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AMERICAN COLONIAL MONETARY REGIMES:
THE FAILURE OF THE QUANTITY THEORY AND
SOME EVIDENCE IN FAVOR OF AN ALTERNATE VIEW

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Bruce D. Smith

"The emissions of paper money were generally opposed by the merchants and business men, and the more intelligent part of the community."

- Elisha Potter

"Emissions of Paper Money Made by the Colony of Rhode Island"

"[The quantity] theory in its various forms has unduly usurped the central place in monetary theory . . . the point of view from which it springs is a positive hindrance to further progress."

- Friedrich Hayek (1935, p. 4)

ABSTRACT

Current approaches to monetary theory and policy owe much to the "quantity theory of money." However, recent theoretical developments suggest that the manner in which money is introduced is more important, even for price level movements, than the quantity of money. Colonial American experience provides a laboratory for discriminating between these views. It is shown here that the nature of backing, rather than the quantity of money, determined its value. Large secular inflations were ended by changing the nature of backing despite the continuance of large note issues (and despite the absence of a metallic standard). Extremely large note issues and note withdrawals are shown not to have produced inflation (currency depreciation) or deflation (currency appreciation).

Perhaps the most prevalent and persistent organizing principle in monetary economics has been the Quantity Theory of Money. While this term encompasses a wide variety of different views of money, certain basic tenets have been widely held. Lucas (1980, p. 1005), for instance, mentions the "two central implications of the quantity theory of money: that a given change in the rate of change in the quantity of money induces (i) an equal change in the rate of price inflation; and (ii) an equal change in nominal rates of interest." He then says that "the two quantity theoretic propositions stated . . . possess a combination of theoretical coherence and empirical verification shared by no other propositions in monetary economics." Similarly strong claims have been put forward by Friedman and Schwartz (1963, p. 676), who assert that since the Civil War

"Changes in the behavior of the money stock have been closely associated with changes in economic activity, money income, and prices. The interrelation between monetary and economic change has been highly stable."

Also, Schwartz (1973, p. 264) concludes that, at least since the time of Alexander the Great, "long-run price changes consistently parallel . . . monetary changes, with one exception for England in the sixteenth century."

Such statements illustrate the powerful claim that quantity theory views have had on the attention of several generations of economists. In fact, however, there appears to be no shortage of episodes which cast doubt on the existence of any simple correlations between money growth rates and inflation. In particular, there is substantial evidence that the relationship between the rate of growth of the money supply and the rate of inflation depends crucially on the way in which money is introduced into (removed from) an economy. This paper presents several pieces of evidence to this effect culled from the monetary experiences of colonial British America. Specifi-

cally, we examine the monetary experiences of several of the American colonies from the 1720s until 1770. Each of the colonies to be examined issued its own notes which circulated (for the most part) as legal tender, served as a local unit of account, and exchanged at a freely determined market rate with pounds sterling. As we will see, each colony examined issued notes during this period that were backed typically not by gold or any other commodity, but by future government income streams. The primary result emerging from this examination is that all of the colonies examined engineered extremely large (relative to typical government expenditures) note issues (reductions) that were not accompanied by inflation (deflation) or any depreciation (appreciation) of the notes issued against pounds sterling. As the most dramatic examples, from 1755 to 1765 Massachusetts increased its per capita stock of paper money by a factor of 6. Nevertheless all available commodity prices declined over this period, and the exchange rate between Massachusetts currency and sterling depreciated by less than 0.2%. From 1755 to 1760 Virginia increased its per capita note issue by 749%, and Pennsylvania by 271%. Virginia notes depreciated only 9% against sterling. (Britain was following a policy of noninflationary expenditure finance), and Pennsylvania notes appreciated against sterling. On the opposite side of the coin, from 1760 to 1770 New York reduced its per capita note circulation by 86%, while its notes appreciated only 10% against sterling and its price level fell only 2%.

The observation that movements in the note issues of the various colonies do not well explain price level and exchange rate movements is not a new one. West (1978), for instance, partially documents via regression techniques that for the most part colonial inflation was at best weakly related to movements in the stock of paper money. This observation has typically been explained, e.g., by West (1978) or Ernst (1973), as due to mismeasurement of

the appropriate "medium of exchange." However, this view has at least two drawbacks. One is common to many empirical implementations of monetary theory: the definition of a "medium of exchange" for empirical purposes is of necessity an arbitrary one. The second is that for colonial economies, as for perhaps any economy, it is a view without empirical content, i.e., given the data available for colonial economies it is impossible to derive a measure for certain key components of Ernst's or West's "medium of exchange."

This paper proposes to interpret colonial experience in the context of a different view of money. This view avoids the two problems mentioned above; i.e., it is not necessary to make arbitrary decisions about monetary aggregates in order to empirically implement it, and it is empirically falsifiable. In particular, the alternate view is one proposed by Sargent (1981) and Wallace (1981). In order to exposit this view, it is useful to think of a monetary system in which money is not fiat in nature, i.e., is not intrinsically valueless (as was the case in the colonial period). Under such a system, "money" is itself a claim to something which agents would desire presumably independently of the prevailing monetary regime. Thus, it has been argued that an alternate monetary theory might price such money in the same way that privately issued (possibly contingent) claims to commodities might be priced. More specifically, if government issued notes are backed, but not necessarily by 100% reserves of the commodity used as backing, then these notes might effectively be viewed as backed by future government tax receipts in excess of expenditures. The analogy with a firm which issues claims to future net profits is obvious. Thus, Sargent (1981, p. 5) has argued that governments on the gold standard, but without 100% gold reserves, were "like a firm whose prospective receipts were its future tax collections. The value of the government's debt was, to a first approximation, equal to the present value of current and future government surpluses."

It is useful to carry Sargent's analogy with a firm one step further. Consider a firm which increases the number of its shares outstanding. Will the price of these shares rise or fall? The answer is that more information is required. In a stock split, one expects a halving of the price of the stock. This corresponds to the case where the quantity of liabilities issued is increased with no change in the firm's income stream. On the other hand, an increase in the number of shares need not imply a lower price per share if the firm's income stream simultaneously increases. Thus in the case of a private issuer of liabilities, changes in income streams must be analyzed along with changes in issues of liabilities. The Sargent-Wallace argument is merely that the same principle applies to governments. When such a principle is applied in this way the following implication arises. Changes in the quantity of money outstanding which are backed do not result in changes in the value of money (price level variations). Increases in the quantity of money when money is not backed are analogous to stock splits, and result in proportional increases in the price level. Thus, in particular, note that when monetary injections are unbacked the naive quantity theory becomes a special case of the Sargent-Wallace viewpoint.

Finally, the Sargent-Wallace view has at least two advantages from an empirical standpoint. First, just as the value of privately issued claims depends on who the issuer is, the value of paper money depends on who it is a claim against. This is true independently of what the prevailing "medium of exchange" is. Thus, this approach to monetary theory suggests that one need only consider the valuation of the liabilities issued by each governmental unit separately from other circulating liabilities. Second, it avoids a view of money which requires arbitrary decisions about what types of liabilities can and should be aggregated to form a measure of the "money supply."

The two views of money described above suggest that very different patterns of price level (and exchange rate) behavior should have been observed in the North American colonies. In particular, long periods of monetary expansion (and contraction) were observed throughout the colonies. According to Lucas' version of the quantity theoretic implications, these should have been accompanied by inflation (deflation) and currency depreciation (appreciation). This was not typically the case. On the other hand, the alternate view described above suggests that significant variations in currency values should not have been observed if money was adequately backed. Both time series and cross-sectional evidence indicates that the latter view accurately describes colonial monetary experience.

In reading this paper, several remarks should be kept in mind. In particular, the choice of economies in which to test these competing views may seem both strange and arbitrary. In fact, it is neither. First, the colonial experiences to be outlined are hardly unique. Sargent (1981) provides evidence from twentieth century hyperinflations indicating that the simple expedient of carefully backing currency with future government income streams served to end severe inflations even though money growth rates remained high. This fact is reminiscent of colonial experience, and we will see that in 1750 Massachusetts ended an inflation of thirty years duration in exactly this way.^{1/} In addition, McCusker and Riley (1983) have conducted an exercise similar in spirit to this one for France (1650-1788), and found evidence that large increases in per capita money stocks did not lead to inflation. Thus, colonial experiences in fact tend to reflect a broad pattern of experience across different countries and time periods.

Second, the colonial economies are attractive to study for several reasons. One has already been mentioned: there were dramatic increases and

reductions in the circulation of paper money that were not accompanied by any significant price level (or exchange rate) movements. Also, the various colonies provide an interesting cross-section of experiences under similar monetary regimes. And finally, it should be apparent that many of the monetary arrangements discussed correspond quite closely to arrangements examined in modern theoretical models. As an example, it will be seen that colonial deficit finance schemes were not remarkably different from the bond finance schemes that Barro (1974) contrasts with tax financing of expenditures.

This similarity between theoretical specifications and colonial monetary arrangements reflects a simplicity of the colonial economy deriving from an absence of fractional reserve intermediaries. The absence of such intermediaries implies that it is unnecessary to decide whether private bank liabilities were money, and if so, to attempt to disentangle changes in the stock of high-powered money from changes in bank behavior that might affect the "money supply." An attempt to conduct a study such as this one for any more recent period would certainly encounter problems of this sort.

