NBER WORKING PAPER SERIES

COLONIAL AMERICAN PAPER MONEY AND THE QUANTITY THEORY OF MONEY: AN EXTENSION

Farley Grubb

Working Paper 22192
http://www.nber.org/papers/w22192

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
April 2016

Colonial American Paper Money and the Quantity Theory of Money: An Extension

(4/14/16)

Farley Grubb[1]

The quantity theory of money is applied to the paper money regimes of seven of the nine British North American colonies south of New England. Individual colonies, and regional groupings of contiguous colonies treated as one monetary unit, are tested. Little to no statistical relationship, and little to no magnitude of influence, between the quantities of paper money in circulation and prices are found. The failure of the quantity theory of money to explain the value and performance of colonial paper money is a general and widespread result, and not an isolated and anomalous phenomenon.

1 Introduction

The British North American colonies were the first Western economies to emit sizable amounts of paper money—called *bills of credit*. Colonial legislatures printed bills and placed these bills in their treasuries. They directly spent these bills on soldiers' pay, military provisions, salaries, and so on. Some colonies at various times loaned bills to their subjects who pledged their lands as collateral. These legislature-issued paper monies formed an important part of the circulating medium of exchange in many colonies. No public or private incorporated banks issuing banknote monies existed in colonial America (Brock 1975; Grubb 2016; Hammond 1991, pp. 3-67; Newman 2008).

Prior to emitting paper money, the media of exchange used in domestic transactions consisted of barter, typically involving book-credit or tobacco; personal bills of exchange and promissory notes; and foreign specie coins. The composition of this media is unknown, though specie coins were considered scarce (Grubb 2012). The spending and loaning into circulation of sizable quantities of paper money by colonial legislatures could have affected local prices

[1] Professor and NBER Research Associate, Economics Department, University of Delaware, Newark, DE 19716. Email: grubbf@udel.edu.Website: http://www.lerner.udel.edu/faculty-staff/faculty/farley-grubb. Research assistance by Cory Cutsail, Hong Guo, Zhuo Liu, and Changqing Mu, and editorial assistance by Tracy McQueen are gratefully acknowledged.

through a quantity-theory-of-money mechanism.

The quantity theory of money, at least a prominent version, takes the equation-of-exchange identity, $MV \equiv PY$, as expressed in growth rates, $\ln(M) + \ln(V) \equiv \ln(P) + \ln(Y)$, and by assuming that $\ln(V)$ and $\ln(Y)$ are long-run constants, transforms it into the quantity "theory" of money [$\ln(P) = \text{some constant} + \ln(M)$]; where M = the money supply, V = the velocity of that money's circulation, P = prices in that money, and Y = traded real output (Bordo 1987, Fisher 1912). West (1978) applied this theory separately to four colonies, namely Massachusetts, New York, Pennsylvania, and South Carolina. He set M equal to the paper money placed in circulation by each colony and estimated $\ln(P) = \text{some constant} + \ln(M)$, including one- and two-year lags of M to capture delayed transmission effects of M on P. The price index (P) was expressed in that respective colony's paper money unit-of-account and was taken from data on local prices in that respective colony. In the colonies south of New England, he found no systematic relationship between prices and the quantities of paper money in circulation.

The implications of his finding for the mainland colonies south of New England are that colonial legislatures could spend more, or less, paper money into circulation with impunity. The economic forces that constrained colonial paper money policy, and determined the value and performance of this paper money, are no longer clear. His finding led scholars to explore alternative monetary possibilities, most of which have been difficult to test with quantifiable evidence. To date, no generally accepted consensus or widely recognized statistical patterns have emerged to explain the value and performance of colonial paper monies.[2]

One question that has not been addressed is whether the West (1978) finding is

[2] See Goldberg (2009); Grubb (2004, 2005b); Hanson (1979); McCallum (1992); Michener (1987, 1988, 2015); Michener and Wright (2005, 2006a, 2006b); Officer (2005); Rousseau (2006, 2007); Rousseau and Stroup (2011); Smith (1985a, 1985b, 1988); West (1978); Wicker (1985).

anomalous. West (1978) only tested the quantity theory of money in 33.3 percent of the mainland colonies south of New England, comprising only 38.5 percent of the white (free) population therein—as measured in 1770 (Carter, *et al*. 2006, V, p. 652). In addition, the price indices used by West (1978) were from the port cities of New York City, Philadelphia, and Charleston, whereas the paper money measured by West (1978) circulated at least throughout the entire colonies of New York, Pennsylvania, and South Carolina. If the West (1978) results are simply anomalous, confined to three port cities, then the research agenda on colonial paper money pursued over the last quarter century is largely moot.

West (1978) confined his study to New York, Pennsylvania, and South Carolina because, at that time, price indices were only available in the secondary literature for these colonies. Since his study in 1978, commodity and exchange rate price information has become available for other colonies. I use these price data to test the quantity theory of money in the mainland colonies south of New England where it has not been previously tested, namely in New Jersey, Maryland, Virginia, and North Carolina. I also retest the quantity theory of money for New York and Pennsylvania, because I use these colonies in regional grouping tests. My applications, along with those by West (1978), covers 77.8 percent of the mainland colonies south of New England, comprising 95.8 percent of the white (free) population therein—as measured in 1770 (Carter, *et al*. 2006, V, p. 652). The results show whether the failure of the quantity theory of money, when applied to the paper monies issued by the American colonies, is a widespread and general phenomena or simply an isolated anomaly.

In the process, I construct more geographically diverse price indices for Maryland and Virginia than the single-port price indices used by West (1978). I also use prices for sterling bills of exchange drawn on London to create purchasing power parity (PPP) consistent price measures

for each colony, thus providing an additional and alternative specification vehicle. For New Jersey and North Carolina, PPP prices are the only price measures currently available. I also provide improved data on the quantities of paper money in circulation for several colonies, namely for New Jersey, Maryland, and Virginia. Finally, I test the quantity theory of money for regional groupings of contiguous colonies, treating them as one monetary unit. Such has never been done before. Whether colonial borders mattered to paper money circulation in a quantity-theory-of-money framework can be explored with these regional-grouping tests.

The study proceeds as follows: First, data constraints are discussed. Second, the quantity theory of money is applies on the individual colony level. Third, it is applied to regional groupings of colonies. Lastly, a conclusion discusses the implications of these results.

2 Data Issues

The time series useable for statistical testing is limited by the availability of data on the annual amounts of paper money in circulation and on the availability of consistent data on annual commodity prices. Paper money emissions began in 1709 in New Jersey and New York, 1712 in North Carolina, 1723 in Pennsylvania, 1733 in Maryland, and 1755 in Virginia. Once initiated, with minor exceptions, each colony maintained some amount of its paper money in circulation through 1774. Annual data on the amounts in circulation, however, currently exist for New York only after 1745 and for North Carolina only after 1747. For North Carolina, this evidence ends in 1768 rather than in 1774 as it does for the other colonies. Finally, commodity price evidence for New York only begins in 1748. Thus, the annual data useable for New York spans from 1748 to 1774, for New Jersey from 1709 to 1774, for Pennsylvania from 1723 to 1774, for Maryland from 1735 to 1774, for Virginia from 1755 to 1774, and for North Carolina from 1748 to 1768.

Out of 308 colony-years when paper money was in circulation, usable annual data for testing the quantity theory of money on a colony-specific level exists for 74 percent of these years—a reasonably comprehensive coverage. The useable data span for various colonial groupings, however, is further limited by the extent of their data overlap.

Besides local commodity price indices, PPP price indices are also constructed for each colony. PPP implies that $EX_{XX} = P_{XX}/P_{UK}$, namely the exchange rate (EX) of colony XX's paper money to pounds sterling must equal the ratio of prices in colony XX expressed in colony XX's paper money (P_{XX}) to prices in England expressed in pounds sterling (P_{UK}). Taking the natural log of both sides and rearranging terms yields $\ln(P_{XX}) = \ln(EX_{XX}) + \text{in}(P_{UK})$. Data on EX_{XX} can be taken from McCusker (1978) and Grubb (2015b), and data on P_{UK} can be taken from Schumpeter (1938, p. 35). As such, $\ln(P_{XX})$ can be constructed for each colony. It is denoted as $\ln(PX_{XX})$ in all tables hereafter, see the notes to Table 1.

