocks to the vanishing point," (i.e., that large and sustained offsetting specie flows were not within the realm of possibility). This opinion also is advanced by Soltow (1958, p. 480): "the scarcity of gold and silver on many occasions limited the practice of making bullion shipments."

The impossibility of offsetting specie flows is adequately illustrated by the following. According to Ernst (1973), p. 48, "by the beginning of 1756 there was reportedly less than £20,000 cash in the whole country [Virginia]."[23] But in 1757 alone, Virginia issued over £180,000 in paper currency. Hence offsetting specie outflows are a clear impossibility. Adding to this the fact that Virginia received a Parliamentary grant, in specie, of £32,269 in 1757,[24]

and that this represents a lower bound for specie receipts from this source, it is apparent that Virginia's monetary expansion from 1755-60 is reasonably represented by movements in its stock of paper currency.

2. 1760-1770

The shortage of specie in Virginia persisted into the early 1760s. In discussing the year 1762, for instance, Ernst (1965, p. 58) says that "the quitrent fee of two shillings per 100 acres payable in sterling had in the absence of specie come to be levied in paper at the legal exchange rate of 125," and says further (p. 57) that "without specie, [paper] currency provided the only medium of local payment."

Against this background, a contraction of the stock of paper currency began in which, from 1760 to 1770, the per capita currency stock fell 98%. This was accompanied by only a 16% appreciation in the exchange rate between Virginia currency and sterling.

The dramatic contraction of the stock of paper money in this decade does not appear to have been accompanied by any "offsetting" specie inflows, as reports of the monetary situation in Virginia continue to present a picture of a severe monetary contraction. Typical is Evan's (1962, p. 524) report of a "real scarcity of a circulating medium in Virginia in the ten years prior to the Revolution." Thus the situation appears to have been exactly what one would have expected based on an examination of paper currency movements: a huge secular contraction in the money stock. This contraction, however, was not accompanied by anything like proportional movements in currency values.

D. New Jersey

Legislation was passed in 1723 enabling the first New Jersey issues of paper currency. This and subsequent issues, along with the exchange rate between New Jersey currency and sterling, can be followed in Table 4. (There are no price indices for New Jersey.) As can be seen, there is little or no relation between movements in the per capita stock of paper currency and currency values. For instance, from 1730 to 1740 the per capita stock of paper currency increased by a factor of more than 2.5. Despite some gaps in the available exchange rate data, the lack of any major currency depreciation is apparent. After 1740, on the other hand, New Jersey experienced pronounced secular contraction in its paper currency stock. By 1750, the per capita stock of paper currency was only 38% of its 1740 level. Not only did this decline fail to raise the value of New Jersey currency, but New Jersey currency depreciated slightly over the decade.

The lack of any relationship between currency values and movements in the stock of paper currency cannot be explained by offsetting movements in specie stocks. This is the case since New Jersey never had any significant stock of specie. Hence specie outflows in large quantities over 1730-40 or specie inflows during 1740-50 are out of the question. As stated by Phillips (1865), p. 62, "these [paper] issues, with a very small amount of specie and a few notes of some of the adjacent provinces,[25] constituted their [New Jersey's] whole money." This view, along with the impossibility of major specie flows, is also expressed by Brock (1975), p. 86: "there was little or no specie in the colony, nor was there any way of obtaining the metals."

It may be useful to review some of the evidence on the absence of specie in New Jersey in greater detail. To begin, when paper currency issues were authorized in 1723 there was little coin in the colony. This is clearly

stated in the preamble to the act enabling currency issues: "whereas many petitions and applications have been made to his excellency ... setting forth that the silver and gold, formerly current in this province, is almost entirely exported to Great Britain and elsewhere ...." [quoted by Phillips (1865), p. 64.] This view was echoed by the colonial governor.

> Governor Burnet wrote in 1724, that, while the annual charge of government in the colony was only £800, "there was so litte Silver of any sort in the Country, that the People were forced to cut their Spanish gold into small bits and sometimes their earrings" to pay this small sum in taxes. [Brock (1975), p. 86, footnote 51.]

This shortage of specie apparently persisted into the late 1730s and early 1740s. For instance, a letter from Governor Lewis Morris to the Board of Trade dated May 26, 1739 "gives the following account of the province. 'There is but little, if any, gold or silver in the province, their whole commerce ... being managed by means of paper bills of credit.'" [Phillips (1865), p. 69.] Brock agrees, stating that (p. 92) "as had been the case in 1723, so in 1741 little specie was to be had," and (p.95) "a moderate amount of bills of credit seems to have been essential to New Jersey's prosperity during this period when no specie was to be had."

Finally, even the dramatic contraction in the stock of paper currency after 1740 does not appear to have created any significant stock of specie, since Brock (1975, p. 395), discussing the year 1753, refers to "that little foreign specie of which they [i.e., New Jersey] [were] possessed." Thus the paper currency contraction beginning after 1740 does not seem to have been "offset" by specie flows.

E. Maryland

Maryland began issuing paper currency in 1733 for the explicit purpose of providing a medium of exchange for the (by then significant) part of the colony that did not grow tobacco. Maryland currency issues, and the exchange rate between Maryland currency and sterling can be followed in Table 5. (Price indices are available for Maryland only relatively late in this period. See Adams (1986) for a partial price and wage index.)

Co-movements in Maryland currency values and the stock of paper currency in Maryland are examined in great detail in Smith (1985b). Because of the relatively complex system adopted by Maryland for backing its currency, these results are not readily summarized in a brief review. However, it suffices to say that Smith (1985b) found no relationship between currency values and the per capita stock of paper currency in Maryland.

On the issue of specie flows, Maryland is another case in which there appears to be no disagreement that specie inflows occurred while the stock of paper currency rose. This claim appears in Gould (1915), and is echoed by Brock, who says (p. 105) "it [Maryland's paper currency emissions] did not, to any great degree, supplant any other form of currency .... Specie, over the whole period, seems to have increased rather than diminished."

The literature suggesting that offsetting specie flows should accompany paper currency movements does not dispute the claims of Gould and Brock. Rather, the claim is made that paper money in Maryland was not "really" money, because its velocity of circulation was too low. Thus, according to Michener (1986, p. 7), Maryland paper money "would be treated not as money, but as bonds." In support of this claim, Michener argues (footnote 11) that "the comparative unimportance of Maryland money as a medium of exchange is graphically illustrated by McCusker's Maryland exchange rate data."