The format of the paper is as follows, then. An argument is presented that colonial experience is inconsistent with the implications of the quantity theory. The paper then argues that the other view put forth above can account for most of the inflationary (and other monetary) experiences of the colonies. However, most of the direct evidence presented here is aimed at the quantity theory, and derives from the experiences of New England, New York, Pennsylvania, New Jersey, and Virginia. The experiences of some other colonies, most notably Maryland, are better suited to provide direct evidence on the view that the value of colonial paper money was determined by its backing. This subject is taken up by Smith (1983).

In order to present the arguments as stated, it is necessary to cast the quantity theory in an empirically falsifiable form. Section II discusses a version of the quantity theory that might be applied to the colonial period in which flexible exchange rates between different currencies were an important feature of the monetary system. Sections I and III describe colonial monetary arrangements. Section IV discusses the experiences of the colonies with inflation and currency depreciation prior to the French and Indian War. It also argues that most of these experiences are poorly explained by the quantity of money, but well explained by the manner in which backing was provided for issues of paper money.

Section V discusses "monetization" of colonial deficits during the French and Indian War. Deficit finance in the colonies involved massive growth rates of money in all of the colonies considered, and subsequent large reductions in the money stock in a subset of the colonies. This provides an interesting time series cross-section in which it is apparent that these major changes in the money supply did not have any significant impact on price levels or exchange rates. Section VI argues that our results would not differ if a more explicit attempt were made to take account of underlying "real factors" in the economy. Conclusions follow in Section VII.

I. Colonial Monetary Systems: An Overview

There are several types of instruments that constituted what most historians refer to as colonial "money supplies." One, of course, was specie, which in North America was primarily of Spanish or Portuguese origin. This was generally minted in Spanish and Portuguese colonies, and was denominated in the units of account of those colonies. In addition, many of the colonies at one time or another employed commodity monies, or closely related warehouse receipts such as tobacco notes. With the exception of Virginia, however, in

the colonies and time period under consideration commodity monies of this form played no role.

In the case of the first two types of money, colonial governments did not control in any way the amount in circulation. However, each colonial government did, with a large degree of independence, control the quantities of two other instruments, which are the focus of our analysis. These were bills of credit issued either by colonial treasuries, or by colonial institutions known as loan offices. The bills of credit are what were referred to as paper money, or here the term notes is also used as a shorthand. Notes issued by the treasury, as described by McCusker (1976, p. 97)

"were limited in number because colonial legislatures authorized their emission only to a specific sum. . . . They were denominated in colonial currency . . . in contrast to the commodity notes which were denominated in tobacco. . . . But the major characteristic distinguishing colonial bills of credit from commodity notes was their widespread acceptability."

In addition during most of the period discussed here these notes were legal tender, with colonial governments obligated to accept their own notes in payment of taxes. Finally, as we shall discuss in more detail below, these notes were in some sense backed by future tax receipts. However, it should be kept in mind that they were not redeemable for commodities (with an important exception discussed below).

The final type of colonial money was the "loan office note," which was a bill of credit issued by a colonial land bank.^{2/} These banks lent for the purposes of purchasing (primarily) land by issuing their own notes to colonists. These notes were backed ultimately by the property mortgaged, and are described below in greater detail.

Given this overview of colonial monetary arrangements, we can now devote some attention to putting the views of money we wish to contrast in a general, but empirically falsifiable form.

II. A Version of the Quantity Theory

The view that the value of money which is backed by future government income streams depends (in large part) on the present value of future net receipts is easily understood. In the next two sections we will describe the nature of backing for colonial notes, and no further description of this view should be required. Note also that, since under this view we are comparing government liabilities to privately issued liabilities, we clearly should treat the liabilities of each colonial government separately. Or, put otherwise, this alternate view of money also tells us exactly what instruments to examine in "testing" it. The quantity theory, on the other hand, does not provide any obvious insight into how it is to be empirically implemented. Therefore, it is necessary to describe a version of the quantity theory which can be applied to colonial monetary systems.

To this end, recall that each colonial legislature determined the quantity of its own paper money in circulation, subject to the approval of the colonial governor and the crown. Recall also that the quantities of other monetary instruments (coin, tobacco notes, etc.) were not subject to significant colonial control. Thus, each colony ran an essentially independent monetary policy, issuing notes denominated in the currency of that colony which exchanged (for the most part) at freely determined market rates with other types of money. In light of this fact, it seems reasonable for our purposes to view each colony as a "country," issuing its own money under a regime of flexible exchange rates.^{3/} Thus, in keeping with fairly standard practice,^{4/} we will attempt to relate each colony's experiences with inflation and currency depreciation to the quantity of paper money it issued.

Of course, this approach omits many things which a quantity theorist might wish to consider. First, it omits specie circulation, and moreover, it omits things such as tobacco notes, privately issued circulating liabilities (bills of exchange), and book credit. Some comments are merited on the omission of each of these financial instruments.

First and most obviously, these factors must be omitted from an empirical study because there is no data on their quantities. However, we will argue that their omission does little violence to the quantity theory. As already indicated, specie and commodity notes were not denominated in local units of account, and commodity notes played no role in the events we consider except in Virginia. Moreover, these commodity notes were nothing more than circulating warehouse receipts, which exist and are not included in any measure of modern money supplies. Thus, this omission does little violence to the quantity theory.

The lack of data on specie circulation is more unfortunate. However, in some sense it does not seem inappropriate to omit specie from consideration in any event. As noted, circulating specie originated in Spanish and Portuguese colonies. Modern evidence purported to favor the quantity theory omits monies of foreign origin circulating in the country in question. Hence, such an omission does not seem inconsistent with standard practice.

In fact, however, one might wonder whether specie circulation was more important in the colonies than circulation of foreign monies is today. Even if it were, and its omission is not warranted, we can be somewhat reassured that paper currency constituted the most significant part of the money supply. Alexander Hamilton, for instance, estimated that on the eve of the Revolution about one-quarter of the colonial money supply was specie ^{5/} (im-

plying by his usage of the term that three-quarters was in bills of credit). Adam Smith offered an even stronger assessment; that "almost all the ordinary transactions of its [North America's] interior commerce [are] being thus carried on by paper." [Smith (1776), p. 307]. Thus, the focus on paper money alone captures the most substantial component of the money supply.

Suppose that one is not reassured by this, however. Then, it is natural to ask whether the results reported below could be seriously biased by the omission of data on specie circulation. In order to answer this question, it should be noted that one method of argument below will be to show that extremely large increases (reductions) in the supply of paper money did not lead to inflation (deflation). It has been suggested to me ^{6/} that this could be because specie flows essentially "offset" changes in the quantity of notes. This view seems untenable. First, there is no evidence in favor of it. Second, in light of the estimates above, many of the monetary injections to be examined are simply too large to have been offset. Since we will examine episodes where, for instance, per capita note circulation rose by a factor of six in a ten year period and prices fell, specie flows could not salvage quantity theoretic interpretations. Third and most important, in a number of instances there is every reason to think that specie stocks and paper currency stocks moved in the same rather than in offsetting directions. The most obvious example of this occurs in the events surrounding the French and Indian War. Here paper currency stocks rose dramatically during the war, and declined equally dramatically afterward. Similarly, British expenditures in America during the war were large, and almost certainly resulted in expansion of specie stocks. Afterwards, as is well-known, the British government levied taxes to force America to help pay for the war. This almost certainly resulted in drains of specie. These movements in the specie stock should have

roughly paralleled movements in the stock of paper currency. Thus, for the period considered in Section V of the paper, there is every reason to think that our focus on paper currency gives a generally accurate picture of changes in the total stock of currency outstanding.

Finally, the omission of bills of exchange and book credit deserves mention. While it is often argued that book credit was an important component of the "medium of exchange," and hence in principle should be included in empirical attempts to negate the quantity theory, it is clear that credit cards, etc., play a similar role today. This type of credit is routinely omitted from attempts to empirically implement the quantity theory. Hence, this omission is consistent with current practice. In the case of bills of exchange, which were privately issued circulating liabilities, it might at first glance appear as if these were analogous to modern bank liabilities. However, they were not convertible into currency on demand, but rather carried a maturity date. Moreover, they were not divisible, and appear to have circulated only in relatively large denominations. Finally, according to Gould (1915, p. 38), their payment was frequently protested. Hence, the analogy to bank liabilities is far from exact, and again omission does not appear to be out of line with standard practice. Finally in this respect, it should be noted that contemporary usage of the term money (such as Hamilton's mentioned above) included only specie and bills of credit, of which bills of credit were the largest part.

Prior to proceeding with our description of colonial monetary arrangements, one last point is worthy of note. In particular, in matching each colony's money supply movements with price level movements it should be kept in mind that the money of one colony would often circulate widely in adjacent colonies. Where this was standard practice, and where currencies of different

colonies exchanged at par as a matter of course, this is incorporated into the analysis (as in the discussion of New England below). Elsewhere it is also clearly the case that currency circulation did not respect colonial borders. For instance, it is well-known that Pennsylvania currency circulated in New Jersey and in Maryland (during the 1750s). New Jersey currency also circulated in New York and Pennsylvania. However, there is little basis for ascertaining the size of currency flows between colonies, much less net currency flows. Nor is there any reason to assume that the existence of such flows invalidates our practice of looking at percentage growth rates in the per capita money stock and comparing these with percentage changes in prices or exchange rates. Thus, there seems to be a valid basis for attempting to relate each colony's stock of paper currency to its price level and exchange rate. Therefore, we proceed along these lines without further apology in what follows.

