

Goldberg, Dror

Working Paper

Political profit and the invention of modern currency

Working Paper, No. 2008-03

Provided in Cooperation with:

Department of Economics, Bar-Ilan University

Suggested Citation: Goldberg, Dror (2008) : Political profit and the invention of modern currency, Working Paper, No. 2008-03, Bar-Ilan University, Department of Economics, Ramat-Gan

This Version is available at:

<https://hdl.handle.net/10419/95992>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Political Profit and the Invention of Modern Currency

Dror Goldberg

Department of Economics

Bar Ilan University

Abstract

The Massachusetts currency of 1690 was the first inconvertible paper money to be supported solely by a legal tender law. The circumstances that led to its creation exceed the typical story of wartime specie shortage. Due to temporary political constraints of that turbulent period, the currency could be neither backed by land nor granted a full legal tender status, as was then standard. Instead, it had to be disguised from England as a simple, private-like IOU. By pleasing both its pay-demanding troops and England, the government maximized its probability of survival subject to the constraints.

* dg@drorgoldberg.com. I thank John Hanson for his guidance. I benefited from suggestions and comments of Katherine Engel, Farley Grubb, Richard Johnson, John McCusker, William Roberds, James Rosenheim, Winifred Rothenberg, Peter Rousseau, George Selgin, Richard Sylla, and seminar participants at Texas A&M University and at the ASSA, EHS, and SSHA meetings. The Melburn G. Glasscock Center for Humanities Research at Texas A&M University provided financial support.

Monetary innovation, the development of new forms of money, has not received much systematic study from economic historians.

Richard Sylla, “Monetary Innovation in America”

1. Introduction

Paper money is one of the most powerful political and economic tools in history. Its Chinese inventors supported it first with convertibility but later simply forced everyone to accept it in trade (or else). Our modern paper money, in contrast, has a much weaker legal status: it merely discharges monetary obligations (e.g., contractual debts and taxes), which are denominated in its unit of account. Nobody is obliged to provide tangible assets or services for it: neither the government (it has not been convertible, even indirectly, since 1971), nor sellers in the marketplace.

This latter type of money was invented in Massachusetts in 1690. Economic historians have attributed its lack of convertibility to the fact that it was an emergency wartime issue and the colony had no specie. This seems like a reasonable hypothesis since it happened so many times *later*. Economic historians have also described this money as a *natural*, almost trivial, development from other paper moneys, such as the 1685 Canadian card money and the 1688 Boston banknotes¹.

However, further examination of the standard account of the Massachusetts invention raises serious doubts as to its accuracy. First, the money was issued after a military defeat put the colony in huge debt to its troops. Any previous government that issued paper money in such a severe crisis simply forced everyone to accept the new money in trade,

¹ Weeden, *Economic I*, p. 330, Davis, *Colonial I*, p. 26, Nettels, *Money*, p. 250, Dorfman, *Economic Mind I*, p. 106, Bailyn, *New England*, pp. 188-9, Rabushka, *Taxation*, pp. 358, 360.

as in the Chinese tradition². Based on its legislative record in general, and that of wartime in particular, we would expect the Puritan colony – legendary for excessive regulation – to do the same³. It didn't. Second, it had been standard practice in Massachusetts to back currency and debts with land. This too was not done in 1690. Third, it had also been standard practice to make money legal tender for both debts and taxes, but the 1690 money was officially legal tender only for taxes. Finally, although it is often presented as an inconvertible currency – and indeed it was never converted by the government into specie or goods – the letter of the law actually did promise such convertibility if possible.

This paper aims to explain the reasons that led Massachusetts to break with monetary tradition (including its own) and dare support a new paper money with such a flimsy law at such a critical time. My explanation is based on the unique political situation in 1690. Massachusetts was ruled by a provisional local government while its agents in London were lobbying for restoration of the colony's revoked charter. I argue that the objective of the political elite was to maximize its chances of surviving in power in both the short run and the long run, given peculiar constraints at home and abroad. The bankrupt colony had to issue money to its troops to avoid a mutiny (short run), but some of its traditional methods of supporting currencies – legal tender for debts and land backing – could have upset the king who was then considering charter restoration (long run). In the unique regulatory circumstances of 1690, the colony had no legal right to use these methods. The

² This includes the Canadian case (Shortt, *Documents*, p. 71), which Massachusetts was familiar with (Davis, *Colonial I*, pp. 195, 201). For other cases see Goldberg, "Invention and Diffusion."