In view of this statement, it is instructive to consider what McCusker (1978, p. 191) actually says: "coin soon began to serve a supplementary, even secondary role. From the 1730s to the mid-1750s 'the current money of Maryland' meant paper money." Thus, apparently, unless it is appropriate to consider Maryland a barter colony, paper currency enjoyed a velocity of circulation for most of the period at least as great as any other component of the money supply.

Interestingly, McCusker (1978, p. 193) then goes on to argue that the fiscal policy "backing" Maryland currency did dramatically affect its velocity of circulation in later years.[26] This, of course, is exactly what Modigliani-Miller Theorems for open market operations assert; that velocity can vary widely in ways depending on fiscal actions underlying monetary changes. Thus McCusker's argument is a (non-statistical) confirmation of the findings in Smith (1985b). Furthermore, the finding that fiscal actions directly affect velocities of circulation is exactly what Friedman and Schwartz (1982, p. 31) claim lacks any "systematic empirical ... support."

F. North Carolina

Paper currency circulation and sterling exchange rates for North Carolina appear in Table 6. (No price index is available.) As discussed at length in Smith (1985b), until 1748 North Carolina's paper currency issues represented pure monetization of deficits. Not surprisingly, North Carolina's currency depreciated severely.

After 1748, although still not entirely "well-backed," North Carolina currency issues conformed much better to the paradigm outlined in section I.[27] During this period, there was little relation between movements in the (per capita) paper currency stock, and movements in currency values. For instance,

from 1750 to 1760 the per capita paper currency stock increased by a factor by 2.4. The sterling exchange rate rose by about 43%. Then, from 1760 until 1768, the per capita paper currency stock was more than halved. The value of North Carolina currency against sterling appreciated only 5%. Thus there were substantially less than proportional (long-run) co-movements between the money stock and currency values.

North Carolina, like New Jersey, is an instance where there was apparently never any significant specie stock. Hence offsetting specie flows are again an impossibility. For instance Brock (1975), in his chapter on currency situations before 1751, says of North Carolina (p. 107-8): "it appears certain that there was never any substantial amount of coin in the colony throughout the period." The impossibility of specie flows offsetting variations in the paper currency stock is apparent; as argued by Brock (p. 113), "when the first bills [of credit] were emitted there was no gold or silver to be displaced by them; nor was the barter currency supplanted by them," and (p. 114) "in a colony such as North Carolina ... there were no silver and gold to be displaced by the bills [of credit]."

This situation had apparently not changed by the late 1750s, about which Brock (1975, p. 443) says "so scarce was specie, that the only medium in many cases in which payments to the crown could be made was bills of credit." Since such payments were meant to be made in coin, this indicates a genuine shortage of specie. Nor had the specie shortage improved by the late 1760s or early 1770s, even after the sustained contraction of the paper currency stock. Ernst (1973, p. 206) refers to the "dearth of specie" in North Carolina at this time, and provides the following more detailed characterization (p. 199-200):

> By the end of the [French and Indian] war hard cash was in short supply throughout North Carolina. Late in 1765 Governor William Tryon reported home that while a few coins still passed in the maritime counties scarcely any circulated in the backcountry. And the situation promised to get worse as local merchants continued to remit what little specie came to hand to British and foreign markets. As for the effect of the recently enacted stamp tax, the governor asserted that the duties to be paid in the province's five superior courts alone would in a year's time consume the available stock of hard money....

Nor did the availability of specie increase later in the decade, as Ernst provides the following view of North Carolina in 1771 (p. 295):

> In general [Governor] Martin's view was that paper money of any kind was 'inducive of a fraudulent medium of circulation.' Nonetheless he felt that the great deficiency of specie in North Carolina dictated the need for some paper currency.

In general, the scarcity of coin in North Carolina is amply indicated by the fact that Bullock (1900) regarded it as necessary to devote two pages (p. 176-7) to arguing that it is plausible to think that there was any specie at all in North Carolina in the late 1760s. In view of the fact that the paper currency stock had declined dramatically, it is apparent that there were basically no net specie inflows, much less "offsetting" inflows.

G. Pennsylvania

1. 1723-1730

Pennsylvania issued its first paper currency in 1723 during a period of apparent economic depression, and in a period where the specie stock of the colony was apparently nearly depleted.[28] This first paper currency issue had been partly drawn in, reducing the stock of paper currency somewhat, by 1728.

In 1729 the colony increased its paper currency stock by 79%. As shown in Table 7, price measures indicate no inflationary consequences of this increase, nor did the sterling exchange rate depreciate much. Thus the sizable paper currency expansion in 1729 had no important effects on currency values.

It would appear that this increase was not offset by specie outflows. This is for the same reasons as in New Jersey, North Carolina, Virginia, and certain periods in the history of South Carolina. In particular, it appears that there was very little specie in the colony that could have flowed elsewhere. Lester (1938, p. 351-2), for instance, says of two contemporaries

> Both Logan and Norris [contemporaries] stated that gold and silver were entirely withdrawn from circulation .... Logan stated that gold was then 'so scarce that my family in my absence have not received the value of £5 of it for every hundred pounds in paper.'

Lester (1938, p. 360) says further that "in February 1728, the following statement on business conditions appeared in the Pennsylvania Gazette: 'Money here seems very scarce ...," suggesting a lack of specie flows to offset the paper currency contraction of the mid 1720s. Letwin (1981, p. 462) also indicates that contemporaries routinely reported a lack of specie during the late 1720s: "for example, Samuel Powel of Pennsylvania wrote in 1728 ... 'and for shipping silver I can't pretend to do that for it was never so scarce as now. If I were to pawn all I have in the world, I don't think I could pick up £100 in all our town." Thus there was no specie to generate offsetting specie outflows at this time.

2. 1730-1755

After 1730 Pennsylvania experienced a secular decline in its per capita paper currency stock. From 1730 to 1750, in fact, the per capita paper currency stock fell about 47% (Table 7), while prices rose and the sterling exchange rate depreciated.

This, of course, is contrary to what one would expect on the basis of standard models of money. However, Pennsylvania between 1730 and 1760 would also appear to be the strongest candidate for offsetting specie flows in the colonial period. In particular, if the reports above are reasonably accurate, then McCusker's (1978, p. 180) discussion indicates that there must have been a substantial influx of specie. Moreover, Pennsylvania received specie shipments from England in the late 1740s in payment for expenses incurred during King George's War. Whether specie inflows were large enough to "offset" the secular decline in the paper currency stock would be hard to know, but movements in the paper currency stock would seem to overstate the extent of monetary changes in Pennsylvania during this time.