III. Loan Office Systems

As indicated above, paper money consisted of two types of bills of credit. The first of these was issued by colonial treasuries to cover shortfalls of receipts relative to expenditures, and was used directly to purchase goods and services. Thus, these are easily understood and require no further explanation except with regard to their backing, which is provided when deficit finance is discussed in more detail. Bills of credit issued by colonial loan offices, however, are an instrument outside the realm of contemporary experience, and hence merit a more complete description.

The first colonial loan office was established in 1712 in South Carolina, and the last in 1737 in New York. At least ten of the colonies established land banks, which as indicated previously, printed notes for the purpose of purchasing mortgages. In this section we describe the loan office

system, which was a major source of notes prior to the French and Indian War in most colonies. Then, in the next section we examine the differences between colonies which experienced high rates of inflation and currency depreciation, and those which experienced stable currency values.

A. Description

The general nature of loan offices was (for our purposes) fairly constant across colonies (although their administration was not). A colony printed notes which were used to purchase mortgages secured by land or some other "real" commodity (most often plate). Minimum and maximum values were established for the amount of any single loan, and most often the colony would put up at most half the value of the security offered. In general, town governments or existing colonial offices were mobilized for distributing money and ascertaining the value of the property to be mortgaged. Colonial legislatures authorized issues of loan office notes at their own discretion, and in quantities at their discretion but subject to the approval of the colonial governor and/or proprietor, and sometimes London. When a new issue of notes was approved this would be announced, and prospective borrowers would queue up at local loan offices.

These loans were made at interest rates which varied across colonies, but that lay typically within the range of 4 to 6% for the colonies considered here. These rates appear generally to have been below private market rates of interest. Thus, it should be noted that new issues should not be neutral according to any theory, as these constituted subsidies to particular sets of borrowers.

Provisions concerning payment of principal and interest varied across colonies, and across time in any one colony. However, loan repayments could be made with notes accepted at par by the loan office. As the principal

of a loan was repaid, notes were retired. Interest receipts were used to fund general expenditures of the colonies. Several colonies were able to fund peacetime expenditures based solely on the interest receipts from these loans.^{7/}

Naturally, there were some defaults on loans. In the event of a default, the loan office would auction off the mortgaged property, using the receipts of the auction to retire notes.

Finally, as indicated above, the notes issued by these land banks were not redeemable in commodities. They were typically given legal tender status, and colonial governments were generally obligated to accept them in payment of taxes.

B. Remarks

At this point several remarks are in order. The first is that we may view the land bank system as a government funded subsidy to certain portions of society, with the deficits involved financed by the issue of negotiable, noninterest bearing, legal tender notes. These were not fiat money, however, in the sense that they were backed by the future receipts of the loan offices from the repayment of principal, or the proceeds of auctions of property on which there was default.

Second, it is reasonable to ask why colonial governments chose to issue notes in this way. In regard to this question, several comments should be made. First, one of the motivations for establishing many of the loan offices was the oft-cited shortage of specie in the colonies. While this was belittled by Smith (1776), and at first blush seems difficult to interpret, in fact specie in circulation tended to be of large denomination relative to average wealth or income. This made payment of taxes a continuing problem which loan office issues were meant to ameliorate.^{8/}

This does not explain why the colonies did not issue unbacked fiat money, however. In fact, of course, theoretical models of money suggest that such issues are possible only in economies with "low" real rates of interest. The fact that market rates appear often to have been at their usury limit prior to the establishment of loan offices suggests that this necessary condition for the existence of unbacked notes was not met. Moreover, it is unlikely London would have permitted such an arrangement.

It is still the case, of course, that other arrangements for issuing notes could have been made. The nature of the loan office reflects colonial concern both with the system of land tenure, and with the monetary system (as well as the nature of British heritage). Thus, these offices should not be viewed as being purely an instrument of monetary control. The reasons for establishing offices of this form is beyond the scope of this paper, however.

IV. Currency Values: 1720-1755

In this section we examine the experiences of several colonies prior to the French and Indian War. As will be seen, the New England colonies experienced severe inflation and currency depreciation. In contrast, the Middle Atlantic colonies displayed relatively stable price levels and exchange rates against sterling. It will also be seen that, particularly in the mid-Atlantic colonies, little or no relationship existed between the quantities of notes issued and their value. In addition, it will be argued that the differences between the two sets of colonies were attributable to the way in which note issues were backed. It will be noted that Maryland and the southern colonies are not considered. Currency values in some of these colonies are explored in Smith (1983). Virginia, which did not issue notes before 1750, will be considered when we examine the French and Indian War.

The scheme of this section is as follows. First, we consider price levels in Boston, Philadelphia, and New York, and relate them to the quantity of notes in circulation. These are the only sets of relevant price level data available, but they serve to illustrate nicely the differences between the New England and the Middle Atlantic colonies. Then, we consider the exchange rate experiences of various colonies against sterling. The pattern which emerges is quite similar to that for price levels. In particular, outside of New England, the level of note circulation seems not to explain exchange rate phenomena. However, the nature of backing for notes explains interregional differences. This is discussed in Section IVC. Finally, we consider the experience of Massachusetts in ending, almost immediately, thirty years of secular inflation in 1750.

A. Price Levels

Table 1 presents figures on per capita note circulation in Massachusetts, exchange rate indices for Massachusetts pounds against sterling, and data on the prices of wheat and molasses and their "specie equivalents." As is apparent, Massachusetts experienced thirty years of sustained depreciation of its currency, and of inflation in the price of commodities. It is also apparent that this inflation was not related closely to the quantity of Massachusetts notes in circulation. For instance, from 1725 until 1740, there is clearly a secular reduction in the per capita stock of notes issued as earlier issues were retired and as the population grew. However, despite this reduction in the per capita money supply, the price of molasses quadrupled, and the price of wheat rose by 49%. Also, note that in 1740 per capita note issue was 3% higher than the 1720 level, and yet the price of molasses was 4 times the 1720 price, while the price of wheat was 1.86 times its 1720 level. Moreover, there is no similar such trend in the (deflated) "specie prices" of these

goods. Clearly, then, this inflation is not attributable to changes in the note issues of Massachusetts.

However, at this point it might be objected that the economy of New England was a fairly integrated one. Moreover, until 1750 the currencies of all the New England colonies exchanged at par.^{9/} Thus, it could be argued that it is appropriate to contrast price levels in Massachusetts with the stock of New England, rather than Massachusetts currency. When this is done, the quantity theory fares much better. Data on the outstanding stock of bills of credit for New England as a whole are present in Table 1a. As can be seen, between 1720 and 1740 the total per capita quantity of paper money in circulation increased by a factor of 1.86. So did wheat prices. Molasses prices, as we have noted, quadrupled, and the exchange rate more than doubled.

Similarly, from 1740 to 1750 the per capita quantity of paper money in New England more than tripled. The exchange rate roughly doubled over the same decade, the price of wheat nearly quadrupled, and the price of molasses nearly doubled. Hence when we take New England as a whole, quantity theoretic predictions perform quite well. In light of the fact that they do not perform well elsewhere (as will be seen), we return to an explanation of this fact below. However, at this point we might note that for New England as a whole before 1750, naive quantity theoretic predictions are quite accurate. This lends credence to the idea that it is appropriate to contrast price level movements with movements in the stock of paper currency outstanding for the relevant colonial units.

Consider now the experience of Pennsylvania. Table 2 presents figures on note issue, exchange rates, and price levels. This indicates a currency which exchanged with sterling at a relatively stable rate (for instance, relative to Massachusetts). It also displays the feature of a secular

decline in per capita note issue after 1730 (continuing until 1755). In spite of this 25 year trend, in 1755 Pennsylvania's exchange rate had depreciated somewhat, and its price level was 12% higher than in 1730. Moreover, this is true in spite of the fact that "silver equivalents" prices were not much different in 1755 than in 1730. In view of the fact that per capita note issue declined 47% over this period, this seems difficult to reconcile with quantity theory views.

There are also some shorter term episodes which are difficult to reconcile with the quantity theory. For instance, in 1729 Pennsylvania increased its note issue by 79%. From 1728 to 1729 the price level fell, and from 1729 to 1730 it rose 6%. Note that these changes in the price level are nearly matched by changes in "silver equivalents" prices. After 1730 prices do not reattain the 1728 level again until 1741. Certainly the 79% increase in note issue in 1729 represents a large increase in the money supply of the colony. The failure of this to be reflected in prices seems difficult to reconcile with the quantity theory.

The second obvious feature of Table 2 is its differences from Table 1. In particular, Pennsylvania did not experience the severe depreciation or inflation of Massachusetts. We will return to an explanation of this difference below.

Finally, consider the data for New York City presented in Table 3. Between 1715 and 1717, £44,287 had been issued, about half of which remained in circulation in 1737.^{10/} In 1737 New York established its loan office, issuing £40,000 of notes for this purpose, and £8,350 for payment of debts. Thus, note issue increased by over 200% in 1737, remaining constant until 1745. It will be noted that this occasioned virtually no change in exchange rates. Moreover, from 1720 until 1750, the per capita stock of notes in

circulation increased by 67%. Nevertheless, the price level rose only 9% over the same period. Thus, despite these increases in note issue, there were no similar increases in prices, or corresponding exchange rate depreciations.