³ That year the government eliminated free press (Steele, *English*, pp. 146-7), restricted marine trade (Moody and Simmons, *Glorious*, henceforth M-S, pp. 186-7, 254, 261, 321, 350), searched and impressed goods (PRO CO 5/855 #103), and opened private mail (PRO CO 5/855 #78, CO 5/856 #145).

solution to the maximization problem was to disguise the new money as a private-like IOU which was not backed by land. This IOU was seemingly not forced on anyone other than the government itself and “happened” to be convenient for use as money.

There is no direct evidence as to the intentions and motives of the Massachusetts government as it devised this revolutionary type of money. If indeed there was a clever deception perpetrated on the Crown, those involved knew better than to document it. The principal contemporary source was Cotton Mather. A supporter of that currency, he deliberately destroyed his diary and correspondence of that period⁴. My hypothesis, which aims to illuminate the odd features of this monetary innovation, is therefore based on circumstantial evidence, including other contemporary legislation and the colony’s behavior once the imperial constraint abated.

Richard Sylla has developed a framework for analyzing the determinants of monetary innovation⁵. He argues that new forms of money are invented when profit-maximizing agents attempt to get around regulation. I generalize Sylla’s framework: the profit to be maximized can be political rather than economic, and the constraining regulation is not necessarily a monetary one (in this case some of it concerns land).

The paper is organized as follows: Section 2 provides background and reviews the paper money order. Section 3 discusses convertibility and backing. Section 4 deals with legal tender for debts and Section 5 relates to legal tender for taxes. Section 6 concludes.

⁴ Steele, *English*, p. 104.

⁵ Sylla, “Monetary Innovation in America.”

2. Some Basic Facts⁶

In 1684 Massachusetts lost its original charter due to its excessive independence and also had to close its mint. In 1686 it became the core of the Dominion of New England, ruled by a royal governor. The local elite tried to form a private bank to relieve the scarcity of coin. The banknotes were supposed to be backed by both land and a full legal tender status (i.e., for both debts and taxes). The bank scheme was aborted in 1688. Following the Glorious Revolution, the colonists deposed the governor in 1689. They established a provisional government which was tentatively endorsed by the Crown ex-post. They joined King William's War with Canada and the northeastern Natives, while their agents in London negotiated with Crown and Parliament about charter restoration.

In October 1690 Massachusetts tried and failed to occupy Quebec. Plagued with small-pox, frost and starvation, the returning troops demanded pay⁷. They received debentures which stated how much the colony owed them. The government, which counted on expected loot to pay the expenses, imposed new taxes. These were not paid quickly enough. Payments for previous expeditions had already been postponed and the government could not get away with it again. The threat of mutiny, riot, desertion, or even defection, was very real⁸. Allowing troops to pay taxes with their debentures⁹ was not enough. On December 24th, 1690, an order authorized a five men committee to give

⁶ A classic reference is Hutchinson, *History* I. Also see Johnson, *Adjustment*, and Lovejoy, *Glorious*.

⁷ The main contemporary source is Mather, *Pietas*, pp. 41-5. It is largely supported by contemporary letters.

⁸ Mather, *Pietas*, p. 44, PRO CO 5/855 #94, 127, 145, CO 5/1081 #188, CO 5/1306 p. 387, Massachusetts Archives (henceforth MA) 36:200-1. England's most memorable naval defeat (Chatham 1667) was caused by mass defection and desertion of sailors who were angry for being paid with debentures called "tickets" (Davies, *Gentlemen*, pp. 82-3, Pepys, *Diary*, 14 June 1667). Some of them even led that Dutch raid.

bills ... unto all such persons who shall desire the same, to whom the Colony is indebted for such sum or sums of money as they shall have debentures ... every of which bills according to the sums therein expressed shall be of equal value with money, and the Treasurer and all the receivers subordinate to him shall accept, and receive the same accordingly in all public payments ... the Colony is hereby engaged to satisfy the value of said bills as the Treasury shall be enabled. And any person having of said bills in his hands, may accordingly return the same to the Treasurer, and shall receive the full sum thereof in money, or other public stock at the money price as stated for that time¹⁰.