PPP has been shown to hold for all colonies where colony-specific commodity price indices exist between that colony and England and between that colony and all other colonies with commodity price indices, namely for Massachusetts, New York, Pennsylvania, Maryland, Virginia, South Carolina, Montreal, and Quebec (Grubb 2003, p. 1786; 2005a, p. 1346; 2010, pp. 132-5). If PPP holds for these colonies, then it is reasonable to assume that it holds for New Jersey and North Carolina. Using PPP price indices in the quantity-theory-of-money framework provides an alternative check on the results using commodity price indices for the colonies of New York, Pennsylvania, Maryland, and Virginia. Such has not been done before.

The exchange rates for constructing PPP prices come from the prices in local paper money for purchasing sterling bills of exchange drawn on London (McCusker 1978). The empirical driver in the PPP equation is that exchange rate. As such, PPP prices can be considered

as the local prices of sterling bills of exchange drawn on London, i.e. not that different conceptually from using local wheat or tobacco prices to create a commodity price index.

The commodity price indices for New York and Pennsylvania are the same as used by West (1978), namely from Bezanson, Gray, and Hussey (1935, pp. 6, 433) and Cole (1938, pp. 11, 120-1). These price indices consist of the unweighted averages of 20 commodities for Pennsylvania and 15 commodities for New York. These commodities are import and export goods in the port cities of Philadelphia and New York City, respectively.

For Maryland and Virginia, I construct unweighted price indices from annual data on the prices of wheat, corn, and tobacco. While these indices involve fewer commodities than the indices for Pennsylvania and New York, these three commodities are the most ubiquitously traded local goods in Maryland and Virginia. In addition, I take the raw price data from several counties spanning each colony. Thus, they represent a more colony-wide price effect than the single-port price indices West (1978) used for Pennsylvania and New York.[3]

3 Individual Colony-Specific Tests

The econometric specifications for testing the quantity theory of money are taken from West (1978, p. 4) so that the results are comparable with quantity-theoretic estimates in the prior literature (Grubb 2004, p. 349; Rousseau 2007, p. 267). Individual colony-specific tests are reported in Table 1. For each colony, that colony's annual commodity price index and its annual PPP price index are regressed, separately, on that colony's contemporaneous annual amounts of paper money in circulation. Separate regressions are run with one- and then two-year lags of the annual amounts of paper money in circulation to capture any delayed impact of money on prices.

[3] They are also superior to the price indices used by West (1978, pp. 3-5) for Massachusetts (Boston), where he found statistically significant and reasonably large associations between paper money and prices.

All regression are corrected for serial correlation. The high R^2 and model *F* statistic in the regressions are due to lagged values of the dependent variable being included as independent variables to correct for serial correlation.

[Place Table 1 Here]

Out of 30 regressions in Table 1, only 13 percent contain a statistically significant positive relationship between paper money and prices. For New York, New Jersey, Maryland, and Virginia, no statistically significant positive relationships between paper money and prices were found. Only Pennsylvania and North Carolina contain statistically significant effects.

For Pennsylvania, a statistically significant positive contemporaneous relationship between paper money and prices exists for commodity prices, but not for PPP prices. Adding one- or two-year lags of the paper money supply eliminates this relationship. A statistically significant relationship between a two-year lag in the paper money supply and prices exists for PPP prices, but not for commodity prices. The magnitudes of these statistically significant effects are economically trivial. A 10 percent increase in the paper money supply yields only a 0.3 and 0.7 percent increase in prices for these two statistically significant effects, respectively.

For North Carolina, a statistically significant positive contemporaneous, or a two-year lagged relationship, between paper money and prices exists for PPP prices, but not for both. Again, the magnitudes of these statistically significant effects are economically trivial. A 10 percent increase in the paper money supply yields only a 1.2 and 1.8 percent increase in prices for these two statistically significant effects, respectively.

On the individual colony level, among the mainland colonies south of New England, the lack of positive statistical significant and quantitatively meaningful relationships between the quantities of paper monies in circulation and prices are a general and widespread phenomena. It

is not just confined to the port cities of New York City, Philadelphia, and Charleston.

4 Regional Groupings of Colonies

Colonies south of New England did not make the paper money of their neighboring colonies a legal tender within their own jurisdictions. Nevertheless, scholars have asserted, based on a few contemporary anecdotal and politically partisan statements, that paper money circulated more or less freely across colonial borders, particularly among New York, New Jersey, and Pennsylvania, and among Maryland and Pennsylvania.[4] One explanation for the lack of a statistical association between paper money supplies and local prices, as shown in Table 1, is that the paper money supply is incorrectly measured. The relevant paper money supply might be the combination of the paper monies of contiguous colonies. Such a combination of paper monies *could* yield a positive statistically significant association of economically relevant magnitudes between local prices and the quantity of paper money in circulation.

I systematically test this hypothesis in Tables 2, 3, and 4. The same specifications, econometric methods, and statistical tests as used in Table 1 are applied in Tables 2, 3, and 4. The data are changed so that the paper money supply is the sum of the paper monies in circulation of the colony grouping listed, and the commodity and PPP price indices are the average of those reported for the colony grouping listed. All commodity price indices are set to 100 in the same year so they are comparable relative values. The face value of all paper monies are adjusted to be in comparable face-value units, see the notes to Table 1.

Table 2 reports colonial groupings among New York, New Jersey, and Pennsylvania. Out

[4] For example, see Brock (1975, pp. 87-89, 92-93, 398; 1992, pp. 89-90, 111-113); Michener (1987, pp. 236, 275). For a debate on the topic and the evidence involved, see Grubb (2006a, pp. 46-47, 63-66; 2006b, pp. 487-489, 491-497, 504-505); Michener and Wright (2006a, pp. 13, 24-30, 34-37; 2006b, pp. 260-264, 251).

of 18 regressions in Table 2, 28 percent contain a statistically significant positive relationship between paper money and prices. As such, a stronger positive, statistically significant, relationship between paper money and prices exists for these colonies when treated as joint monetary units than when treated as individual colonies. This outcome is consistent with some cross-border circulation of paper money among this set of three colonies.

[Place Table 2 Here]

For New York and New Jersey treated as one monetary unit, a positive statistically significant relationship only exists between the contemporaneous joint paper money supply and commodity prices. Adding one- or two-year lags of the joint paper money supply eliminates this relationship. The magnitude of this effect is economically trivial. A 10 percent increase in their joint paper money supply yields only a 0.8 percent increase in commodity prices.

For Pennsylvania and New Jersey treated as one monetary unit, a positive statistically significant relationship exists between the contemporaneous joint paper money supply and commodity prices and PPP prices. Adding one- or two-year lags of the joint paper money supply eliminates this relationship for PPP prices. Adding a one-year lag of the joint paper money supply eliminates this relationship for commodity prices. When lags of up to two years for commodity prices are used, a positive statistically significant relationship exists between the one-year lag, but not the contemporaneous, joint paper money supply and prices. The magnitudes of these three statistically significant effects are economically trivial. A 10 percent increase in their joint paper money supply yields only a 0.4, 0.4, and 1.3 percent increase in prices, respectively.

Finally, for New York, New Jersey, and Pennsylvania treated as one monetary unit, a positive statistically significant relationship exists only between the contemporaneous joint paper money supply and commodity prices. Adding one- or two-year lags of the joint paper money

supply eliminates this relationship. The magnitude of this effect is economically trivial. A 10 percent increase in their joint paper money supply yields only a 0.5 percent increase in prices.

The results in Table 2 are consistent with the hypothesis of cross-border circulation of the paper monies among New York, New Jersey, and Pennsylvania. The quantitative impacts, however, are trivial. As such, the irrelevance of cross-border circulation of paper monies among these colonies with regard to the quantity theory of money cannot be rejected with confidence.

Table 3 reports colonial groupings among Maryland, Virginia, and North Carolina. Out of 18 regressions in Table 3, none have a positive statistically significant relationship between paper money and prices. The irrelevance of cross-border circulation of paper monies among these colonies with regard to the quantity theory of money cannot be rejected with confidence.