From 1750 until 1755 there was a minor reduction in per capita note circulation (7.5%). This was accompanied by a 10% increase in prices, and resulted in a 0.5% depreciation of New York currency. Thus, the New York experience confirms that of Pennsylvania: price level movements are not well explained by movements in the stock of notes, even over relatively long periods. It is also similar to the Pennsylvania experience in that New York maintained price level and exchange rate stability. After examining the exchange rate experiences of other colonies, we will return to an explanation of the difference between New York, Pennsylvania, and Massachusetts.

Prior to proceeding, however, we may already note the relatively poor explanatory power of note issue in accounting for price level movements outside New England. We will now see that this extends to exchange rate movements in other colonies as well.

B. Exchange Rates

We have seen that Massachusetts experienced severe depreciation of its currency, while New York and Pennsylvania did not. Moreover, exchange rate movements in the latter colonies were not well explained by changes in note issues. Nor, in light of the differing colonial experiences, can they readily be accounted for by monetary factors in the rest of the world. In this section we extend our examination to New Jersey and Rhode Island to provide further support for these observations.

Table 4 provides figures on note circulation and exchange rates for New Jersey. As can be seen, the quantity of notes in circulation in 1739 was 50% larger than in 1724, while the exchange rate depreciated 14%. Ten years

later, note issue was only 63% of the 1739 level while the exchange rate against sterling was unchanged. Five years after that, note issue was only 8% of its 1749 level, while the exchange rate appreciated 1%. These observations are dramatically at variance with the quantity theory. They also indicate that the New Jersey experience parallels that for New York and Pennsylvania in that exchange rates were highly stable despite large variations in the stock of New Jersey currency. Lester (1939) indicates that the Delaware experience was qualitatively similar to that for these three colonies as well.

The Rhode Island experience, on the other hand, is similar to that of Massachusetts. Table 5 indicates the time path of per capita note issue and of the exchange rate for Rhode Island currency against sterling. From 1725 to 1730 per capita note issue more than doubled, from 1730 to 1735 it more than doubled again, and from 1735 to 1745 per capita note issue nearly doubled. As noted previously, until 1750 Rhode Island and Massachusetts currencies exchanged at par, so that Rhode Island avoided experiencing anything like proportional depreciation of its currency. Nevertheless, its currency depreciation was substantial.

The conclusions of this section are fairly obvious. First, the quantity of money does little to explain price level or exchange rate behavior outside of New England. Second, the New England and Middle Atlantic colonies had strikingly different experiences with respect to the stability of currency values. We turn now to the question of whether variation in currency values, and these interregional differences can be accounted for by the manner in which notes were backed.

C. An Explanation

It has been noted that, outside of New England, the time paths of price levels and exchange rates are not well accounted for by movements in the

stock of paper currency. It has also been noted that Pennsylvania and New York had very stable currencies and price levels relative to the New England colonies. In this section we argue that the interregional differences observed are readily accounted for by differences in the degree of care taken in backing notes with future income streams.

Consider first the experience of New England. To the extent that the quantity theory can account for the inflation and currency depreciation experienced, it must do so by matching price movements with growth in the entire stock of New England paper currency. In this section we argue that, in New England, note issues were poorly backed. This means only that increases in note issues were not matched by similar increases in future government income streams. Hence, the quantity theory becomes a special case of the general view of money outlined above.

In the middle Atlantic colonies, on the other hand, both large increases and secular reductions in per capita money stocks were observed. These changes did not produce price level or exchange rate movements expected on the basis of the quantity theory. Our explanation for this, and for the interregional differences between New England and the other colonies studied, will be that outside New England changes in the stock of outstanding notes were accompanied by appropriate changes in anticipated government income streams. This explanation will rely on two observations. First, while on paper the monetary arrangements across colonies did not vary in any way crucial to our argument, loan office provisions for backing currency appear to have been administered far more scrupulously in the middle Atlantic colonies than in New England. This is probably the most important difference between the two regions. Secondly, however, there exist indications that land values remained more stable in the mid-Atlantic area than in New England. In light

of the role played by land in backing notes, this observation provides a possible additional reason for the relative success of currency arrangements in the middle Atlantic colonies.

It will be recalled that a large component of the stock of paper money--loan office notes--were loaned out on the security of mortgaged property. The income streams generated by repayment of principal on these loans served to back the notes. In order to guarantee these income streams, provisions of loan office bills generally required that loans be made in amounts of no more than half the value of mortgaged property. In the event of defaults on loans, the mortgaged property was to be auctioned off and the proceeds of the auction used to retire notes.

As indicated previously, there are substantial indications that provisions meant to provide secure future income streams were better observed in the middle Atlantic colonies than in New England. For instance, in New England it seems that provisions specifying sizes of loans were not much adhered to. According to Thayer (1953, p. 153),

Generally the land-bank laws prohibited a loan of more than one half the value of the property given in security. One suspects, however, that in New England and the Carolinas the evaluators paid slight regard to this requirement, permitting loans to be made with very inadequate security.

Moreover, delinquent repayment was common. Nevertheless, mortgaged property was not seized for auction. Again according to Thayer (1953, p. 157),

Many of the early land-banks, especially in New England, did not make provision for yearly payments on the principal. As a result, when the loans came due the borrowers, more often than not, were unable to pay off their debt. Instead of foreclosing on the mortgages as required by the provisions of the law, the legislatures usually extended time to the delinquents. When the first issue became due in Massachusetts in 1719 less than one half of

the principal had been paid. Ten years later most of the loans had been repaid, but it was another decade before all of the accounts were settled. The same story holds for the other loan issues in Massachusetts, notwithstanding the fact the laws after about 1720 required both interest and principal to be paid on a yearly basis.

Rhode Island was even more lenient regarding security for loans. Borrowers from Rhode Island often relent to others in Massachusetts, so that Rhode Island officials were obviously not sure what the ultimate backing of a loan was. Moreover, while the government of Massachusetts attempted to discourage this practice, it was unable to do so. As stated by Felt (1839, p. 88)

Rhode Island had [in October 1733] also ordered a large emission of their bills, which, as usual, were expected to have their chief circulation in Massachusetts.

He then states that (p. 89) "the governor of Massachusetts was desired to send out a proclamation warning the people to be on their guard against taking the late bills of Rhode Island. . . . Though a great and imposing effort was made to keep the Rhode Island bills out of our market, yet they soon flowed in and became current".

Of course that colonial loan officers did not adhere strictly to the provisions of the laws does not imply that defaults were a problem. However, Potter (1865, p. 106) says of Rhode Island that

In the emission of a bank of £100,000, in August, 1738, provision was made for loaning it and for securing the payment of the interest, as well as the principal, by mortgage. The colony had lost a considerable part of the interest of former banks, as it was only secured by bonds,

which adequately illustrates the problems that arose.

Thus, in New England administration of the loan office was not

conducive to secure backing of notes. While again the law was not always adhered to in the middle colonies, Thayer (1953, p. 157) states that

The middle colonies came nearest to living up to the letter of the law but even in Pennsylvania no penalties were imposed for payments made one, two, or even three months late.

This contrasts strongly with Thayer's statement about Massachusetts. Also, officials in the Middle Atlantic region were more scrupulous in following provisions regarding security for loans.

That Pennsylvania loan office estimators did not over-value property is shown by the records of property sold on default of payments. Usually the amount due the loan office was but a small part of the sale price. . . . The sales on foreclosed mortgages in 1762 involved property in all parts of the province. Certainly, as is evident from the figures, Pennsylvania was taking no risk on property of this kind.^{11/}

It seems, then, that efforts were taken to back notes far more securely in the middle colonies than in New England. In addition, it seems that land values were more stable in the middle colonies than elsewhere, and hence that land provided a better source of backing there than in New England. Again quoting Thayer (1953, p. 153),

One can be quite certain, however, that land outside of the middle colonies was not a very good security for any money. . . . In Pennsylvania, however, there are records which clearly show that the reverse was the case in that province.

Thayer (1953, p. 155) also documents the low level of demand for land in New England, and contrasts this with other colonies:

The loan office in the middle colonies almost always had a waiting list for loans. This, however, was not true in the other colonies. . . . For example, about one half of the second Massachusetts issue of £100,000 was not used, the local officers reporting that the money remained in their hands without borrowers.

In short, then, provisions meant to provide adequate income streams for backing notes were not closely followed in New England. This is demonstrated graphically by the fact that, according to Brock (1975, Table IIA), in 1740 64% of the outstanding stock of paper currency in Massachusetts was overdue for retirement. Consequently, it is not surprising that the value of these liabilities was not stable. On the other hand, in New York, Pennsylvania, and New Jersey notes were backed in such a way that their value was retained. In other words, the currency experiences of these colonies as opposed to that of New England is consistent with the view that government liabilities which are backed are analogous to privately issued liabilities, i.e., their value depends crucially on the nature of their backing.