3. 1755-1760

As in all the colonies, Pennsylvania experienced a marked increase in its stock of paper money during these years. From 1755 until 1760, the per capita stock of paper money rose 277%. Nevertheless, sterling exchange rates appreciated, and the price level in Philadelphia rose only 17%.

Again, noting that (at least according to McCusker (1978), p. 180) Pennsylvania was perhaps the most coin rich of the colonies at the beginning of this time period, it would appear to be the best candidate for offsetting specie outflows. In fact, Brock (1975) argues (p. 386-389) that specie

outflows (plus population growth) probably resulted in approximately no net change in the per capita money supply of Pennsylvania at this time. It is instructive to consider Brock's argument in detail, since this will indicate what extreme assumptions must be made to generate offsetting specie flows in (perhaps) the most specie rich of the colonies.

Brock (p. 386), while noting that there is conflicting evidence, takes the number 80% to be the ratio of specie to specie plus paper currency in 1753. He then computes the implied specie stock to be about £300,000. Over £400,000 of paper currency were issued from 1755 to 1760, and in addition Pennsylvania received specie from England, as did the other colonies. Thus an offsetting specie outflow is still not possible, even if all specie had left Pennsylvania by 1760. Thus Brock (p. 387) revises his estimate of the specie stock of Pennsylvania to £400,000 (p. 387), which would make the ratio of specie to the total money supply about .83. Brock is then obviously able to produce offsetting specie outflows.

This exercise is interesting, since it indicates the heroic nature of the assumptions required to generate "offsetting" specie flows, even in Pennsylvania which was rich in specie and which had a not unusually large increase (by the standards of other colonies) in its paper currency stock during 1755-60. In particular, Brock's estimate that specie comprised at least 80% of the money supply is well out of line with other estimates in the literature. For instance, Weiss (1970, p. 779) estimates that in 1774, in Pennsylvania, "between 40 and 48 percent of the money supply would therefore have been the paper money issued ...." (Under the "endogenous money supply" view of Bordo, Bordo-Marcotte, and Michener, things should not have been too different in the early 1750s, since the per capita paper currency stock was not markedly different in 1774 than in 1750.) Further, the estimate of Weiss

regarding the composition of the money supply is itself out of line with other estimates. Letwin (1981, p. 467) ventures the guess that paper money constituted about 67% of the Pennsylvania money supply circa 1730, declining more or less steadily to about 60% in 1775. Since Letwin's usage includes more than specie and paper currency in the "money supply," this suggests that 40% represents an upper bound on the specie component of the money supply. Moreover, this is generally consistent with the widely cited contemporary estimate of Peletiah Webster.[29]

Since Brock (1975) is not quite able to generate offsetting specie outflows under the assumption that specie constituted 80% of the Pennsylvania money supply, the above underscores how difficult it is to generate "offsetting specie flows" even in a specie-rich colony, which was moreover engaged in a not particularly large (relative to the other colonies) expansion of its paper currency stock at this time.

4. 1760-1770

Again as was true elsewhere, the decade of the 1760s was one of marked contraction in Pennsylvania's currency stock. The per capita paper currency stock was reduced by 68% in ten years, while the price level in Philadelphia fell 3% (Table 7), and Pennsylvania currency appreciated only 3% against sterling.

Offsetting specie inflows, and even significant specie inflows, would not appear to be a possibility during this decade. Ernst (1973) has been quoted above to the effect that specie was in short supply by 1764. This situation persisted:

By the beginning of 1766 the amount of paper in circulation ran close to £290,000 out of the total of £330,000 outstanding at the end of the war. Coin supplies apparently diminished far more rapidly [my emphasis]. [Ernst (1973), p. 102.]

In short, as it appears on the basis of paper currency stock movements, this was a period of dramatic monetary contraction. For instance, "by late 1767 and through the next year numerous news-paper articles appeared citing the great scarcity of money." [Ernst (1973), p. 107.] Thus this was an episode of significant secular monetary contraction that was unaccompanied by any noticeable change in currency values.

H. Summary

In summary, during many of the episodes discussed above, there was not enough specie to allow for offsetting specie flows, in either direction. As put by Brock (p. 532), "in ordinary times the supply of specie was at best meagre and uncertain, and was not infrequently wanting altogether." Remarks of this form on the lack of specie abound in the literature.[30] Moreover, in some instances, movements in the specie stock and the stock of paper currency were obviously in the same direction, as was the case in New York (1755-60), South Carolina from 1749-1770, and in all the colonies from 1760-1770.[31] Thus attempts to account for the lack of relation between variations in the paper currency stock and currency values by appealing to offsetting specie flows would seem to be doomed to failure.

III. The Exchange Rate Regime

As shown above, there is little evidence in favor of the idea that movements in the stock of paper money in the colonies were "offset" by

specie flows. According to Bordo (1986), Bordo-Marcotte (1986), and Michener (1986), this should be surprising. In particular, these authors have argued that the colonies are best understood as having fixed exchange rates against sterling. Being small open economies, their money supplies should therefore have been endogenous, and increases in the paper currency stock (which could not be spent elsewhere) should have displaced some other component of the money supply.

The apparent absence of appropriate specie flows already indicates that this view is erroneous. However, it is also strange to argue that the colonies are best understood as having fixed exchange rates. The Bordo/Bordo-Marcotte claim is based on the legal rates between specie and colonial units of account discussed in section I. Michener's claim is that exchange rates were determined by some unspecified "social conventions" of merchants that established "customary" rates of exchange.[32,33] However, Michener (p. 19) also appeals to "legal sanction" of these conventions by the colonies themselves.

In light of these arguments, this section proceeds as follows. First, it will be shown that conventional wisdom is that the colonies should be viewed as having flexible exchange rates. Second, some evidence on a colony by colony basis will be presented on this issue. Third, and finally, since Bordo, Bordo-Marcotte, and Michener all appeal to legal enforcement of some exchange rate, it will be shown how colonial courts actually settled sterling debts that were paid in paper. This will provide considerable evidence that exchange rates in the colonies were not fixed against sterling.

A. Overview

It has already been seen (section I) that Brock (1975) viewed colonial exchange rates against sterling as being determined by market forces. This

is further evidenced by his statement (p. 535-6) that "in the paper money colonies the value of coin followed the fortunes of the paper issues," i.e., that the value of coin in terms of colonial units of account was not fixed. Governor Lewis Morris' view has also been recorded by McCusker (1978) and reported in section I. This view apparently reflects McCusker's: there was not a fixed rate between colonial currency and sterling.