[Place Table 3 Here]

Table 4 reports the remaining colonial groupings among the colonies from New York through Virginia. It starts with the center grouping of Maryland and Pennsylvania, and then expands out by adding contiguous colonies in a sequence that goes from longest time span to shortest time span. Out of 24 regressions in Table 4, only one (4 percent) has a statistically significant positive relationship between paper money and prices. For Maryland and Pennsylvania treated as one monetary unit, and for Maryland, Pennsylvania, and New Jersey treated as one monetary unit, no positive statistically significant relationships exist between their joint paper money supplies and average prices.

[Place Table 4 Here]

For Maryland, Pennsylvania, New Jersey, and New York treated as one monetary unit, a positive statistically significant relationship exists only between contemporaneous joint paper money supplies and average commodity prices. Adding one- or two-year lags of the joint money

supply eliminates this relationship. The magnitudes of this statistically significant effect is economically trivial. A 10 percent increase in their joint paper money supply yields only a 0.4 percent increase in commodity prices.

Finally, for Virginia, Maryland, Pennsylvania, New Jersey, and New York treated as one monetary unit, no positive statistically significant relationships exist between their joint paper money supplies and average prices. In fact, one regression using PPP prices yields a perverse result, namely a statistically significant *negative* relationship between paper money and prices. Again, irrelevance of cross-border circulation of paper monies among these colonies with regards to the quantity theory of money cannot be rejected with confidence.

5 Conclusions

The lack of statistically significant positive relationships, as well as the lack of any economically relevant magnitudes to the few statistically significant associations, between paper money supplies and prices in the British mainland colonies south of New England is shown to be general and widespread, and not just a few isolated anomalous outcomes.[5] This finding has several implications. First, the spate of studies on colonial paper monies published after 1978 that tried to explain this outcome are not irrelevant exercises.[6] They are addressing a widespread phenomenon and not just some minor and localized event. Second, the statistically positive relationship between paper money and prices found in New England may be the true anomalous outcome (Officer 2005; West 1978, p. 4). More research is needed to make sure that result is not spurious. Third, cross-border circulation of colonial paper monies, if such occurred, was

[5] This results is also not due to constancy in the paper money supply. The data in Appendix Table 1 show that the paper money supplies exhibit considerable magnitude fluctuations throughout the period covered.
[6] See fn. 2.

economically irrelevant in a quantity-theory-of-money framework. Fourth, colonial legislatures, at least those in mainland colonies south of New England, could apparently emit more or less paper money with impunity, i.e. with little systematic effect on prices or exchange rates. How they were able to do this, and why the British government as well as some pamphleteers and essayists failed to grasp this, needs to be addressed.

The recent demonstration that purchasing power parity holds between colonies and also holds between England and the colonies indicates that the lack of a statistical, as well as any economically relevant, relationship between paper money and prices in a quantity-theory-of-money framework is likely not a problem of poorly measured prices and exchange rates (Grubb 2003, p. 1786; 2005a, p. 1346; 2010, pp. 132-5). The market arbitrage that makes purchasing power parity hold is consistent with quality measures of prices and exchange rates.

That leaves the measurement of money as the primary suspect for the failure of the quantity theory of money as applied to colonial paper monies. The quantity theory of money tells us nothing about the value and performance of colonial paper monies south of New England. To explain the value and performance of these paper monies a different conceptualization and value measurement of these paper monies is needed—different from that implicitly embedded in the quantity-theory-of-money framework. In addition, domestic transactions in colonial America were consummated not just through a paper money medium of exchange, but also through barter structures and occasionally by foreign specie coins. Understanding the relationship between paper money, barter, and coins must be improved before quantity theoretic approaches can reveal meaningful and empirically verifiable patterns in the data (Grubb 2012, West 1978).

References

Bezanson A, Gray RD, Hussey M (1935) Prices in colonial Pennsylvania. University of Pennsylvania Press, Philadelphia

Bordo MD (1987) Equation of exchange. In: Eatwell J, Milgate M, Newman P (eds) The New Palgrave: a dictionary of economics, vol. 2. Macmillan, London, pp. 175-177

Brock LV (1975) The currency of the American colonies, 1700-1764. Arno, New York

Brock LV (1992) The colonial currency, prices, and exchange rates. Essays in History 34:70-132

Carter SB, *et al* (eds) (2006) Historical statistics of the United States earliest times to the present millennial edition, volume 5. Cambridge University Press, New York

Clemens PGE (1980) The Atlantic economy and colonial Maryland's eastern shore. Cornell University Press, Ithaca, NY

Cole AH (1938) Wholesale commodity prices in the United States, 1700-1861. Harvard University Press, Cambridge, MA

Fisher I (1912) The purchasing power of money. Macmillan, New York

Goldberg D (2009) The Massachusetts paper money of 1690. Journal of Economic History 69:1092-1106

Grubb F (2003) Creating the U.S.-dollar currency union, 1748-1811: a quest for monetary stability or a usurpation of state sovereignty for personal gain? American Economic Review 93:1778-1798

Grubb F (2004) The circulating medium of exchange in colonial Pennsylvania, 1729-1775: new estimates of monetary composition, performance, and economic growth. Explorations in Economic History 41:329-360

Grubb F (2005a) State 'currencies' and the transition to the U.S. dollar: reply—including a new view from Canada. American Economic Review 95:1341-1348

Grubb F (2005b) Two theories of money reconciled: the colonial puzzle revisited with new evidence. NBER Working Paper #11784 http://www.nber.org/papers/w11784

Grubb F (2006a) Theory, evidence, and belief—the colonial money puzzle revisited: reply to Michener and Wright. Econ Journal Watch 3:45-72 http://www.econjournalwatch.org/pdf/EJWCompleteIssueJanuary2006.pdf

Grubb F (2006b) Benjamin Franklin and colonial money: a reply to Michener and Wright—yet again. Econ Journal Watch 3:484-510 http://www.econjournalwatch.org/pdf/EJWCompleteIssueSeptember2006.pdf

Grubb F (2010) Testing for the economic impact of the *U.S. Constitution*: purchasing power parity across the colonies versus across the states, 1748-1811. Journal of Economic History 70:118-145

Grubb F (2012) Chronic specie scarcity and efficient barter: the problem of maintaining an outside money supply in British colonial America. NBER Working Paper #18099 http://www.nber.org/papers/w18099

Grubb F (2014) A new approach to solving the colonial monetary puzzle: evidence from New Jersey, 1709-1775. NBER Working Paper #19903 http://www.nber.org/papers/w19903

Grubb F (2015a) Colonial New Jersey's paper money regime, 1709-1775: a forensic accounting reconstruction of the data. Historical Methods 48:13-34

Grubb F (2015b) Colonial Virginia's paper money regime, 1755-1774: a forensic accounting reconstruction of the data. NBER Working Paper #21785 http://www.nber.org/papers/w21785