D. Ending Inflation in Massachusetts

As seen above, Massachusetts suffered severe inflation and currency depreciation after 1720. Means of stabilizing currency values, on the one hand, and of emitting notes, on the other, became divisive political issues.^{12/} Finally in 1748, with the prices of wheat and molasses both more than seven times their 1720 levels, the colonial governor recommended that there be no new emissions of notes. It was then moved in the colonial legislature that specie to be received by Massachusetts as recompense for expenses in the previous war with the French be used to retire the outstanding notes of the colony. A committee of representatives from Massachusetts met with representatives of New Hampshire, Rhode Island, and Connecticut to recommend the same course of action to them, but these colonies rejected the proposal.

In 1749, this proposal passed the Massachusetts legislature. As described by Felt (1839, p. 121-2),

A law is made for the redemption of the Province bills of credit. It requires all this paper to be exchanged at the treasury by March 31, 1750. . . . If any of such bills are kept back for a year after the time designated, they are to be irredeemable. It appoints that what the specie, to be received from England, lacks of paying these notes, shall be cancelled by a tax. It appoints a penalty for taking or passing any of the New Hampshire, Connecticut, and Rhode Island notes.

However, this proposal had at first had little impact on currency values in Massachusetts.

While the General Court were debating the question, whether they would redeem their paper with this money, the inhabitants were generally indifferent, because they viewed the plan as chimerical, and not likely to be realized.^{13/}

Then, as the redemption actually began, considerable opposition to it was expressed. As described by Felt (1839, p. 129),

redemption is going on, money is very scarce. A memorial is laid before the Assembly, stating that its subscribers are unable to obtain either paper or coin, for their work or wares, and therefore cannot pay their taxes; for which their property is seized and vended from one fourth to one tenth of its value. For such reasons they pray, that relief may be granted them in the premises.

As a response to the ensuing shortage of specie,^{14/} a bill was passed permitting the treasury to issue certificates, which differed from earlier notes in that they were redeemable in specie. In Felt's words (1839, p. 131),

To supply a medium of exchange, a bill passes for the Treasurer to issue certificates, on interest, to be paid by December 31, 1751. . . .
[This provided for] issue of treasury notes for money borrowed for the Province on interest. This precedent

became a practice. Similar securities were continually issued to meet the disbursements of the government. Though it passed business, on special agreements, yet it was not allowed to be legal tender. It was emitted from the treasury till the Revolution, and was then soon renewed under a different administration.

With this new monetary regime in place, currency values stabilized almost immediately. As indicated in Table 6, which gives exchange rates against sterling, depreciation had been steady and severe through 1749. In 1750, as the new regime (with new denominations) was implemented, currency values became stable and remained completely so until the system was temporarily suspended during the French and Indian War. In particular, the month to month fluctuations in exchange rates before 1750 contrast very sharply with the virtual constancy of exchange rates after 1751. In addition, as Table 7 indicates, after 1750 prices generally fell.

It might be suspected, however, that this stabilization of exchange rates and prices occurred for reasons that had nothing to do with Massachusetts' currency reform. For instance, in 1751 the Currency Act prohibited the colonies of New England from further issues of legal tender notes. However, the practical effects of this prohibition seem to have been nil. To see the impact that the currency reform did have in Massachusetts, it is useful to consider the post 1750 experiences of New Hampshire, Rhode Island, and Connecticut. Exchange rates for these currencies against sterling are presented in Table 8. June 1750 marked the date of the highest exchange rate against London for Massachusetts currency until 1758. By contrast, New Hampshire and Rhode Island currencies both depreciated over 50% between 1750 and 1755. In Connecticut this depreciation was 40%. Thus, in spite of the massive depreciations continuing in each of its neighboring colonies, "currency reform" in Massachusetts put an end to inflation and depreciation of its currency.

Moreover, that it did so while note issues increased dramatically will be seen in the next section.

It will be noted that the evidence from this "currency reform" is very similar to that presented by Sargent (1981) for currency reforms in countries experiencing hyperinflations in the 1920s. In both Massachusetts and those countries, currencies which had been only poorly backed or unbacked were replaced by carefully backed currencies. The result in each case was a near immediate end to inflation, which in Massachusetts was a phenomenon of thirty years duration.

In the case of Sargent's evidence, it has been questioned whether this means of ending an inflation is "relevant" for contemporary economies. In particular, it has been suggested that nominal contracting broke down under extremely high rates of inflation. Only the breakdown of this contracting permitted a speedy end of the hyperinflations, according to this view. In light of this argument, one might wonder whether an absence of such arrangements permitted the rapid cure of inflation in colonial Massachusetts.

In fact, it is easy to document the prevalence of nominal contracting in Massachusetts at this time, and in other colonies as well. This prevalence is surprising in light of the large "barter component" of colonial exchange. In particular, exchanges were often based on "barter contracts" in which one agent would deliver some commodity in exchange for promised delivery of some other commodity in the future. In view of the fact that "indexation" of such contracts would seem easy to arrange, it is something of a puzzle that nominal contracting was so prevalent. As Baxter (1945, p. 33) states (in discussing Thomas Hancock)

What is really surprising is that barter contracts were not framed with an eye to stable values. As we have seen, most of Hancock's exchanges of goods were arranged, not on the basis of "I'll give you x barrels of beef for y gallons of molasses," but "I'll sell you fx of beef, you can later square our account with molasses to the value of fx at the prices then current.

He also says that^{15/} "payment in kind was not a device by which creditors avoided changes in the value of money." He then documents the prevalence of these contracting practices in New England prior to 1750, and they are also easy to document in the Middle Atlantic colonies, where the relative stability of currency values makes them less surprising. Thus, thirty years of inflation were ended in Massachusetts in 1750 despite the prevalence of nominal contracting as a means of doing business.

V. Monetary Deficit Finance in the Colonies

During the period when loan offices operated, several colonies were able to pay all government expenses from the interest proceeds on loans. Thus, these colonies effectively had no system for taxation. Other colonies had only a limited apparatus for raising taxes. The French and Indian War was the first instance in which many colonies had large sustained governmental expenditures. No colony could finance such expenditures through taxation. Thus, some colonies resorted to monetary finance of deficits which, for them, were quite large. Other colonies, such as Virginia which had no prior experience with paper money, preferred to borrow to finance their deficits. However, this proved impossible in view of the large amounts required. Therefore, even in Virginia "arose an absolute necessity of having recourse to a paper currency."^{16/}

The way in which the colonies responded to these deficits was to finance them by printing (for the most part) irredeemable notes, some interest

bearing and some not, which were negotiable and which colonial governments were obligated to accept in payment of taxes. At the same time as note issue was authorized, however, colonial legislatures levied future taxes for retirement of the notes. Essentially, the working of this system was as follows. Notes were not redeemable for any commodities. Their retirement was effected by levying taxes payable in notes. As notes were received for taxes, they were destroyed. Clearly, then, this system backed notes with future tax receipts, and mitigated against the accumulation over a long period of any public debt. By way of contrast, Britain financed its wartime deficit by borrowing, without resort to any form of finance that is normally considered inflationary.^{17,18/}

According to the notion that money is valued as a claim to future government tax receipts, it is important to know whether the colonies were scrupulous in providing taxes for retirement of note issues. In this regard, the statement of Nicholas (1912, p. 233) is revealing. Speaking of the taxes voted for retiring notes, he says

The Sums voted, at different Times, were upon proper Estimates; and Funds, the most ample and unexceptionable, were established for the Redemption of the Treasury Notes; indeed, I can say with great Truth, that the Assembly was so scrupulous in this Matter, that, rather than there should be the smallest Doubt of their Sufficiency, they valued the funds at much less, than those, who were best acquainted with them, were persuaded they would yield.

The same seems generally to have been true of the other colonies.

An overview of the magnitude of per capita note issues is provided in Table 9. The increase in note issue from 1755 to 1760 is striking in all of the colonies. Per capita note issue rose 278% in Pennsylvania, 89% in New York, 749% in Virginia, 791% in Massachusetts, and by 61.5% in Rhode Island.

Thus, from 1755 to 1760, the colonies experienced dramatic increases in their money supplies.

In spite of these increases, currency values remained remarkably stable. Table 10 presents indices of exchange rates of these currencies against sterling. Except for Rhode Island, the colonies presented display virtually no depreciation of their currencies. In Massachusetts, the value of currency increased, New York experienced a 7% appreciation in its currency from 1755 to 1760, Virginia experienced a 9% depreciation as it increased its note issue by over 700% per capita, and Pennsylvania notes appreciated as well. Rhode Island did experience a 41% depreciation along with its 61.5% increase in note issue. However, from 1750 to 1755 Rhode Island currency depreciated by 83% as per capita note issue increased by 31%.^{19/} Thus, even for Rhode Island this experience represents relative stability of currency values.

Some data on price levels are presented in Table 11. In Massachusetts, the price of wheat was 11% higher in 1760 than in 1755, while the price of molasses was 42% higher than in 1755. These are hardly dramatic wartime inflations by any standards, and do not seem to be exceptional price rises in light of the nearly nine-fold increase in per capita note issue.^{20/} Price level movements in Pennsylvania and New York are not remarkably different. Over the five year period 1755-1760, prices in Pennsylvania rose 17.1% and in New York prices rose 19.7%. In view of the 278% increase in per capita note circulation in Pennsylvania, and the 89% increase in New York, these would seem to be quite moderate wartime inflations. Thus, the early wartime experiences of the colonies certainly run counter to what one would expect on the basis of the quantity theory. Moreover, as note issues tended to be carefully backed by future tax receipts, these experiences are highly consistent with the alternate view presented above.