Such an attitude reflects a consensus view of the literature on the history of money in the colonies. For instance, according to Ernst (1973, p. 15), "the rate of exchange is [was] a price determined by the play of market forces." Ernst (1973, p. 15) goes on to argue that "what little specie did remain in Virginia [for instance] commanded a premium -- despite the laws rating paper and coin as equal [my emphasis] .... In brief, at a time of panic and depression, the limited metallic standard broke down, leaving fiat money to do the work as best it could."

This view is echoed by Ferguson (1953, p. 18), who says that when "sterling bills [of exchange] became scarce and expensive, ... specie [my emphasis] and bills of exchange rose in value relative to paper money," and Lester (1938, p. 325) who refers to the colonial "paper standard." Further reports to the same effect appear in Hammond (1957, p. 10): "the bills of credit of colonial governments ... [might] either be kept equal to specie in value or not," in Weiss (1970, p. 775): "if the colonists suffered from a loss of specie, we should find that specie rose in value, ..." or in Bullock (1900, p. 78): "the direst direct penalties ... were imposed upon those ... who should dare to discriminate in favor of specie; but such forcing laws were as ineffectual in supporting the credit of paper money as they have proved in all other cases."

It is also the case that colonial governments took no actions to maintain any exchange rate. As described by Nettels, (1934, p. 262),

Besides providing taxes with which to redeem newly issued bills of credit, the colonies used other devices to uphold their intended values in specie. Acts of issue generally promised that the holders of the colony's bills might at any time exchange them for any stock in the colonial treasury. But since the treasuries ordinarily did not have any stock of either specie or goods of approved value, this promise probably had no effect in maintaining the specie value of bills.

And, as will be seen below, many colonial governments regarded any efforts they might take to maintain exchange rates as futile. If this was true for colonial governments, it is difficult to see why it would not be true for merchants. In any event, the exchange rate situation is now treated on a colony-by-colony basis. Again, since there is no question about how New England is to be regarded, the New England colonies are not discussed here.

B. South Carolina

As discussed above, Brock (1975, p. 166) quotes a committee of the colonial assembly to the effect that "after the introduction of bills of credit in the year 1703, gold and silver had 'for the most part been dealt for as a merchandize, and not as a currency in payments, or a medium of trade.'" This would not seem to be a description of a fixed exchange rate regime.

C. New York

That specie did not circulate at fixed rates (or within specie export and import points) is amply indicated by the fact that in 1768 the New York "Chamber of Commerce appointed a committee to establish the value in New York currency of the major coins in circulation ...." [McCusker (1978), p. 156.] This would hardly have been necessary under a fixed exchange rate regime. Nor would it have been necessary if the merchants making up the

Chamber of Commerce had been "maintaining" an exchange rate, as Michener contends.

It is also interesting to notice the attitude of New York courts toward how sterling denominated debts could be paid in paper. This attitude yields considerable information both about the exchange rate regime, and about "legal sanctions" of "customary rates." According to Brock (p. 340, footnote 10), "in the case of debts due in sterling, the practice in New York was to give judgements in bills of credit in sums sufficient to purchase the sterling amount of the debts." Or, in other words, a fixed rate between coin and paper currency was not enforced on such settlements. Of course, in view of the relationships between specie and colonial currency cited above, this is hardly surprising.

D. Virginia

The determination of exchange rates in Virginia is discussed in great detail by Soltow (1958), who describes regular meetings in Williamsburg of an organized foreign exchange market. In this market,

> As contemporaries pointed out, the price of sterling in Virginia was 'regulated chiefly by the Quantity of Money and the Number of Bills brought to the Market.' At times when the supply of cash was 'so scarce, that there was not sufficient at the General Court to satisfie the demand of the Drawers,' the exchange rate declined. If 'there was more money than Bills,' the price of sterling rose." [Soltow (1958), p. 475]

Soltow also describes how "the Williamsburg meeting of merchants provided the major market for sterling exchange," (p. 474), and says that (p. 478) "at times when the supply of cash was so scarce ... the exchange rate declined. If 'there was more money the Bills,' the price of sterling rose."

This description of free market exchange rate determination is certainly clear enough. It is echoed by Ernst (1965, p. 45): "exchange rates between specie and sterling often deviated from the figures cited for paper and sterling, although Virginia law rated specie and paper as equal in value." Thus it is false that "pieces of eight and bills of credit were used interchangeably as a medium of exchange." [Michener (1986), p. 19]

There is also a good deal of information on how courts and the legal system regarded exchange rates, because this was a major source of friction between England and Virginia. In 1749 legislation required that courts settle sterling debts paid in other currencies at a fixed rate established by law. While this legislation was enacted before any paper currency was issued, once paper currency appeared the law enabled debts to be "discharged in legal tender paper 'of a local, uncertain, and fluctuating value' according to the nominal or mandatory, and not the actual, rate of exchange." [Ernst (1973), p. 52.] Thus "actual" exchange rates fluctuated, as argued above.

This situation led to further legislation in 1755 when "the Burgesses amended the act of 1749 to allow courts of record to settle all executions for sterling debts in local currency ... at a 'just' rate of exchange. A just rate was taken to be the actual rate at the time of court judgement ...." [Ernst (1973), p. 54.] Or, in other words, "the local courts should have the authority to ascertain the difference in exchange between sterling and current money." [Gipson (1961), p. 263.] Thus courts did not enforce "legal rates," they simply observed the actual, fluctuating rate of exchange in making settlements.[34] And moreover, the extent of exchange rate variation is indicated by the fact that British merchants were unhappy about the fact that "a significant margin could exist between the rate set by the provincial court and the commercial rate at the time a debtor finally settled his account." [Sosin (1964), p. 178.]

While Bordo (1986) and Bordo-Marcotte (1986) make much of "legally fixed exchange rates," in general these were illusory. As put by Sosin (1964, p. 180), colonial governments were fully aware of the futility of trying to legislate rates: "No laws, they [the House of Burgesses] declared, could guard against the fluctuating rate of exchange."

E. Maryland

According to McCusker (1978, p. 191), the "restricted use" of Maryland currency and its depreciation "had the further effect of severing its relationship to the currency value of coin in the colony." Thus paper currency and coin were not exchangeable for each other at fixed rates.

F. North Carolina

As seen above, North Carolina never had any substantial quantity of specie. Not surprisingly, then, there was an established legal practice with respect to how sterling debts were to be settled when paid in paper currency. According to Ernst (1965, p. 70), "the courts as a matter of practice had always made judgements for protested sterling bills of exchange at the actual and not the legal sterling exchange rates." Thus again actual and legal rates diverged.