Grubb F (2016) Is paper money just paper money? Experimentation and variation in the paper monies issued by the American colonies from 1690 to 1775. Research in Economic History 32: forthcoming
Hammond B (1991) Banks and politics in America. Princeton University Press, Princeton, NJ [original 1957]
Hanson JRII (1979) Money in the colonial American economy: an extension. Economic Inquiry 17:281-286
McCallum BT (1992) Money and prices in colonial America: a new test of competing theories. Journal of Political Economy 100:142-161.
McCusker JJ (1978) Money and exchange in Europe and America, 1600-1775. University of North Carolina Press, Chapel Hill, NC
Michener RW (1987) Fixed exchange rates and the quantity theory in colonial America. Carnegie-Rochester Conference Series on Public Policy 27:233-308
Michener RW (1988) Backing theories and currencies of eighteenth-century America: a comment. Journal of Economic History 48:682-692
Michener RW (2015) Redemption theories and the value of American colonial paper money. Financial History Review 22: 315-335
Michener RW, Wright RE (2005) State "currencies" and the transition to the U.S. dollar: clarifying some conclusions. American Economic Review 95:682-703
Michener RW, Wright RE (2006a) Miscounting money of colonial America. Econ Journal Watch 3:4-44 http://www.econjournalwatch.org/pdf/EJWCompleteIssueJanuary2006.pdf
Michener RW, Wright RE (2006b) Farley Grubb's noisy evasions on colonial money: a rejoinder. Econ Journal Watch 3:251-274 http://www.econjournalwatch.org/pdf/EJWCompleteIssueMay2006.pdf
Newman EP (2008) The early paper money of America. Krause Publications, Iola, WI
Officer LH (2005) The quantity theory in New England, 1703-1749: new data to analyze an old question. Explorations in Economic History 42:101-121
Rousseau PL (2006) A common currency: early US monetary policy and the transition to the dollar. Financial History Review 13:97-122
Rousseau PL (2007) Backing, the quantity theory, and the transition to the U.S. dollar, 1723-1850. American Economics Review 97:266-270
Rousseau PL, Stroup C (2011) Monetization and growth in colonial New England, 1703-1749. Explorations in Economic History 48:600-613
Smith B (1985a) Some colonial evidence on two theories of money: Maryland and the Carolinas. Journal of Political Economy 93:1178-1211
Smith B (1985b) American colonial monetary regimes: the failure of the quantity theory of money and some evidence in favor of an alternative view. Canadian Journal of Economics 18:531-565
Smith B (1988) The relationship between money and prices: some historical evidence reconsidered. Quarterly Review, Federal Reverse Bank of Minneapolis 12:18-32
Schumpeter EB (1938) English prices and public finance, 1660-1822. Review of Economics and Statistics 20:21-37
West RC (1978) Money in the colonial American economy. Economic Inquiry 16:1-15
Wicker E (1985) Colonial monetary standards contrasted: evidence from the Seven Years' War. Journal of Economic History 45:869-884

Table 1 Quantity Theory of Money on the Individual Colony Level from New York to North Carolina

Individual Colonies						Adjusted *Lags*	*N*	R^2	*F*
New York, 1747-1774									
$\ln(P_{NY})_t$ =	0.77	+ 0.03$\ln(M_{NY})_t$							
	(0.63)					1	26	0.59	18.8***
$\ln(PX_{NY})_t$ =	1.02	+ 0.02$\ln(M_{NY})_t$							
	(0.85)	(0.03)				1	27	0.49	13.5***
$\ln(P_{NY})_t$ =	0.72	+ 0.08$\ln(M_{NY})_t$	- 0.05$\ln(M_{NY})_{t-1}$						
	(0.64)	(0.05)	(0.05)			1	26	0.59	12.8***
$\ln(PX_{NY})_t$ =	0.95	+ 0.08$\ln(M_{NY})_t$	- 0.07$\ln(M_{NY})_{t-1}$						
	(0.83)	(0.05)	(0.05)			1	27	0.51	10.0***
$\ln(P_{NY})_t$ =	0.83	+ 0.05$\ln(M_{NY})_t$	+ 0.03$\ln(M_{NY})_{t-1}$	- 0.07$\ln(M_{NY})_{t-2}$					
	(0.61)	(0.05)	(0.08)	(0.05)		1	25	0.64	11.5***
$\ln(PX_{NY})_t$ =	0.87	+ 0.09$\ln(M_{NY})_t$	- 0.09$\ln(M_{NY})_{t-1}$	+ 0.02$\ln(M_{NY})_{t-2}$					
	(0.91)	(0.06)	(0.09)	(0.06)		1	26	0.49	6.9***
New Jersey, 1709-1774									
$\ln(PX_{NJ})_t$ =	3.86***	+ 0.00$\ln(M_{NJ})_t$							
	(1.07)	(0.00)				1	65	0.50	32.9***
$\ln(PX_{NJ})_t$ =	3.88***	- 0.00$\ln(M_{NJ})_t$	+ 0.01$\ln(M_{NJ})_{t-1}$						
	(1.07)	(0.01)	(0.01)			1	65	0.49	21.8***
$\ln(PX_{NJ})_t$ =	4.92***	+ 0.00$\ln(M_{NJ})_t$	+ 0.01$\ln(M_{NJ})_{t-1}$	- 0.01$\ln(M_{NJ})_{t-2}$					
	(1.05)	(0.01)	(0.01)	(0.01)		1	64	0.49	14.2***
Pennsylvania, 1723-1774									
$\ln(P_{PA})_t$ =	0.30	+ 0.0323$\ln(M_{PA})_t$**							
	(0.26)	(0.0153)				3	49	0.88	85.6***
$\ln(PX_{PA})_t$ =	1.50***	+ 0.03$\ln(M_{PA})_t$							
	(0.49)	(0.02)				1	51	0.57	34.2***
$\ln(P_{PA})_t$ =	0.64**	- 0.02$\ln(M_{PA})_t$	+ 0.06$\ln(M_{PA})_{t-1}$						
	(0.26)	(0.05)	(0.05)			2	50	0.85	70.8***
$\ln(PX_{PA})_t$ =	1.51***	+ 0.02$\ln(M_{PA})_t$	+ 0.01$\ln(M_{PA})_{t-1}$						
	(0.50)	(0.05)	(0.04)			1	51	0.56	22.4***
$\ln(P_{PA})_t$ =	0.33	- 0.00$\ln(M_{PA})_t$	+ 0.04$\ln(M_{PA})_{t-1}$	- 0.00$\ln(M_{PA})_{t-2}$					
	(0.28)	(0.05)	(0.08)	(0.05)		3	49	0.87	55.5***
$\ln(PX_{PA})_t$ =	1.63***	+ 0.03$\ln(M_{PA})_t$	- 0.08$\ln(M_{PA})_{t-1}$	+ 0.07$\ln(M_{PA})_{t-2}$*					
	(0.51)	(0.06)	(0.08)	(0.04)		1	50	0.56	16.8***
Maryland, 1735-1774									
$\ln(P_{MD})_t$ =	2.85***	- 0.00$\ln(M_{MD})_t$							
	(0.70)	(0.01)				2	38	0.34	7.3***

$\ln(PX_{MD})_t$ =	1.86***	- 0.00$\ln(M_{MD})_t$			1	39	0.40	13.8***
	(0.62)	(0.01)						
$\ln(P_{MD})_t$ =	2.85***	+ 0.00$\ln(M_{MD})_t$	- 0.00$\ln(M_{MD})_{t-1}$		2	38	0.33	5.5***
	(0.71)	(0.01)	(0.01)					
$\ln(PX_{MD})_t$ =	1.93***	+ 0.00$\ln(M_{MD})_t$	- 0.01$\ln(M_{MD})_{t-1}$		1	39	0.40	9.4***
	(0.62)	(0.01)	(0.01)					
$\ln(P_{MD})_t$ =	2.70***	+ 0.00$\ln(M_{MD})_t$	- 0.01$\ln(M_{MD})_{t-1}$	+ 0.01$\ln(M_{MD})_{t-2}$	2	38	0.33	4.7***
	(0.72)	(0.01)	(0.01)	(0.01)				
$\ln(PX_{MD})_t$ =	1.20**	+ 0.00$\ln(M_{MD})_t$	- 0.017$\ln(M_{MD})_{t-1}$	+ 0.01$\ln(M_{MD})_{t-2}$	1	38	0.55	12.3***
	(0.58)	(0.01)	(0.012)	(0.01)				
Virginia, 1755-1774								
$\ln(P_{VA})_t$ =	4.39***	+ 0.01$\ln(M_{VA})_t$			0	20	0.00	0.1
	(0.52)	(0.04)						
$\ln(PX_{VA})_t$ =	1.97*	+ 0.01$\ln(M_{VA})_t$			2	18	0.53	7.4***
	(0.92)	(0.03)						
$\ln(P_{VA})_t$ =	4.64***	- 0.10$\ln(M_{VA})_t$	+ 0.09$\ln(M_{VA})_{t-1}$		0	19	0.00	0.7
	(0.63)	(0.09)	(0.08)					
$\ln(PX_{VA})_t$ =	2.74**	- 0.12$\ln(M_{VA})_t$	+ 0.19$\ln(M_{VA})_{t-1}$		2	17	0.56	5.0**
	(1.07)	(0.11)	(0.15)					
$\ln(P_{VA})_t$ =	5.22***	+ 0.07$\ln(M_{VA})_t$	- 0.20$\ln(M_{VA})_{t-1}$	+ 0.07$\ln(M_{VA})_{t-2}$	0	18	0.00	0.3
	(0.81)	(0.23)	(0.40)	(0.17)				
$\ln(PX_{VA})_t$ =	2.02**	+ 0.12$\ln(M_{VA})_t$	- 0.23$\ln(M_{VA})_{t-1}$	+ 0.15$\ln(M_{VA})_{t-2}$	2	18	0.54	5.1**
	(0.91)	(0.14)	(0.25)	(0.11)				
North Carolina, 1748-1768								
$\ln(PX_{NC})_t$ =	1.00*	+ 0.12$\ln(M_{NC})_t$**			1	20	0.82	45.0***
	(0.48)	(0.06)						
$\ln(PX_{NC})_t$ =	1.16**	+ 0.08$\ln(M_{NC})_t$	+ 0.07$\ln(M_{NC})_{t-1}$		1	20	0.82	30.0***
	(0.51)	(0.07)	(0.08)					
$\ln(PX_{NC})_t$ =	1.83***	+ 0.09$\ln(M_{NC})_t$	- 0.02$\ln(M_{NC})_{t-1}$	+ 0.19$\ln(M_{NC})_{t-2}$**	2	19	0.86	22.6***
	(0.51)	(0.06)	(0.08)	(0.07)				