While the war continued until 1763, it will be noted from Table 9 that per capita note issue declined markedly from 1760 to 1765 in all the colonies. This decline indicates the rapidity with which notes were retired after the war, and is as striking as the wartime note issue. During these five years, per capita note issue in Pennsylvania fell 46%, Virginia issue fell 44%, and Rhode Island issue fell 55%. These reductions in the supply of colonial currencies are not reflected in currency values, however. In fact, during this period all of the colonies experienced depreciations ranging from 3% to 14%. Nor did prices decline in response to the withdrawal of notes. As Table 11 indicates, from 1760 to 1765 prices fell by 5.8% in Pennsylvania and thereafter were higher than the 1765 level despite withdrawals of notes. Similarly, prices in New York fell 9% from 1760 to 1765, and rose thereafter despite a continued reduction in per capita note circulation.

Looking at the period 1760 to 1770 is perhaps even more dramatic. Over these ten years, per capita note issue in Pennsylvania fell 68%, in New York fell 86%, in Rhode Island fell 96%, and in Virginia fell 98%. Despite these spectacular contractions of colonial currency supplies, Pennsylvania experienced only 3% appreciation against sterling over the decade, New York currency did not appreciate, Virginia currency appreciated 16% and Rhode Island currency depreciated by 30%. The story is similar with respect to the price level. Prices in New York were only 2% lower in 1770 than in 1760. In Pennsylvania prices were only 3% lower in 1770 than in 1760, despite the 68% decline in note issue per capita. Clearly, then, the quantity theory alone cannot confront these observations.

As was the case prior to the French and Indian War, Massachusetts presents an interesting contrast with the other colonies. By 1770, each of the other colonies considered had reduced its money supply to a level approxi-

ating (or in most cases much below) the pre-war level. In Massachusetts, however, the per capita stock of notes in circulation was more than 6 times larger in 1765 than in 1755, and in 1770 was still 1.7 times as large as in 1755. Nonetheless, in 1765 the prices of all commodities were lower than in 1755, and exchange rates remained virtually unchanged. Similarly, in 1770 the exchange rate had appreciated relative to its 1755 level, molasses was 14% cheaper (despite the 70% increase in notes), and wheat was only 5% more expensive than in 1755. These facts seem particularly difficult to reconcile with the quantity theory. Moreover, lest one wonder whether there could have been outflows of specie which wholly or partially offset the movements in paper currency stocks, it will be recalled that in Section II we argued that changes in specie stocks should have generally paralleled changes in the outstanding stock of notes during this period. Thus, such a mechanism is unlikely to have been responsible for the observed movements in prices and exchange rates.

It is harder to interpret the post-1760 data as supportive of alternate theories, however. During this time there was increasing interference from Britain in colonial monetary affairs. It is beyond the scope of this paper to attempt to disentangle these effects from the way in which the colonies conducted their monetary affairs. However, it will be noted that none of the observations presented are at all inconsistent with the view that "representative" monies are valued in much the same way as are claims on firms.

VI. "Monetary" versus "Real" Factors

To this point our discussion has focused on explanations of price level movements which rely either on (a) per capita money stock movements, and these alone, or (b) per capita money supply movements coupled with the behavior of underlying fiscal policy. In other analyses of the type being conducted here, whenever price level movements fail more or less to mirror

movements in the money supply, it is typical to examine the behavior of both velocity and real output explicitly.^{21/} In our case this is not possible, since absence of any data on real output for the colonies precludes such an examination. However, this does not mean that nothing is known about economic growth during the colonial period. In the remainder of this section, then, it is argued that our focus on movements in the per capita money supply is generally adequate to account for movements in real output for the purposes of this study. To the extent that this is not fully adequate to account for variation in real output, we will argue that failure to account for such variation biases our results in favor of the quantity theory. Hence, this omission will not alter the conclusions obtained here.

To begin, then, it should be noted that studies of the money-price relationship in the colonial period typically operate on the assumption that, over sufficiently long periods, economic growth coincides with population growth. This is explicit, for instance, in Letwin (1981), which adopts as a working hypothesis (p. 467) that per capita income was unchanged between 1730 and 1775 (in Pennsylvania). A more systematic study of variation in real output is undertaken by Egnal (1975), who concludes that "between 1720 and 1775 the growth of population was the most important reason for the increasing total output of the colonies. The rise in per capita product . . . made a comparable contribution to total output only between 1745 and 1760" (Egnal, p. 199). Hence for most of our period, the focus on per capita money stocks probably accounts adequately for real growth.

Of course, the colonial period did display standard business cycles. While any systematic examination of these cycles is beyond the scope of this paper, there is one very obvious point that can easily be made. In particular, the most dramatic evidence presented here derives from the French and

Indian War period. During this episode, per capita money stocks rose dramatically (between about 1755 and 1761), and fell dramatically thereafter. Nevertheless, rates of price increase were not high during the first subperiod, nor were they particularly low thereafter. This is all the more difficult to explain by traditional methods given that the 1755-1760 period contains a standard wartime boom, and the 1760-1765 period a standard postwar recession. Moreover, the latter was exacerbated by well-known British and colonial economic actions and reactions during the 1760s.^{22/} Both these facts make price level behavior even more difficult to understand by conventional means. Hence the failure to explicitly account for real factors here should, at the least, not bias our results against the quantity theory, and more likely, a more complete attempt to account for these factors would strengthen our argument.

VII. Conclusion

Each of the colonies ran an essentially independent "monetary policy" prior to the 1760s. When colonial currencies were carefully backed by future governmental surpluses, they held their value remarkably well. When such backing was not carefully provided, depreciation was the rule. The quantity of notes issued, on the other hand, bears little relation to currency values, or to colonial price levels. Does this, then, constitute a refutation of the quantity theory?

The answer is that it would seem that it does, for the following reason. One last attempt to salvage a version of the quantity theory might be to note that increases in colonial money supplies were virtually always accompanied by promised future monetary reductions. As Sargent and Wallace (1981) have pointed out, under certain circumstances anticipated future monetary changes can dominate current changes in their effect on price movements. Could this explain colonial price level and exchange rate behavior? The

answer appears to be no, because the mechanism through which the Sargent-Wallace result operates is that anticipated future inflation (deflation) accompanying future monetary changes affects current behavior. A glance at the Tables presented here will indicate that if colonists expected monetary reductions to produce significant deflation, they were badly disappointed. For instance, as we have seen, from 1760 to 1770, prices in Pennsylvania fell 3% and prices in New York fell 2%. In light of the 68% and 86% per capita reductions in their respective money supplies, clearly these monetary reductions were not producing significant deflations. Hence, the Sargent-Wallace mechanism seems not to have been operative here. Thus, the colonial period should be viewed as a refutation of the propositions, stated by Lucas (1980), which we have cited above.

For the most part, colonial monetary arrangements financed government expenditures, provided a medium of exchange when specie was inadequate for this purpose, and maintained reasonably stable currency values. British interference with these arrangements after 1760 occasioned much resentment, and Franklin informed the British that interference with monetary regimes had alienated the colonies much more severely than the Stamp Act. To a certain extent the British ultimately permitted some return to the loan office system, but too late to provide for much interesting history of these.

Under the Articles of Confederation, many of the states reverted to their earlier methods of currency issue. The fact that state notes were regarded differently from the essentially unbacked Continental currency again provides support for the theory we have put forth here. In fact, the Revolutionary War debt, including state notes, can be viewed as a claim to future tax receipts, and the period between the end of the war and 1792 provides further confirmation of the view espoused above. This is the subject of future research.

In conclusion, then, recent theoretical developments have suggested that the quantity of money is far less important, even for price level movements, than the way in which it is introduced. Early American experience provides a useful laboratory for testing this view. This experience tends to suggest that it is a viewpoint which deserves more serious consideration than it seems to have received.

Notes

1/One criticism of the evidence provided by Sargent is that it is irrelevant to modern economies with elaborate nominal contractual arrangements. Interestingly, we shall see that currency reform in Massachusetts was successful despite the apparent prevalence of nominal contracting.

2/For all practical purposes there were no private banks. See below.

3/Although, see the discussion of New England below.

4/See, e.g., Vogel's (1974) study of Latin America.

5/See the comment in McCusker (1978, p. 7, n. 9), and the references provided there.

6/By Robert Lucas and Edward Prescott.

7/Given the profitable nature of these loan offices, a natural question is why no private land banks survived for any significant length of time. The answer seems to lie in the opposition of colonial governments to privately operated banks. On this point see the discussions by Billias (1959) and Felt (1839). It should be noted that after the disappearance of the loan offices, it was some time before any banks voluntarily made agrarian loans in the U.S.

8/On the problem of specie shortages as being related to large denomination coins, see Hanson (1979, 1980). On the fact that loan office issues were meant partly to address this problem, see Lester (1938, 1939).

9/This fact is interesting in itself, since it seems to have been a somewhat endogenous matter of practice rather than an outcome imposed by policy. In light of the fact that, during much of the period in question, Rhode Island was rapidly expanding its money supply, while Massachusetts was contracting its per capita stock of circulating notes, it is interesting that this practice endured as long as it did.

10/Lester (1939) p. 204.

11/Thayer (1953) p. 157.

12/See the discussion in Felt (1839), or the discussion of disputes over the privately operated Land and Silver Banks in Billias (1959).