G. Pennsylvania

As described by McCusker (1978, p. 176), by the late 1720s Pennsylvania was left "without an official, legal value for silver and for coin." He then goes on to conclude that "the lack of any legal value for this coin proved a difficulty for Pennsylvania ... since it tended to leave coin in the category of a commodity rather than a currency [my emphasis]." On this point McCusker could easily have been paraphrasing Benjamin Franklin, who wrote in 1729 that

there is some difference [in the rate of exchange] between them [bills of credit] and silver; ... it is evident that the difference is occasioned by the scarcity of the latter, which is now become a merchandise, rising and falling like other commodities as there is a greater or less demand for it or as there is more or less plenty. [Quoted by Bullock (1900), p. 54-55.]

This is hardly the description of a fixed exchange rate regime.

With respect to court enforcement of legal exchange rates, the situation in Pennsylvania was what has been seen elsewhere. According to Brock (1975, p. 553), "the practice [in Pennsylvania] was to allow payment of sterling debts in colonial currency only when bills were tendered in quantity equivalent to the sterling value of the obligation." This could hardly have been an issue under a fixed exchange rate regime.

By 1742 in Philadelphia, McCusker (1978, p. 191-2) reports published agreements by merchants to accept specie at established rates vis-a-vis colonial currency. Perhaps this is the sort of phenomenon Michener (1986) has in mind with respect to the maintenance of exchange rates by merchants.[35] However, McCusker also suggests that the rates established already had become equilibrium rates prior to the publication of such agreements. Thus cause and effect with respect to exchange rate stability later in Pennsylvania history may not be as Michener suggests.

H. Summary

Legal exchange rates between specie and colonial currency were not maintained by colonial governments in any conventional sense, nor were they enforced by courts. In many circumstances the currency value of specie and colonial currency diverged; in some circumstances silver was regarded as a commodity rather than a currency. In New York, the Chamber of Commerce as late as 1768 expended real resources on a study of the currency value of various

coins. This would not seem to be an activity likely to be undertaken under a de facto fixed exchange rate regime.

The point of suggesting that the colonies had "de facto fixed exchange rate regimes" is, of course, to suggest also that small movements in exchange rates would set off specie flows. Such a view would also not appear to enjoy much support in the literature. As summarized by Ernst (1973, p. 16), "there was no automatic, or semi-automatic, in-and-out flow of 'metal' whenever the market, or free, rate for bills of exchange got out of hand in Virginia." I am aware of no indication that the situation was different elsewhere.

IV. Conclusions

The view that the lack of relationship between paper currency movements and currency values can be explained by "offsetting" specie flows enjoys no support in the historical literature. Nor does the idea that the colonies are best understood as having fixed exchange rates. Thus, the situation appears to be as presented by Smith (1985a,b); the colonies provide a wealth of evidence against conventional models of money.

The view that the colonies should be studied as if they had fixed exchange rate regimes is also a strange one, in that it does nothing to salvage conventional models of money. In the absence of any evidence about offsetting changes in other components of the money supply, colonial exchange rate and money supply data provide evidence that is wildly contrary to predictions about how endogenous money supplies should behave (under fixed exchange rate regimes) in models like those of Lucas (1982), Sargent (1987, chapter 5), and Michener (1984,1986). Since the evidence is that there were not offsetting changes in other components of the money supply, it would appear that, independently of the exchange rate regime, colonial data provides substantial evidence against conventional models of money.

Appendix

The purpose of this appendix is to assemble material that supports the second part of the argument in Smith (1985a,b); the reason why monetary movements and price movements were largely unrelated in the episodes discussed above is because the colonies undertook fiscal actions that prevented monetary changes from affecting currency values. The form this appendix takes is simply a review of the historical literature that suggests that fiscal actions prevented significant variation in currency values (in the episodes reviewed above.).

To begin, both colonial governments and the Board of Trade (the English body charged with primary oversight of colonial monetary arrangements) frequently took the position that currency values would be "protected" so long as monetary changes were accompanied by appropriate fiscal actions. Brock (1975, p. 173) discusses, for instance, how the Board of Trade recommended that the governor of Massachusetts

> "be directed for the future not to give his assent to any Act of making bills of credit current, unless the said Act do at the same time establish a sufficient fund for the payment and discharge of such bills." As the years wore on, the principle here enunciated became of first importance in determining the Board's policy towards bills of credit. It was probably derived by analogy from private credit instruments, which, when the maker was known as one who paid them promptly at stated times, maintained their value.

This, of course, is exactly the analogy employed by Sargent (1982) and Smith (1985a,b).

A similar argument is given by Sosin (1964, p. 180), who attributes to the Board of Trade the view that "putting into circulation large quantities of paper money on insufficient and uncertain funds had been the principal cause of the fluctuating rate of exchange [in Virginia] ...."[36] Moreover,

similar positions were taken by colonial governments. For instance, the assembly of North Carolina was "of [the] Opinion that the Growing demand to pay our Taxes and the Gradual decrease by the Sinking Fund, Whereby the torn and worn Bills are Yearly Burnt must soon Enhance their Value." [Quoted by Sosin (1964), p. 178] Thus Nettels' (1934, p. 257) summary appears justified: "in the opinion of the colonists, the principal factor affecting the value of their paper [currency] was the provision made for redeeming it from tax revenues."

The view of contemporaries was apparently reflected in a number of histories of the colonies that predate modern studies, as Nettels wrote in 1934 that "American writers have generally explained the depreciation of colonial bills of credit by the weakness of the security behind them rather than by the quantity issued," (p. 266, footnote 53) and then refers the reader to Ely and Laughlin. While I am not familiar with this literature, the same opinion is expressed, for instance, by Dewey (1903, p. 27) in trying to explain why paper currency depreciated severely in Massachusetts, but virtually not at all in Pennsylvania:

> The reasons for the greater success of Pennsylvania [with respect to currency depreciation] was perhaps due to the wiser provisions for redemption, - in Massachusetts, for example, the period was either too short, as five years from 1714; or too long and indefinite, with no demand for payments by installments; hence it was easy for borrowers to put off the day of settling their obligations, until they were financially involved. In Pennsylvania all the bills were issued against installment mortgages running for sixteen years, and this colony was also careful not to issue excessive amounts, and imposed adequate taxes for the support of the government.

The same opinion is, of course, expressed widely in more modern historical literature on the colonies. Gould (1915, p. 104), for instance, took the view that "the strength of paper currency [in Maryland] was undoubtedly maintained

by the exceptional strength of the funds against which it was issued," that is, that currency values were heavily influenced by the types of background fiscal actions emphasized by Wallace (1981) and Sargent-Smith (1986, 1987). This opinion is repeated by Thayer (1953, p. 146) who attributes the lack of currency depreciation in New York, Pennsylvania, and New Jersey to "a moderate volume of money issued on the security of good land ... [that] gave value and stability to the currency." Or, in other words, Thayer restated the position of the Board of Trade.