Sources: Bezanson, Gray, and Hussey (1935, p. 433); Brock (1975, pp. 82-3, 346-4, 386-7, 436-7); Carter, *et al* (2006, v. 5, pp. 682-7); Celia and Grubb (2016); Clemens (1980, pp. 226-7); Cole (1938, pp. 120-1); Grubb (2005, p. 35; 2014; 2015a, pp. 15-6; 2015b); McCusker (1978, pp. 163-5, 172-4, 184-6, 202-3, 211-2, 218-9); Schumpeter (1938, p. 35); West (1978, p. 4).

Notes: Data are annual. Standard errors are in parentheses under their respective coefficients. The regression specification is taken from West (1978, p. 4). All regressions were run in Stata. Linear interpolated values are used in the data where necessary. Colonies are designated by '$_{XX}$', where NY = New York, NJ = New Jersey, PA = Pennsylvania, MD = Maryland, VA = Virginia, NC = North Carolina. M_{XX} is the face-value amount of that colony's paper money in circulation, respectively. For Maryland, these numbers are from the MMGp column in Appendix Table B of Grubb (2005b) and from Celia and Grubb (2016). For Virginia, these numbers are from Grubb (2015b),

and for New Jersey these numbers are from Grubb (2015a). For New York, Pennsylvania, and North Carolina, the numbers are from Brock (1975, pp. 82-3, 346-4, 386-7, 436-7). P_{XX} = that colony's commodity price index expressed in that colony's paper money unit of account, respectively. Colony-specific commodity price indices do not yet exist for New Jersey and North Carolina. For Maryland, P_{MD} is an unweighted price index composed of Talbot and Kent County tobacco, wheat, and corn prices. The raw data are taken from Clemens (1980, pp. 226-7). For Virginia, P_{VA} is an unweighted price index composed of York and Rappahannock River Basins tobacco prices, York River corn prices, and James River wheat prices. The raw data are taken from Carter, *et al* (2006, v. 5, pp. 682-7). The commodity price index for Pennsylvania is taken from Bezanson, Gray, and Hussey (1935, p. 433), and the commodity price index for New York is taken from Cole (1938, pp. 120-1). All price indices are converted to 1766 = 100. PX_{XX} are alternative purchasing power parity price indices. I construct them as $\ln(PX_{XX})_t = \ln(EX_{XX})_t + \ln(P_{UK})_t$ for each colony. P_{UK} = a price index of English consumer goods in pounds sterling taken from Schumpeter (1938, p. 35). EX_{XX} = the price of sterling bills of exchange drawn on London in each colony's paper money unit-of-account. EX is considered the exchange rate of a colony's paper money to pounds sterling. These exchange rates, divided by 100, are taken from McCusker (1978), and for New Jersey form Grubb (2015b). Using PX_{NY} adds one more observation year (1747) to the New York data compared with using P_{NY}. I converted Virginia's paper money (M_{VA}) to the face value of the other colonies' paper monies by multiplying its face value by 1.062—0.8 times the face value of Virginia's paper money equal pounds sterling which equals 0.7533 times the face value of the other colonies' paper monies. The same is done to Maryland's post-1765 exchange rate to pounds sterling (EX_{MD}) and to Virginia's exchange rate to pounds sterling (EX_{VA}). Maryland paper money post-1765 (M_{MD}) was denominated in Spanish silver dollars. I converted it into Maryland paper money pre-1766 that is denominated in Maryland pounds by multiplying the post-1765 money by 0.2987. One Maryland pound pre-1766 equaled 0.7533 pounds sterling at face value. A Spanish silver dollar equaled 0.225 pounds sterling. All regressions were tested using Durbin's Alternative Test for serial correlation. When the hypothesis of no serial correlation could not be rejected, lags of the dependent variable were added to the specification (coefficients not reported) until Durbin's Alternative Test for serial correlation failed to reject the hypothesis of no serial correlation above the 0.1 level.

*** Statistically significance above the 0.01 level.

** Statistically significance above the 0.05 level.

* Statistically significance above the 0.1 level.

Table 2 Quantity Theory of Money for Middle Colony Groupings

Colony Groupings						*Lags*	*N*	Adjusted R^2	*F*
New York and New Jersey, 1748-1774									
$\ln(P_{NY})_t$	= 0.93*	+ 0.08$\ln(M_{NY+NJ})_t$**							
	(0.63)	(0.03)				1	26	0.67	26.8***
$\ln((PX_{NY+NJ})/2)_t$	= 1.17	+ 0.03$\ln(M_{NY+NJ})_t$							
	(0.79)	(0.03)				1	26	0.47	12.2***
$\ln(P_{NY})_t$	= 0.84	+ 0.11$\ln(M_{NY+NJ})_t$	- 0.03$\ln(M_{NY+NJ})_{t-1}$						
	(0.57)	(0.07)	(0.08)			1	26	0.66	17.3***
$\ln((PX_{NY+NJ})/2)_t$	= 1.12	+ 0.06$\ln(M_{NY+NJ})_t$	- 0.04$\ln(M_{NY+NJ})_{t-1}$						
	(0.82)	(0.08)	(0.08)			1	26	0.45	7.9***
$\ln(P_{NY})_t$	= 0.82	+ 0.09$\ln(M_{NY+NJ})_t$	+ 0.01$\ln(M_{NY+NJ})_{t-1}$	- 0.04$\ln(M_{NY+NJ})_{t-2}$					
	(0.58)	(0.08)	(0.13)	(0.08)		1	25	0.66	12.5***
$\ln((PX_{NY+NJ})/2)_t$	= 1.09	+ 0.07$\ln(M_{NY+NJ})_t$	- 0.08$\ln(M_{NY+NJ})_{t-1}$	+ 0.03$\ln(M_{NY+NJ})_{t-2}$					
	(0.86)	(0.09)	(0.15)	(0.09)		1	25	0.43	5.5***
Pennsylvania and New Jersey, 1725-1774									
$\ln(P_{PA})_t$	= 0.61**	+ 0.04$\ln(M_{PA+NJ})_t$***							
	(0.26)	(0.01)				2	50	0.85	96.3***
$\ln((PX_{PA+NJ})/2)_t$	= 2.14***	+ 0.042$\ln(M_{PA+NJ})_t$**							
	(0.55)	(0.016)				2	50	0.58	24.0***
$\ln(P_{PA})_t$	= 0.66**	+ 0.00$\ln(M_{PA+NJ})_t$	+ 0.04$\ln(M_{PA+NJ})_{t-1}$						
	(0.26)	(0.05)	(0.05)			2	50	0.85	71.7***
$\ln((PX_{PA+NJ})/2)_t$	= 2.17***	+ 0.01$\ln(M_{PA+NJ})_t$	+ 0.03$\ln(M_{PA+NJ})_{t-1}$						
	(0.56)	(0.06)	(0.06)			2	50	0.58	17.8***
$\ln(P_{PA})_t$	= 0.40	- 0.03$\ln(M_{PA+NJ})_t$	+ 0.13$\ln(M_{PA+NJ})_{t-1}$**	- 0.06$\ln(M_{PA+NJ})_{t-2}$**					
	(0.27)	(0.05)	(0.06)	(0.03)		1	50	0.85	72.9***
$\ln((PX_{PA+NJ})/2)_t$	= 2.24***	+ 0.02$\ln(M_{PA+NJ})_t$	- 0.00$\ln(M_{PA+NJ})_{t-1}$	+ 0.03$\ln(M_{PA+NJ})_{t-2}$					
	(0.57)	(0.06)	(0.08)	(0.03)		2	50	0.57	14.2***
New York, New Jersey, and Pennsylvania, 1748-1774									
$\ln((P_{NY+PA})/2)_t$	= 0.76	+ 0.05$\ln(M_{NY+NJ+PA})_t$**							
	(0.50)	(0.02)				1	26	0.71	31.2***
$\ln((PX_{NY+NJ+PA})/3)_t$	= 1.21	+ 0.02$\ln(M_{NY+NJ+PA})_t$							
	(0.79)	(0.03)				1	26	0.47	12.1***
$\ln((P_{NY+PA})/2)_t$	= 0.91	+ 0.02$\ln(M_{NY+NJ+PA})_t$	+ 0.04$\ln(M_{NY+NJ+PA})_{t-1}$						
	(0.60)	(0.07)	(0.07)			1	26	0.70	20.2***
$\ln((PX_{NY+NJ+PA})/3)_t$	= 1.19	+ 0.04$\ln(M_{NY+NJ+PA})_t$	- 0.02$\ln(M_{NY+NJ+PA})_{t-1}$						
	(0.80)	(0.08)	(0.08)			1	26	0.45	7.8***