13/Felt (1839) p. 124.

14/It will be recalled that shortages of small-denomination specie were one of the original reasons for establishing a loan office.

15/Page 25.

16/This is the description of Robert Carter Nicholas (1912, p. 232-3), who in 1765 became Treasurer of Virginia.

17/See the discussion in Adam Smith (1776).

18/It will be noted that this financing scheme of using government debt and pre-announced levies of future taxes is quite similar to the scheme considered by Barro (1974).

19/Notice that the rates of depreciation reported in tables 8 and 10 for Rhode Island diverge. This is because Weiss' (1970) figures have been used in Table 10. McCusker (1978) does not report exchange rates for Rhode Island during the 1760s. For this reason the Weiss figures appear in Table 10.

20/As a standard for comparison, from 1940 to 1945 base money per capita rose 101.35% in the U.S., M2 per capita rose 126.91%, the CPI rose 28.14%, and the WPI rose 34.61%.

21/See, e.g., Friedman and Schwartz (1963) and their discussion of the greenback period.

22/On this point see Ernst (1973).

References

- Barro, R. J. (1974) 'Are Government Bonds Net Wealth?' Journal of Political Economy 82, 1095-1117
- Baxter, W. T. (1945) The House of Hancock (Cambridge: Harvard University Press)
- Bezanson, A.; R. Gray; and M. Hussey (1935) Prices in Colonial Pennsylvania (Philadelphia: University of Pennsylvania Press)
- Billias, G. A. (1959) 'The Massachusetts Land Bankers of 1740,' University of Maine Studies, Second Series No. 74
- Brock, L. V. (1975) The Currency of the American Colonies 1700-1764 (New York: Arno Press)
- Cole, A. H. (1938) Wholesale Commodity Prices in the United States 1700-1861 (Cambridge: Harvard University Press)
- Egnal, M. (1975) 'The Economic Development of the Thirteen Colonies, 1720 to 1775,' William and Mary Quarterly Review vol. 32, Third Series, 191-222
- Ernst, J. A. (1973) Money and Politics in America 1755-1775 (Chapel Hill, N. C.: University of North Carolina Press)
- Felt, J. B. (1839) An Historical Account of Massachusetts Currency (Boston: Perkins and Mavin)
- Ferguson, E. J. (1953) 'Currency Finance: An Interpretation of Colonial Monetary Practices,' William and Mary Quarterly Review 10, 153-80
- Fisher, I. (1922) The Purchasing Power of Money (New York: Macmillan)
- Friedman, M. and A. J. Schwartz (1963) A Monetary History of the United States (Princeton: Princeton University Press)
- Gould, C. P. (1915) Money and Transportation in Maryland, 1720-1765, Johns Hopkins Studies in Historical and Political Science, Series 33 (Baltimore)

- Hammond, B. (1957) Banks and Politics in America from the Revolution to the Civil War (Princeton: Princeton University Press)
- Hanson, J. R. III (1979) 'Money in the Colonial American Economy: An Extension,' Economic Inquiry 17, 281-86
- _____ (1980) 'Small Notes in the American Colonies,' Explorations in Economic History 17, 411-20
- Hayek, F. A. (1935) Prices and Production (London: Routledge and Sons)
- Kemmerer, D. L. (1939) 'Colonial Loan Office System in New Jersey,' Journal of Political Economy 47, 867-74
- Lester, R. A. (1938) 'Currency Issues to Overcome Depression in Pennsylvania, 1723 and 1729,' Journal of Political Economy 46, 324-75
- _____ (1939) 'Currency Issues to Overcome Depression in Delaware, New Jersey, New York, and Maryland, 1715-37,' Journal of Political Economy 47, 182-217
- Letwin W. (1981) 'Monetary Practice and Theory of the North American Colonies During the 17th and 18th Centuries,' in V. Barbagli-Bagnoli, ed., La Moneta Nell' Economia Europea (Rome: Le Monnier)
- Lucas, R. E., Jr. (1980) 'Two Illustrations of the Quantity Theory of Money,' American Economic Review 70, 1005-14.
- McCusker, J. J. (1976) 'Colonial Paper Money,' in E. P. Newman and R. G. Doty, eds., Studies on Money in Early America (New York: American Numismatic Society)
- _____ (1978) Money and Exchange in Europe and America: A Handbook (Chapel Hill, N. C.: University of North Carolina Press)
- McCusker, J. J. and R. Menard (forthcoming) The Economy of British America, 1607-1790: Needs and Opportunities for Study (Chapel Hill, N. C.: University of North Carolina Press)

- McCusker, J. J. and J. C. Riley (1983) 'Money Supply, Economic Growth, and the Quantity Theory of Money: France, 1650-1788,' Explorations in Economic History 20, 274-93
- Nicholas, R. C. (1912) 'Paper Money in Colonial Virginia,' William and Mary Quarterly Review 20, 227-62
- Phillips, H., Jr., (1865) Historical Sketches of the Paper Currency of the American Colonies (Roxbury, Mass.: W. Elliot Woodward)
- Potter, E. R. (1865) 'A Brief Account of Emissions of Paper Money Made by the Colony of Rhode Island,' in H. Phillips, Jr., Historical Sketches of the Paper Currency of the American Colonies (Roxbury, Mass.: W. Elliot Woodward)
- Ratchford, B. U. (1941) American State Debts (Durham, N. C.: Duke University Press)
- Sargent, T. J. (1981) 'The Ends of Four Big Inflations,' Federal Reserve Bank of Minneapolis Working Paper 158 (Minneapolis) [Also in R. Hall, ed. (1982) Inflation: Causes and Effects (Chicago: University of Chicago Press)]
- Sargent, T. J. and N. Wallace (1981) 'Some Unpleasant Monetarist Arithmetic,' Federal Reserve Bank of Minneapolis Quarterly Review 5, 1-17
- Schwartz, A. J. (1973) 'Secular Price Changes in Historical Perspective,' Journal of Money, Credit and Banking 5, 243-69
- Schweitzer, M. M. (1983) 'Government, Capital Formation, and Colonial Economic Development: The General Loan Office of Pennsylvania, 1723-1755,' Philadelphia Center for Early American Studies
- Smith, A. (1776) The Wealth of Nations (New York: Modern Library, 1937 edition)

- Smith, B. (1983) 'Some Colonial Evidence on Two Theories of Money: Maryland and the Carolinas,' Federal Reserve Bank of Minneapolis Working Paper 245 (Minneapolis)
- Thayer, T. (1953) 'The Land Bank System in the American Colonies,' Journal of Economic History 13, 145-59
- U.S. Bureau of the Census (1976) Historical Statistics of the United States
- Vogel, R. C. (1974) 'The Dynamics of Inflation in Latin America, 1950-1969,' American Economic Review 64, 102-14
- Wallace, N. (1981) 'A Modigliani-Miller Theorem for Open Market Operations,' American Economic Review 71, 267-74
- Warren, G. F.; F. A. Pearson; and H. M. Stoker (1932) Wholesale Prices for 213 Years, 1720-1932, Cornell University, Agricultural Experiment Station Memoir 142 (Ithaca, N. Y.: Cornell University Press)
- Weiss, R. W. (1970) 'The Issue of Paper Money in the American Colonies, 1720-1774,' Journal of Economic History 30, 770-84
- West, R. C. (1978) 'Money in the Colonial American Economy,' Economic Inquiry 16, 1-15

Table 1

Massachusetts

Date	Note ^a Issue (£ per 1,000 people)	Exchange ^b Rate Index (1720 = 100)	Wheat ^c price (Mass. £)	Wheat ^c price (specie)	Molasses ^d price (Mass. £)	Molasses ^d price (specie)
1720	2,087	100	7.00	3.98	2.00	1.14
1725	3,171	132	8.73	3.93	2.00	0.90
1730	2,938	154	10.75	3.76	3.00	1.05
1735	2,556	164	13.25	3.38	4.73	1.21
1740	2,159	239	13.00	---	8.00	---
1745	4,824	294	17.92	3.49	9.54	1.86
1750	12,257	471 ^e	50.25 ^e	4.79	15.17 ^e	1.84

a Source: Data on note issues is from Brock (1975), Table II (revised). Data on population is from U.S. Bureau of the census (1976), p. 1168. Population figures for odd numbered years are interpolated.

b Source: McCusker (1978, p. 140-41).

c Wholesale price in shillings per bushel. Source: Cole (1938), Appendix A.

d Wholesale price in shillings per gallon. Source: Cole (1938), Appendix A.

e Based on numbers reported for 1749.

Table 1a

New England Bills of Credit Outstanding^a

Date	£ per 1,000 population
1720	1,620
1725	2,300
1730	2,277
1735	2,770
1740	3,038
1745	6,259
1750	10,869

a Source: Data on circulating notes are from Brock (1975), Table II (revised). Population data are from U.S. Bureau of the Census (1976, p. 1168). Odd numbered years are based on population interpolations.