Any number of other authors express the same opinion. Ferguson (1953, p. 173), in his classic study, argues that

> The credit of the bills depended on several interrelated factors. Regardless of any promise on the face of the notes, the basic security was the fund assigned to withdraw the money. The holder had to be certain that all taxes and payments to the government taken together would be enough to create a general use for the bills and ensure a demand for them.

McCusker (1976, p. 98-100) makes the same kind of argument in explaining the vastly different experiences with currency depreciation in New England (which experienced severe currency depreciation), and Maryland (which had much more stable currency values):

> One of the reforms of their paper money that the colonists attempted to introduce was a change in its backing. Bills of credit based solely on colonial laws that established their legal tender status and required that they be accepted in payment of provincial taxes were prone to sometimes considerable inflationary pressures .... In reaction to such inflation, colonists in several places thought to give sounder backing to these bills of credit through a variety of schemes. The idea of issuing paper money on loan through a public or private agency and securing this money with the collateral offered in obtaining the loan had its origin in the seventeenth century .... In practice, because there was no effective provision for the redemption of such notes [in Massachusetts], the scheme worked poorly. In Massachusetts in the 1740's the land office notes were caught up in the general depreciation of New England currency. Maryland's loan office, based on a somewhat different system of redemption for its notes ... also

ran into difficulty during the same period but was to find its paper money in much better shape in the text two decades.

The same view was put somewhat differently by McCusker (1978, p. 190) in his discussion of Maryland:

> In an attempt to insure that its bills of credit would retain their value, the Maryland legislature provided for the eventual redemption of the bills. For this purpose the law established a 'sinking fund' .... The success of this plan and the redemption of the bills in two stages ... created a precedent for future issues of paper currency. This ... factor tended, obviously to reinforce and enhance the value of Maryland paper money.

It is possible to produce many similar such statements. Of interest is the argument of Perkins (1980, p. 120) that

> No positive correlation exists between the inclusion of private legal-tender provisions and the maintenance of par values for colonial currencies. Vastly more important was the colonial legislatures' resolve to vote the taxes to retire the outstanding paper and the persistence of the loan offices in collecting mortgage debts.

The private legal tender provisions referred to are the legal establishment of a relationship between the currency value of coin and colonial units of account. This, as seen above, is emphasized by Bordo (1986) and Bordo-Marcotte (1986). According to Perkins, however, such legalisms were largely irrelevant. Background fiscal actions were the important determinants of currency values. A final statement of this principal applied to the colonies appears in Wicker (1985, p. 869):

> Pennsylvania, New York, and South Carolina with fiduciary standards issued large quantities of paper money to finance the war accompanied by only moderate increases in the rate of inflation .... Success of war finance in Pennsylvania, New York and South Carolina can be attributed

to paper-money issues that financed government expenditures and were matched by imposition of tax liabilities for early redemption."

Further elaboration on the relationship between fiscal actions of the type described by Wallace (1981), Sargent (1982), and Sargent-Smith (1986, 1987), and currency values appears in Smith (1985a,b). As this appendix should make clear, these claims in Smith (1985a,b) simply echo a large body of previously existing literature, as well as contemporary colonial views.

TABLE 1

South Carolina

Date	Paper Currency Outstanding (£) (1)	Pounds per 1,000 Population (2)	Exchange Rate (£S.C. per £100 Sterling) (3)	Price Level (Average of 1762-74 = 100) (4)
1703	4,000	...	150	...
1707	12,000	...	150	...
1708	14,000	...	150	...
1710	14,000	1,286	150	...
1711	20,000	...	150	...
1712	56,000	...	150	...
1714	...	...	200	...
1715	...	...	300	...
1716	90,000	...	...	...
1717	...	...	575	...
1718	...	...	500	...
1720	100,000	5,866	400	...
1721	...	...	533	...
1722	80,000	...	580	...
1723	120,000	...	675	...
1724	...	...	650	...
1725	...	...	672	...
1726	...	...	700	...
1727	106,500	...	700	...
1728	106,500	...	700	...
1729	106,500	...	700	...
1730	106,500	3,550	644	...
1731	211,275	...	700	...
1732	...	...	700	79
1733	...	...	700	80
1734	...	...	700	108
1735	...	...	700	105
1736	...	...	743	96
1737	...	...	753	117
1738	...	...	775	125
1739	...	...	792	84
1740	...	...	796	77
1741	...	...	691	97
1742	...	...	699	85
1743	...	...	700	70
1744	...	...	700	64
1745	...	...	700	46
1746	...	...	...	45
1747	...	...	761	69
1748	...	...	762	88
1749	133,045	2,142	725	96
1750	...	...	702	100

TABLE 1 (continued)

Date	Paper Currency Outstanding (£) (1)	Pounds per 1,000 Population (2)	Exchange Rate (£S.C. per £100 Sterling) (3)	Price Level (Average of 1762-74 = 100) (4)
1751	...	...	700	83
1752	...	...	700	97
1753	152,322	...	700	112
1754	156,156	...	700	86
1755	221,359	2,801	700	86
1756	311,816	...	714	77
1757	542,837	...	700	78
1758	595,567	...	700	86
1759	521,369	...	700	112
1760	863,827	9,182	700	92
1761	867,744	...	700	80
1762	...	...	700	77
1763	584,916	...	717	92
1764	585,246	...	718	86
1765	472,378	4,327	709	87
1766	446,673	...	707	100
1767	344,147	...	700	94
1768	481,999	...	700	102
1769	497,654	...	...	104
1770	424,154	3,414	717	93
1771	...	...	762	108
1772	...	...	679	137
1773	391,391	...	728	116
1774	258,971	...	700	104

Sources: Column 1: Brock (1975, pp. 106-26 and table 27; col. 2: Brock (1975) and U.S. Bureau of the Census (1976), p. 1168; col. 3: McCusker (1978), pp. 222-24 col. 4: Taylor (1932).