$\ln((P_{NY+PA})/2)_t$	= 0.87	$- 0.01\ln(M_{NY+NJ+PA})_t$	$+ 0.10\ln(M_{NY+NJ+PA})_{t-1}$	$- 0.04\ln(M_{NY+NJ+PA})_{t-2}$					
	(0.63)	(0.09)	(0.15)	(0.09)	1	25	0.68	13.9***	
$\ln((PX_{NY+NJ+PA})/3)_t$	= 1.08	$+ 0.17\ln(M_{NY+NJ+PA})_t$	$- 0.31\ln(M_{NY+NJ+PA})_{t-1}$	$+ 0.18\ln(M_{NY+NJ+PA})_{t-2}$					
	(0.80)	(0.12)	(0.31)	(0.12)	1	25	0.48	6.5***	

Sources: See the source note to Table 1.
Notes: See the notes to Table 1.

Table 3 Quantity Theory of Money for Southern Colony Groupings

Colony Groupings						*Lags*	*N*	Adjusted R^2	*F*
Maryland and Virginia, 1755-1774									
$\ln((P_{MD+VA})/2)_t$	= 2.36	+ 0.01$\ln(M_{MD+VA})_t$							
	(1.39)	(0.07)				1	19	0.12	2.2
$\ln((PX_{MD+VA})/2)_t$	= 3.92**	- 0.11$\ln(M_{MD+VA})_t$*							
	(1.39)	(0.06)				1	19	0.44	8.0***
$\ln((P_{MD+VA})/2)_t$	= 4.66**	- 0.06$\ln(M_{MD+VA})_t$	+ 0.05$\ln(M_{MD+VA})_{t-1}$						
	(0.95)	(0.12)	(0.09)			0	19	0.00	0.2
$\ln((PX_{MD+VA})/2)_t$	= 3.87**	- 0.10$\ln(M_{MD+VA})_t$	- 0.01$\ln(M_{MD+VA})_{t-1}$						
	(1.48)	(0.10)	(0.07)			1	19	0.40	5.0**
$\ln((P_{MD+VA})/2)_t$	= 4.78***	+ 0.07$\ln(M_{MD+VA})_t$	- 0.22$\ln(M_{MD+VA})_{t-1}$	+ 0.14$\ln(M_{MD+VA})_{t-2}$					
	(1.12)	(0.15)	(0.20)	(0.11)		0	18	0.00	0.6
$\ln((PX_{MD+VA})/2)_t$	= 0.71	- 0.03$\ln(M_{MD+VA})_t$	+ 0.00$\ln(M_{MD+VA})_{t-1}$	+ 0.05$\ln(M_{M+VA})_{t-2}$					
	(2.06)	(0.11)	(0.14)	(0.08)		1	18	0.50	5.3***
Virginia and North Carolina, 1755-1768									
$\ln(P_{VA})_t$	= 3.36***	+ 0.09$\ln(M_{VA+NC})_t$							
	(0.83)	(0.07)				0	14	0.06	1.9
$\ln((PX_{VA+NC})/2)_t$	= -0.55	+ 0.13$\ln(M_{VA+NC})_t$							
	(1.88)	(0.09)				2	12	0.54	5.3**
$\ln(P_{VA})_t$	= 4.05**	- 0.09$\ln(M_{VA+NC})_t$	+ 0.12$\ln(M_{VA+NC})_{t-1}$						
	(1.51)	(0.22)	(0.15)			0	13	0.00	0.6
$\ln((PX_{VA+NC})/2)_t$	= 0.70	- 0.09$\ln(M_{VA+NC})_t$	+ 0.21$\ln(M_{VA+NC})_{t-1}$						
	(1.85)	(0.15)	(0.13)			2	12	0.63	5.6**
$\ln(P_{VA})_t$	= 4.96**	- 0.05$\ln(M_{VA+NC})_t$	- 0.02$\ln(M_{VA+NC})_{t-1}$	+ 0.03$\ln(M_{VA+NC})_{t-2}$					
	(2.07)	(0.84)	(1.43)	(0.64)		0	12	0.00	0.0
$\ln((PX_{VA+NC})/2)_t$	= -0.78	+ 0.66$\ln(M_{VA+NC})_t$	- 0.94$\ln(M_{VA+NC})_{t-1}$	+ 0.43$\ln(M_{VA+NC})_{t-2}$					
	(2.08)	(0.48)	(0.83)	(0.38)		1	12	0.44	3.2**
Maryland, Virginia, and North Carolina, 1755-1768									
$\ln((P_{MD+VA})/2)_t$	= 3.99***	+ 0.04$\ln(M_{MD+VA+NC})_t$							
	(0.66)	(0.05)				0	14	0.00	0.7
$\ln((PX_{MD+VA+NC})/3)_t$	= 4.84***	+ 0.01$\ln(M_{MD+VA+NC})_t$							
	(0.87)	(0.07)				0	14	0.00	0.0
$\ln((P_{MD+VA})/2)_t$	= 4.47***	- 0.15$\ln(M_{MD+VA+NC})_t$	+ 0.15$\ln(M_{MD+VA+NC})_{t-1}$						
	(0.86)	(0.12)	(0.09)			0	13	0.07	1.5
$\ln((PX_{MD+VA+NC})/3)_t$	= 7.17***	- 0.25$\ln(M_{MD+VA+NC})_t$**	+ 0.08$\ln(M_{MD+VA+NC})_{t-1}$						
	(0.72)	(0.10)	(0.08)			0	13	0.37	4.6**

$\ln((P_{MD+VA})/2)_t$ = 4.16*** + 0.00$\ln(M_{MD+VA+NC})_t$ - 0.12$\ln(M_{MD+VA+NC})_{t-1}$ + 0.14$\ln(M_{MD+VA+NC})_{t-2}$
(1.16) (0.27) (0.44) (0.21) 0 12 0.00 0.8

$\ln((PX_{MD+VA+NC})/3)_t$ = 0.34 + 0.10$\ln(M_{MD+VA+NC})_t$ - 0.24$\ln(M_{MD+VA+NC})_{t-1}$ + 0.20$\ln(M_{MD+VA+NC})_{t-2}$
(3.49) (0.17) (0.30) (0.14) 1 12 0.60 5.2**

Sources: See the source note to Table 1.
Notes: See the notes to Table 1.