Table 2
Pennsylvania

Date	Note Issue (£) ^a	Per Capita ^b Note Issue (£ per 1,000 people)	Price index ^c (silver equivalent)	Exchange Rate ^d	Price index ^e (Pa. £)
1720	---	---	107.00	138.75	86.2
1721	---	---	99.00	137.75	78.6
1722	---	---	103.00	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	---	116.00	149.58	97.6
1728	38,890	---	110.00	150.62	92.8
1729	68,890	---	107.00	148.61	92.5
1730	68,890	1,330	109.00	152.03	98.0
1731	68,890	---	97.00	153.28	87.1
1732	68,890	---	90.00	160.90	83.6
1733	68,890	---	91.00	166.94	90.0
1734	68,890	---	---	170.00	87.2
1735	68,890	1,000	94.00	166.11	87.8
1736	68,890	---	89.00	167.00	83.6
1737	68,890	---	91.00	170.25	91.1
1738	68,890	---	92.00	160.42	91.1
1739	80,000	---	84.00	169.69	82.2
1740	80,000	935	90.00	165.45	87.3
1741	80,000	---	124.00	146.14	112.6

1742	80,000	---	110.00	159.38	108.3
1743	80,000	---	96.00	159.79	95.6
1744	80,000	---	89.00	166.67	90.9
1745	80,000	780	86.00	174.77	92.7
1746	85,000	---	88.00	179.86	99.7
1747	85,000	---	96.00	183.78	110.6
1748	85,000	---	111.00	174.12	124.7
1749	85,000	---	113.00	171.39	121.5
1750	84,500	707	113.00	170.60	113.0
1751	84,000	---	114.00	169.86	112.8
1752	83,500	---	117.00	166.85	111.9
1753	82,500	---	114.00	167.49	109.9
1754	81,500	---	110.00	168.35	109.1
1755	96,000	702	107.00	168.79	109.6

a Source: Lester (1938), p. 353.

b Source: Weiss (1970), p. 779.

c Source: Cole (1938), Appendix C, Table 47. (Base 1741-45).

d Source: McCusker (1978), p. 184-5; Pa. £ per £100 sterling.

e Source: Bezanson, Gray, and Hussey (1935, p. 433).

Table 3

New York

Date	Note issue ^{a, f} (£ per 1,000 population)	Price index ^b (silver equivalent)	Exchange ^c rate	Price index ^d
1720	1,200	75.90	162.92	55
1725	---	79.00	165.00	52
1730	---	86.00	166.88	--
1731	---	70.50	165.00	--
1732	---	63.00	165.00	--
1733	---	---	165.00	--
1734	---	---	165.00	--
1735	---	---	165.00	--
1736	---	62.25	165.00	--
1737	---	---	165.00	--
1738	---	---	165.00	--
1739	---	69.67	166.67	--
1740	1,255	73.00	166.25	--
1741	---	---	159.44	--
1742	---	---	170.97	--
1743	---	---	174.67	--
1744	---	59.00	175.42	--
1745	---	62.00	183.33	--
1746	---	---	185.83	--
1747	---	---	191.46	--
1748	---	103.83	183.39	--
1749	---	93.00	176.46	68

1750	2,000	82.75	179.33	60
1751	---	89.08	181.50	65
1752	---	91.00	175.92	66
1753	---	89.50	179.39	65
1754	---	88.92	179.72	65
1755	1,850	90.75	180.13	66

a Source: Weiss (1970), p. 779.

b Source: Cole (1938), Appendix B, annual average from Table 39. (Base 1761-65).

c Source: McCusker (1978), p. 163-64, (N.Y. £ per £100 sterling).

d Source: Warren, Pearson, and Stoker (1932), p. 215-6.

f Weiss reports a per capita stock of £2,500 for 1745. However, this figure is inconsistent with the reported timing and quantity of note emissions reported by Brock (1975, Table IV), and with the population figures reported by the Census Bureau (1976). Thus, this figure has been omitted.

Table 4

New Jersey

Date	Currency in ^a Circulation (£)	Per Capita Note ^b Circulation (per 1000 population)	Exchange Rate ^c (N. J. 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 Z 1-23 (p. 1168), U.S. Bureau of the Census (1976).

c Source: 1724 figure is from Lester (1939), p. 192, the remaining figures are from McCusker (1978), p. 172-73.

d Source: 1754 figure is from Lester (1939), p. 193.

Table 5

Rhode Island

Date	Note issue ^a (£ per 1,000 population)	Exchange Rate Index ^b (1720 = 100)
1720	3,400	100
1725	2,540	132
1730	5,800	154
1735	11,900	164
1740	18,300	239
1745	22,000	294
1750	14,900	471

a Source: Weiss (1970, p. 779).

b Source: McCusker (1978, p. 140-41).

Table 6

Massachusetts Exchange Rates^a
(£ Massachusetts per £100 sterling)

Date	
1745:	
January	600.00
February	550.00
March	550.00
April	700.00
May	700.00
June	570.00
July	700.00
August	700.00
September	700.00
October	700.00
November	650.00
December	617.50
(annual average)	644.79
1746:	
January	585.00
September	700.00
(average)	642.50
1747:	
June	950.00
September	875.00
December	950.00
(average)	925.00
1748:	
March	950.00
July	875.00
(average)	912.50
1749:	
January	1,000.00
April	975.00
December	1,125.00
(average)	1,033.33
1750:	
January	150.00
April	150.00
June	135.33
September	126.67
October	126.67
November	133.33
(average)	137.33

1751:	
May	133.33
(average)	133.33
1753:	
March	126.67
May	133.33
(average)	130.00
1754:	
February	133.33
(average)	133.33
1755-1757:	
(each month, 23 observations)	133.33

a Source: McCusker (1978), p. 141. Missing observations are not available.

Table 7

Prices of Wheat and Molasses in Boston^a

Date	Wheat ^b	Molasses ^c
1750	4.79	1.84
1751	4.55	1.64
1752	4.78	1.70
1753	4.74	1.77
1754	5.02	1.65

a Source: Cole (1938), Appendix A.

b Shillings per bushel.

c Shillings per gallon.

Table 8

Rates of Exchange, at the Standard Price and Current Market Price of Silver in England (Pounds colonial per £100 sterling).^a

Date	New Hampshire		Rhode Island		Connecticut	
	Standard Price	Current Market Price	Standard Price	Current Market Price	Standard Price	Current Market Price
1749	1,122.58	1,078.07	1,161.29	1,115.24	1,103.23	1,059.48
1750	1,003.16	958.19	1,244.52	1,188.72	1,025.81	979.82
1751	1,133.42	1,080.28	1,244.52	1,186.16	---	---
1752	1,222.26	1,145.06	1,333.36	1,249.14	1,248.39	1,169.54
1753	1,266.77	1,173.11	1,555.55	1,440.54	1,258.06	1,165.05
1754	1,333.36	1,249.33	1,666.84	1,561.80	1,335.48	1,251.32
1755	1,555.55	1,494.10	1,889.03	1,814.41	1,432.26	1,375.68
1756	2,000.13	1,931.29	2,333.42	2,253.11	133.33 ^b	---

a Source: McCusker (1978), p. 153.

b Change of units.

Table 9

Nominal Note Issues (per 1,000 population)

Date	Pennsylvania ^a	New York ^a	Virginia ^a	Massachusetts ^b	Rhode Island ^a
1750	707	2,000	0	---	14,900
1755	702	1,850	212	250	19,500
1760	2,660	3,500	1,800	2,229	31,500
1765	1,440	---	1,000	1,536	14,200
1770	855	502	39	426	1,300
1774	804	1,030	---	226	3,650

a Source: Weiss (1970), p. 779.

b Source: Data on note issues is from Brock (1975), Table IX (Revised). Population data is from U.S. Bureau of the Census (1976), p. 1168. Population figures for years other than 1760 and 1770 are interpolated.

Table 10

Indices of Exchange Rates with London
(1750 = 100)

Date	Boston ^a	Rhode Island ^b	Philadelphia ^c	New York ^d	Virginia ^e
1750	100	100	100	100	100
1755	97	183	99	100	103
1760	94	258	93	93	112
1765	97	295	100	102	128
1770	92	335	90	93	94
1774	99	335	99	101	103

a Source: McCusker (1978, pp. 140-42).

b Source: Weiss (1970, p. 778).

c Source: McCusker (1978, pp. 184-86).

d Source: McCusker (1978, pp. 163-65).

e Source: McCusker (1978, pp. 210-12).

Table 11
Price Levels
Massachusetts^a

	Wheat prices ^b	Molasses prices ^c
1755	5.14	1.59
1756	4.95	1.62
1757	4.48	2.05
1758	4.56	2.02
1759	5.56	2.48
1760	5.76	2.26
1761	5.53	2.02
1762	6.10	1.71
1763	6.33	1.52
1764	5.04	1.34
1765	4.90	1.24
1766	5.34	1.32
1767	5.90	1.29
1768	6.00	1.30
1769	5.23	1.38
1770	5.39	1.37

Date	New York Price Level ^{d,e}	Philadelphia Price Level ^{d,f}
1755	66	107.3
1756	66	109.6
1757	65	107.1
1758	70	109.6
1759	79	125.0
1760	79	125.7
1761	77	121.2
1762	87	133.4
1763	79	136.4
1764	74	119.4
1765	72	118.4
1766	73	124.7
1767	77	123.7
1768	74	119.7
1769	77	115.9
1770	77	121.6

a Source: Cole (1938), Appendix A.

b Shillings per bushel.

c Shillings per bushel.

d In £ colonial currency.

e Source: Warren, Pearson, and Stoker (1932), p. 215-6.

f Source: Bezanson, Gray and Hussey (1935, p. 433).