TABLE 2

New York

Date	Note Issue Outstanding (£)[a]	Note Issue per 1,000 Population[b]
1755	179,076	1848
1756	230,773	
1757	219,281	
1758	307,198	
1759	481,186	
1760	410,387	3503
1761	366,158	
1762	330,807	
1763	287,163	
1764	243,885	
1765	166,502	
1766	131,502	
1767	109,799	
1768	87,348	
1769	82,858	
1770	81,591	501

	Price Level[c]	Exchange Rate[d]
1755	66	180.13
1756	66	182.65
1757	65	178.40
1758	70	172.60
1759	79	168.39
1760	79	167.20
1761	77	181.41
1762	87	189.76
1763	79	186.73
1764	74	184.85
1765	72	182.80
1766	73	177.18
1767	77	178.96
1768	74	179.87
1769	77	172.47
1770	77	165.90

a) Source: Brock (1975), Table XVI, November figures.
b) Source: Brock (1975) and U.S. Bureau of the Census (1976), series Z1-19.
c) Source: Warren, Pearson, and Stoker (1932), p. 215-216.
d) Source: McCusker (1978), p. 164-5. (£N.Y. per £100 sterling.)

TABLE 3
Virginia

Date	Note Issue (£)[a] (emmissions)	Exchange Rate[b] (£ Va. per £100 Sterling)
1755	60,000	129.38
1756	67,000	128.44
1757	179,969	139.71
1758	89,000	137.92
1759	62,000	139.97
1760	52,000	141.43
1761	-	143.72
1762	30,000	152.40
1763		159.88
1764		160.73
1765		160.36
1766		128.48
1767		125.54
1768		124.99
1769		121.97
1770		118.00

a) Source: Brock (1975), Table XXVIII.
b) Source: McCusker (1978) p. 211-2.

TABLE 4
New Jersey

Date	Currency in[a] circulation(£)	Per capita note[b] circulation (per 1,000 population)	Exchange rate[c] (NJ£ per £100 sterling)
1724	40,000	-	149.00
1730	17,640	470	-
1735	22,700	-	-
1736	20,000	-	-
1737	60,000	-	170.00
1738	60,000	-	-
1739	60,000	-	168.33
1740	62,000	1,207	160.62
1741	61,000	-	142.50
1742	61,000	-	150.00
1743	57,500	-	160.00
1746	57,350	-	182.50
1747	50,850	-	-
1748	43,350	-	-
1749	37,850	-	170.00
1750	32,850	460	173.75
1751	27,850	-	172.50
1752	22,850	-	166.25
1753	-	-	167.50
1754	3,000[d]	41	168.17
1755	-	-	170.00

a) Source: Brock (1975, table VI)
b) Approximations based on interpolating population figures in table Z1-23 (1168), U.S. Bureau of the Census (1976)
c) Source: 1724 figure is from Lester (1939, 192), the remaining figures are from McCusker (1978, 172-3)
d) Source: 1754 figure is from Lester (1939, 193)

TABLE 5

Maryland

Date	Note Circulation (£) (1)	Per Capita Circulation (per 1,000 population) (2)	Exchange Rate (£ Md. per £100 Sterling) (3)
1735	56,495	545	140.00
1736	57,864	...	230.00
1737	69,856	...	250.00
1738	69,856	...	225.00
1739	79,820	...	212.34
1740	78,523	676	228.08
1741	83,444	...	238.17
1742	82,072	...	275.00
1743	82,252	...	285.13
1744	83,058	...	166.67
1745	83,058	646	200.00
1746	83,058	...	210.00
1747	85,309	...	225.22
1748	86,040	...	200.61
1749	62,000	...	184.58
1750	62,000	439	177.92
1751	62,000	...	166.83
1752	62,000	...	155.62
1753	62,000	...	151.75
1754	62,000	...	153.75
1755	62,000	409	...
1756	96,017	...	170.00
1757	96,017	...	145.00
1758	96,017	...	150.00
1759	96,017	...	150.00
1760	96,017	592	146.25
1761	96,017	...	148.48
1762	96,017	...	144.45
1763	62,000	...	140.00
1764	41,295	...	136.67
1765	...	...	133.33

Sources: Column 1: Brock (1975), pp. 104-5, 417-21; col. 2: Brock (1975) and U.S. Bureau of the Census (1976), p. 1168; col. 3: McCusker (1978), pp. 202-3.

TABLE 6

North Carolina

Date	Notes in Circulation (1)	Pounds per 1,000 population (2)	Exchange Rate (£ N.C. per £100 Sterling) (3)
1712	4,000	...	...
1713	12,000	...	...
1715	24,000	...	150
1722	12,000	...	500
1724	12,000	...	500
1728	12,000	...	...
1729	52,000	...	500
1731	52,000	...	650
1734	54,500	...	...
1735	...	...	720
1736	...	...	700
1737	...	...	867
1739	...	...	1,000
1748*	21,350	...	1,033
1749	21,160	...	...
1750	20,647	283	133
1751	20,119	...	...
1752	19,028	...	...
1753	18,289	...	...
1754	57,951	...	167
1755	56,054	611	160
1756	57,951	...	180
1757	68,255	...	...
1758	70,253	...	...
1759	69,512	...	185
1760	75,806	686	190
1761	95,335	...	200
1762	85,322	...	200
1763	...	...	200
1764	73,378	...	193
1765	...	...	200
1766	67,880	...	...
1767	...	...	173
1768	60,106	334	180

Sources: Column 1: Brock (1975), pp. 108, 112, tables 23, 24; col. 2: Brock (1975) and U.S. Bureau of the Census (1976), p. 1168; col. 3: McCusker (1978), pp. 217-19.

* Currency reform. New monetary unit employed.

TABLE 7

Pennsylvania

Date	Note issue (£)[a]	Per capita[b] note issue (£ per 1,000) people)	Exchange rate[d]	Price index[e] (PA £)
1720	-	-	138.75	86.2
1721	-	-	137.75	78.6
1722	-	-	135.01	81.6
1723	45,000	-	140.37	84.3
1724	45,000	-	143.11	88.9
1725	38,915	945	139.34	96.6
1726	38,890	-	-	101.0
1727	38,890	-	149.58	97.6
1728	38,890	-	150.62	92.8
1729	68,890	-	148.61	92.5
1730	68,890	1,330	152.03	98.0
1731	68,890	-	153.28	87.1
1732	68,890	-	160.90	83.6
1733	68,890	-	166.94	90.0
1734	68,890	-	170.00	87.2
1735	68,890	1,000	166.11	87.8
1736	68,890	-	167.00	83.6
1737	68,890	-	170.25	91.1
1738	68,890	-	160.42	91.1
1739	80,000	-	169.69	82.2
1740	80,000	935	165.45	87.3
1741	80,000	-	146.14	112.6
1742	80,000	-	159.38	108.3
1743	80,000	-	159.79	95.6
1744	80,000	-	166.67	90.9
1745	80,000	780	174.77	92.7
1746	85,000	-	179.86	99.7
1747	85,000	-	183.78	110.6
1748	85,000	-	174.12	124.7
1749	85,000	-	171.39	121.5
1750	84,500	707	170.60	113.0
1751	84,000	-	169.86	112.8
1752	83,500	-	166.85	111.9
1753	82,500	-	167.49	109.9
1754	81,500	-	168.35	109.1
1755	96,000	702	168.79	107.3
1756	147,510	-	172.57	109.6
1757	262,466	-	166.07	107.1
1758	329,774	-	159.00	109.6
1759	433,562	-	153.52	125.0
1760	486,199	2,646.7	158.61	125.7