Table 4 Quantity Theory of Money for Center-Expanding-Out Colony Groupings

Colony Groupings	*Lags*	*N*	Adjusted R^2	*F*
Maryland and Pennsylvania, 1735-1774				
$\ln((P_{MD+PA})/2)_t = 0.59 + 0.03\ln(M_{MD+PA})_t$				
(0.52) (0.02)	3	37	0.68	20.2***
$\ln((PX_{MD+PA})/2)_t = 2.67^{**} - 0.03\ln(M_{MD+PA})_t$				
(0.81) (0.03)	1	39	0.30	9.2***
$\ln((P_{MD+PA})/2)_t = 0.62 - 0.04\ln(M_{MD+PA})_t + 0.09\ln(M_{MD+PA})_{t-1}$				
(0.51) (0.06) (0.06)	3	37	0.69	17.0***
$\ln((PX_{MD+PA})/2)_t = 2.74^{***} + 0.02\ln(M_{MD+PA})_t - 0.04\ln(M_{MD+PA})_{t-1}$				
(0.83) (0.10) (0.10)	1	39	0.28	6.0***
$\ln((P_{MD+PA})/2)_t = 0.89 + 0.00\ln(M_{MD+PA})_t - 0.06\ln(M_{MD+PA})_{t-1} + 0.12\ln(M_{MD+PA})_{t-2}$				
(0.53) (0.07) (0.12) (0.08)	3	37	0.70	15.0***
$\ln((PX_{MD+PA})/2)_t = 1.79^{**} + 0.07\ln(M_{MD+PA})_t - 0.21\ln(M_{MD+PA})_{t-1} + 0.14\ln(M_{M+PA})_{t-2}$				
(0.87) (0.10) (0.18) (0.11)	1	38	0.38	6.7***
Maryland, Pennsylvania, and New Jersey, 1735-1774				
$\ln((P_{MD+PA})/2)_t = 0.66 + 0.03\ln(M_{MD+PA+NJ})_t$				
(0.52) (0.02)	3	37	0.68	20.2***
$\ln((PX_{MD+PA+NJ})/3)_t = 2.14^{**} - 0.03\ln(M_{MD+PA+NJ})_t$				
(0.80) (0.15)	1	39	0.34	10.0***
$\ln((P_{MD+PA})/2)_t = 0.73 - 0.06\ln(M_{MD+PA+NJ})_t + 0.09\ln(M_{MD+PA+NJ})_{t-1}$				
(0.51) (0.07) (0.07)	3	37	0.69	17.0***
$\ln((PX_{MD+PA+NJ})/3)_t = 2.35^{**} + 0.03\ln(M_{MD+PA+NJ})_t - 0.11\ln(M_{MD+PA+NJ})_{t-1}$				
(0.87) (0.18) (0.18)	1	39	0.33	7.3***
$\ln((P_{MD+PA})/2)_t = 0.98^{*} + 0.00\ln(M_{MD+PA+NJ})_t - 0.05\ln(M_{MD+PA+NJ})_{t-1} + 0.10\ln(M_{MD+PA+NJ})_{t-2}$				
(0.49) (0.09) (0.16) (0.10)	3	37	0.69	14.3***
$\ln((PX_{MD+PA+NJ})/3)_t = 1.22 + 0.11\ln(M_{MD+PA+NJ})_t - 0.24\ln(M_{MD+PA+NJ})_{t-1} + 0.22\ln(M_{MD+PA+NJ})_{t-2}$				
(1.00) (0.18) (0.21) (0.18)	1	38	0.41	7.3***
Maryland, Pennsylvania, New Jersey, and New York, 1748-1774				
$\ln((P_{MD+PA+NY})/3)_t = 0.72 + 0.043\ln(M_{MD+PA+NJ+NY})_t$*				
(0.56) (0.021)	1	26	0.65	24.3***
$\ln((PX_{MD+PA+NJ+NY})/4)_t = 1.01 + 0.02\ln(M_{MD+PA+NJ+NY})_t$				
(0.80) (0.03)	1	26	0.49	13.2***
$\ln((P_{MD+PA+NY})/3)_t = 0.80 + 0.02\ln(M_{MD+PA+NJ+NY})_t + 0.02\ln(M_{MD+PA+NJ+NY})_{t-1}$				
(0.62) (0.06) (0.07)	1	26	0.64	15.6***
$\ln((PX_{MD+PA+NJ+NY})/4)_t = 1.01 + 0.06\ln(M_{MD+PA+NJ+NY})_t - 0.04\ln(M_{MD+PA+NJ+NY})_{t-1}$				
(0.82) (0.09) (0.09)	1	26	0.47	8.5***

$\ln((P_{MD+PA+NY})/3)_t$ = 0.84 + 0.03$\ln(M_{MD+PA+NJ+NY})_t$ + 0.00$\ln(M_{MD+PA+NJ+NY})_{t-1}$ + 0.02$\ln(M_{MD+PA+NJ+NY})_{t-2}$
(0.66) (0.09) (0.16) (0.10) 1 25 0.61 10.6***

$\ln((PX_{MD+PA+NJ+NY})/4)_t$ = 0.83 + 0.20$\ln(M_{MD+PA+NJ})_t$ - 0.36$\ln(M_{MD+PA+NJ})_{t-1}$ + 0.20$\ln(M_{MD+PA+NJ})_{t-2}$
(0.81) (0.13) (0.22) (0.13) 1 25 0.51 7.3***

Virginia, Maryland, Pennsylvania, New Jersey, and New York, 1755-1774

$\ln((P_{VA+MD+PA+NY})/4)_t$ = 1.35 + 0.01$\ln(M_{VA+MD+PA+NJ+NY})_t$
(1.06) (0.04) 1 19 0.43 7.8***

$\ln((PX_{VA+MD+PA+NJ+NY})/5)_t$ = 4.53*** - 0.12$\ln(M_{VA+MD+PA+NJ+NY})_t$*
(1.51) (0.06) 1 19 0.44 8.1***

$\ln((P_{VA+MD+PA+NY})/4)_t$ = 1.88 - 0.06$\ln(M_{VA+MD+PA+NJ+NY})_t$ + 0.07$\ln(M_{VA+MD+PA+NJ+NY})_{t-1}$
(1.27) (0.10) (0.09) 1 19 0.42 5.3**

$\ln((PX_{VA+MD+PA+NJ+NY})/5)_t$ = 4.57** - 0.12$\ln(M_{VA+MD+PA+NJ+NY})_t$ + 0.01$\ln(M_{VA+MD+PA+NJ+NY})_{t-1}$
(1.62) (0.11) (0.09) 1 19 0.40 5.1**

$\ln((P_{VA+MD+PA+NY})/4)_t$ = 2.10 - 0.08$\ln(M_{VA+MD+PA+NJ+NY})_t$ + 0.10$\ln(M_{VA+MD+PA+NJ+NY})_{t-1}$
(1.43) (0.15) (0.24)
- 0.03$\ln(M_{VA+MD+PA+NJ+NY})_{t-2}$ 1 18 0.27 2.5*
(0.13)

$\ln((PX_{VA+MD+PA+NJ+NY})/5)_t$ = 1.47 + 0.07$\ln(M_{VA+MD+PA+NJ+NY})_t$ - 0.26$\ln(M_{VA+MD+PA+NJ+NY})_{t-1}$
(1.95) (0.16) (0.23)
+ 0.19$\ln(M_{VA+MD+PA+NJ+NY})_{t-2}$ 1 18 0.54 6.0***
(0.12)

Sources: See the source note to Table 1.
Notes: See the notes to Table 1. The complete grouping of New York through North Carolina was not estimated because of reduced degrees of freedom.

Appendix Table 1. Data File

Year	MNJ	MPA	MMD	MVA	MNC	MNY	PPA	PNY	PMD	PVA	EXNJ	EXNC
1709	2,542										1.50	
1710	2,236										1.50	
1711	4,962										1.50	
1712	3,852										1.50	
1713	2,995										1.50	
1714	3,253										1.50	
1715	2,396										1.48	
1716	1,539										1.46	
1717	2,579										1.78	
1718	971										1.64	
1719	79										1.50	
1720	79						66.0				1.53	
1721	79						61.5				1.56	
1722	79						63.6				1.56	
1723	79	15,000					67.0				1.56	
1724	37,999	44,915					72.1				1.56	
1725	34,506	38,915					83.0				1.56	
1726	30,771	38,890					83.2				1.41	
1727	27,309	38,890					81.0				1.45	
1728	23,760	38,890					76.3				1.50	
1729	20,700	68,890					74.5				1.54	
1730	17,640	68,890					76.6				1.58	
1731	14,580	68,890					68.7				1.62	
1732	11,520	68,890					67.4				1.67	
1733	28,460	68,890					69.6				1.71	
1734	25,400	68,890					71.4				1.70	
1735	22,700	68,890	56,495				71.4		84.5		1.68	
1736	20,000	68,890	57,864				68.0		84.0		1.67	
1737	60,000	68,890	69,856				71.1		94.2		1.70	
1738	60,000	68,890	74,838				71.5		104.7		1.70	
1739	60,000	80,000	79,820				66.8		90.1		1.71	

1740	62,000	80,000	78,523				68.4		84.7		1.67	
1741	62,000	80,000	83,444				83.8		105.6		2.31	
1742	59,564	80,000	82,072				81.5		114.0		1.53	
1743	56,627	80,000	82,162				71.2		97.9		1.60	
1744	53,669	80,000	82,252				69.3		84.1		1.68	
1745	50,711	80,000	83,058				69.9		80.6		1.76	
1746	58,350	85,000	84,184				73.8		83.8		1.84	
1747	50,892	85,000	85,309			189,495	82.3		83.8		1.83	
1748	44,682	85,000	86,040		21,350	172,001	89.9	103.5	96.1		1.81	1.40
1749	37,224	85,000	62,000		21,160	163,016	90.4	92.7	97.9		1.80	1.37
1750	31,505	84,500	62,000		20,647	153,938	90.2	82.6	102.1		1.73	1.33
1751	26,037	84,000	62,000		20,119	148,214	90.8	88.8	100.5		1.73	1.42
1752	20,819	83,500	62,000		19,028	140,960	90.9	90.7	90.3		1.66	1.51
1753	15,808	82,500	62,000		18,289	132,531	88.6	89.2	97.5		1.68	1.59
1754	14,278	81,500	62,000		57,951	126,081	86.0	88.6	94.6		1.68	1.67
1755	42,748	81,000	62,003	39,484	56,054	179,076	83.9	90.5	94.8	80.6	1.70	1.60
1756	68,717	147,510	70,507	101,508	57,951	230,773	83.9	90.8	97.2	79.6	1.69	1.80
1757	107,187	262,466	79,011	177,997	68,255	219,281	84.5	89.4	83.2	88.3	1.65	1.82
1758	155,657	329,774	87,515	237,164	70,253	307,198	86.7	95.5	84.3	95.2	1.61	1.84
1759	194,127	433,562	96,018	283,500	69,512	481,186	95.7	108.0	95.9	83.5	1.56	1.85
1760	222,597	486,199	85,074	314,634	75,806	410,387	96.3	108.8	99.8	92.3	1.53	1.88
1761	233,566	438,104	74,130	290,464	95,335	366,158	95.6	105.2	96.8	91.5	1.71	1.90
1762	247,036	349,053	63,186	281,734	85,322	330,807	105.3	118.7	97.9	95.2	1.95	2.00
1763	234,672	286,312	52,242	268,813	79,350	287,163	103.3	108.6	101.1	101.9	1.70	2.00
1764	225,319	328,058	41,295	243,540	73,378	243,885	95.3	100.7	92.4	75.7	1.72	1.93
1765	216,419	302,400	1	225,540	70,589	166,502	95.3	99.0	92.2	88.3	1.66	2.00
1766	207,555	278,736	1	205,205	67,800	131,502	100.0	100.0	100.0	100.0	1.60	1.87
1767	199,281	263,860	46,677	177,857	63,953	109,799	99.5	104.8	104.5	82.5	1.62	1.73
1768	190,785	234,450	46,677	150,510	60,106	87,348	94.7	100.6	93.3	102.9	1.64	1.80
1769	182,828	230,496	46,240	138,779		82,858	91.7	104.8	99.1	90.2	1.65	
1770	174,273	204,468	136,869	127,584		81,591	96.5	105.2	107.1	113.6	1.66	
1771	165,506	184,494	136,869	147,822		198,571	100.1	108.0	106.3	102.9	1.67	
1772	153,006	174,643	136,869	108,993		194,440	110.6	121.9	112.9	105.8	1.68	

1773	140,000	154,151	137,430	70,164		190,400	106.3	114.5	114.4	80.6	1.69
1774	125,000	220,473	217,947	45,361		187,714	103.5	104.4	109.1	100.0	1.70
Average	70,508	146,358	76,862	171,217	55,819	204,031					
Standard Deviation	77,433	117,945	37,338	79,877	24,862	99,180					

Appendix Table 1--Continued. Data File

Year	PUK	EXNY	EXPA	EXMD	EXVA
1709	112	1.50			
1710	124	1.45			
1711	93	1.51			
1712	89	1.56			
1713	94	1.54			
1714	95	1.55			
1715	91	1.53			
1716	87	1.58			
1717	85	1.60			
1718	89	1.57			
1719	94	1.54			
1720	92	1.63			
1721	84	1.63			
1722	82	1.64			
1723	86	1.56	1.40		
1724	89	1.65	1.43		
1725	94	1.65	1.39		
1726	88	1.65	1.44		
1727	91	1.65	1.50		
1728	95	1.65	1.51		
1729	87	1.65	1.49		
1730	81	1.67	1.52		
1731	82	1.65	1.53		
1732	78	1.65	1.61		
1733	81	1.65	1.67		

1734	82	1.65	1.70		
1735	80	1.65	1.66	1.40	
1736	85	1.65	1.67	2.30	
1737	83	1.65	1.70	2.50	
1738	82	1.65	1.60	2.25	
1739	92	1.67	1.70	2.12	
1740	99	1.66	1.65	2.28	
1741	91	1.59	1.46	2.38	
1742	86	1.71	1.59	2.75	
1743	77	1.75	1.60	2.85	
1744	78	1.75	1.67	1.67	
1745	85	1.83	1.75	2.00	
1746	83	1.86	1.80	2.10	
1747	86	1.91	1.84	2.25	
1748	88	1.83	1.74	2.01	
1749	87	1.76	1.71	1.85	
1750	83	1.79	1.71	1.78	
1751	85	1.82	1.70	1.67	
1752	83	1.76	1.67	1.56	
1753	83	1.79	1.67	1.52	
1754	84	1.80	1.68	1.54	
1755	84	1.80	1.69	1.62	1.37
1756	100	1.83	1.73	1.70	1.36
1757	97	1.78	1.66	1.45	1.48
1758	92	1.73	1.59	1.50	1.46
1759	90	1.68	1.54	1.50	1.49
1760	86	1.67	1.59	1.46	1.50
1761	86	1.81	1.73	1.48	1.53
1762	92	1.90	1.76	1.44	1.62
1763	94	1.87	1.73	1.40	1.70
1764	97	1.85	1.73	1.37	1.71
1765	98	1.83	1.70	1.33	1.70
1766	100	1.77	1.63	1.74	1.36

1767	99	1.79	1.66	1.75	1.33
1768	91	1.80	1.67	1.75	1.33
1769	92	1.72	1.58	1.71	1.30
1770	98	1.66	1.54	1.60	1.25
1771	107	1.78	1.66	1.72	1.31
1772	109	1.73	1.61	1.68	1.31
1773	106	1.78	1.66	1.75	1.38
1774	104	1.81	1.69	1.77	1.38

Sources: See the source notes to Table 1.
Notes: See the notes to Table 1. Blank spaces indicate that no usable data are available. A one is substituted in place zero for MMD in 1765 and 1766 because ln(0) is undefined.

Colonial American Paper Money and the Quantity Theory of Money: An Extension
Farley Grubb
NBER Working Paper No. 22192
April 2016
JEL No. E31,E42,E51,N11

ABSTRACT

The quantity theory of money is applied to the paper money regimes of seven of the nine British North American colonies south of New England. Individual colonies, and regional groupings of contiguous colonies treated as one monetary unit, are tested. Little to no statistical relationship, and little to no magnitude of influence, between the quantities of paper money in circulation and prices are found. The failure of the quantity theory of money to explain the value and performance of colonial paper money is a general and widespread result, and not an isolated and anomalous phenomenon.

Farley Grubb
University of Delaware
Economics Department
Newark, DE 19716
and NBER
grubbf@udel.edu