Table 7 (continued)

Date	Note issue (£)[a]	Per capita[b] note issue (£ per 1,000) people)	Exchange rate[d]	Price index[e] (PA £)
1761	438,104	-	172.71	121.2
1762	349,053	-	176.26	133.4
1763	286,312	-	173.00	136.4
1764	328,058	-	172.86	119.4
1765	302,400	-	169.90	118.4
1766	278,736	-	162.96	124.7
1767	263,860	-	166.02	123.7
1768	234,450	-	166.62	119.7
1769	230,496	-	157.56	115.9
1770	204,468	851.7	153.92	121.6

a) Source: Lester (1938, p. 353) for 1723-1755, Brock (1975, Table XIX) for 1756-1770.
b) Source: Weiss (1970, p. 779) for 1725-1755, Brock and U.S. Bureau of the Census (1976), Series Z1-19, for 1760-70.
c) Source: McCusker (1978, 184-6); PA £ per £100 sterling.
d) Source: Bezanson, Gray and Hussey (1935, 433).

Notes

1. These examples are discussed in detail by Smith (1985b).

2. There are no price indices for South Carolina before 1732.

3. See the discussion in the appendix.

4. See, e.g., Brock (1975), Ernst (1973), Nettels (1934), and West (1978).

5. McCusker and Menard (1985) provide a survey of the literature on the growth of real per capita income in the colonies. They perform several calculations based on an average per capita growth rate of 0.6% per year. (McCusker and Menard cite 0.3% as the average annual rate of growth of per capita income in Britain during the same period.) This would translate into less than a 7% increase in per capita income over an average eleven year period (the length of the period in example (ii) above). Obviously, this estimate of growth in per capita income will not admit of income growth explaining the lack of co-movement between per capita money stocks and currency values.

6. This question is also raised by White (1986) in a less critical manner. These claims are simply more recent versions of similar suggestions by several authors; e.g., Ernst (1973), West (1978), and Letwin (1981).

7. See Michener (1986).

8. It should be noted that New England, until 1750, functioned essentially as a "common currency area."

9. It is interesting to note that, when commercial rates of exchange deviated too much from the par of exchange, colonies often simply changed the par of exchange.

10. Subject again to the caveat that New England was essentially a common currency area until 1750.

11. Repayment could be made either in paper currency, or in specie at a legally established rate.

12. Bordo, Bordo and Marcotte, and Michener.

13. McCusker (1976), p. 102. For a further discussion of why "bills of exchange were of only limited use as a form of money," see McCusker (1976), 102-3.

14. My impressions on this issue are guided by personal correspondence from John Hemphill.

15. See, e.g., the discussion in Brock (1975), p. 116-123.

16. See Smith (1985b, p. 1193). Also it might be asked whether the monetary increase of 1731 had no effects because agents expected the subsequent monetary reductions, with these expectations influencing money demand. This kind of explanation is not generally a tenable one for the colonies, for reasons discussed at length by Smith (1985a,b). See, e.g., Smith (1985b), p. 1192-1193. Here it might simply be noted that if agents expected increasing currency values after 1731, which would be necessary for money demand to rise, they were sorely disappointed. See Table 1.

17. See also Jellison (1959).

18. For documentation of this claim see Smith (1985b), p. 1193.

19. See, e.g., Brock (1975), p. 350.

20. See Nicholas (1912), Brock (1975), p. 475-476, Sosin (1964), p. 180-181, and Ernst (1965), p. 53.

21. Brock (1975), p. 468, footnote 4, and p. 472, footnotes 14 and 15.

22. See also Ernst (1973), p. 87, Ernst (1965), p. 37, and Gipson (1961), p. 268.

23. Professor Ernst has informed me in personal correspondence that the £20,000 refers to "hard cash," or specie. Hence this figure bounds above the possible magnitude of net specie outflows.

24. Brock, (1975), p. 476, footnote 23.

25. This raises a point that bears emphasis; the currency issued by one colony could and did circulate in other colonies. For instance, the paper currencies of New York and Pennsylvania circulated in New Jersey, and New Jersey's currency circulated in New York and Pennsylvania. There is, as far as I am aware, no information about net currency flows between colonies, so it is impossible to know how this fact bears on the arguments presented here. However, it is appropriate to raise it as a caveat.

26. See also the discussion in the appendix.

27. See Smith (1985b) for documentation of this claim.

28. See Brock (1975), p. 550 and Phillips (1865), p. 12, 14.

29. See, e.g., Ratchford (1941), p. 25.

30. See, e.g., Plummer (1942), p. 400 or Sosin (1964), p. 197.

31. In addition to the material presented above, Brock (p. 561) or Ernst (1973), p. 196 could be consulted on this point.

32. It would be interesting to know which merchants allegedly "fixed" exchange rates. In general the idea of a cohesive merchant class with coincident interests vis-a-vis currency values does not receive strong support in the literature. See, e.g., Ernst (1982).

33. McCusker (1978, p. 159) also refers to "customary rates" for intercolonial exchanges at New York. In these exchanges, the currency of some colonies was exchanged for that of other colonies based on the par of exchange, rather than on commercial rates of exchange with London. But McCusker (p. 123) also says of such exchanges that "when a transaction at par meant a considerable difference, merchants made the effort to discover the bill rate and used that instead of par." [See also McCusker (p. 221) for a discussion of how currencies of colonies experiencing major depreciations were treated.] Thus such conventions were fairly limited, breaking down as commercial rates of exchange varied sufficiently. Moreover, to emphasize, this reference is to certain types of intercolonial exchanges only.

34. Further discussion of "illegal advances in the price of coin" appears in Ernst (1965), p. 57, footnote 66.

35. There are a number of reports in the literature of failed attempts by merchants or groups of merchants to manipulate exchange rates. See, e.g., McCusker (1978), p. 176, and Soltow (1958), p. 478.

36. It is interesting to contrast this and Brock's statement with the claim in Michener (1986) that the Board believed paper currency issues produced "offsetting" specie flows.

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