The last line requires explanation. Taxes were usually paid in grain according to “money prices” set in tax laws (e.g., a bushel of barley was worth 4s in tax liability). The order thus decreed two uses of the notes: any payment to the colony could be discharged with the notes and if the treasury had specie or other specific goods, these could be used to redeem the notes. These uses were also printed on the notes. The order also limited the quantity of notes and dealt with counterfeiting and wear and tear.

3. Convertibility and Backing

The letter of the law promised convertibility into certain movable goods if and when possible. Convertibility into land or backing with land was not mentioned. I will argue that the promise that *was* made was a dead letter. I will then show that land’s absence is highly unusual but can be rationalized on political grounds.

3.1. Convertibility into Movables

Due to the fact that the treasury was initially empty, the convertibility promise was at first an empty one¹¹. There is no documentation of such conversion actually occurring at the

⁹ M-S, p. 283.

¹⁰ Modernized spelling. See Massachusetts Court Records VI, pp. 170-1 (reprinted in M-S, pp. 290-1).

¹¹ Mather, *Pietas*, p. 43, PRO CO 5/856 #138, Davis, *Colonial I*, p. 189, Nettels, pp. 262-3.

treasury and no contemporary writer even mentions this clause¹². The only documented conversion was made by patriotic individuals who voluntarily gave their own specie for notes to support the notes' value¹³. This testifies to the treasury's inability to do so.

Convertibility might have been credible if there was hope to obtain specie or goods, but this was not the case. The colony never had revenue from selling private goods. It had produced coin and supported coin-hungry privateers, but England suppressed these activities in the 1680s. The loss in Quebec proved that expected loot was unreliable and in any case the war was on hold for the winter¹⁴. Tax receipts were expected to be in paper rather than specie or goods, because taxpayers were much happier to get rid of the former rather than the latter ones; the colonists were well aware of Gresham's Law¹⁵. Proceeds from land sales could not be relied upon either (see Subsection 3.3). To conclude, the weak promise of convertibility into movables was entirely not credible.

3.2. Absence of Land Backing: An Anomaly

Land has always been a major security for debt repayment. The chronic specie shortage in seventeenth century England and its American colonies expanded the use of land in the financial system. Land itself became a medium of payment and was used in the backing of paper money. This was especially attractive in the colonies: compared with England, they had much less specie and far more land. Payments in land could be made in several

¹² Davis, *Colonial I*, pp. 189-208, PRO CO 5/856 #131, 136, 138, Mather, *Pietas*, Savage, *An Account*.

¹³ Mather, *Pietas*, p. 45.

¹⁴ Hutchinson I, p. 336.

¹⁵ Mather, *Pietas*, p. 44. In Subsection 4.2 I show that even if the treasury had obtained grain somehow, it would have used it to pay its other debts, rather than make it available for paper money redemption.

instances: before a service was rendered (e.g., bribe¹⁶); given voluntarily as debt repayment (e.g., the king's debt to William Penn, which became Pennsylvania¹⁷); or ordered by court as debt repayment (e.g., bankruptcies and deceased people¹⁸).

Wars involved unusually large expenses, often involved land disputes, and the victor usually gained land. Therefore, war-related payments in land were natural in the Anglo-American world. Soldiers *expected* to have a share in the land they defended or conquered. As early as 1642 Connecticut paid in land for wartime service¹⁹. Back home, Cromwell's troops were paid with debentures which were convertible into confiscated enemy land²⁰. In 1675, Massachusetts promised land to its troops before a critical battle in King Philip's War, and later it promised that all public lands, towns' common lands and the colony's interest in conquered lands outside the colony would be held as security until all wartime debts were repaid²¹. An important scholar speculated that receipts for these debts may have circulated as currency²². The huge area annexed in that war indeed made it standard for early 1680s Massachusetts to repay its debts in land. Recipients

¹⁶ Jeffries Papers at Massachusetts Historical Society (henceforth MHS), vol. 4 #108.

¹⁷ For examples in Massachusetts see Shurtleff, *Records* II, pp. 51, 132, 189, MA 45:198, Jeffries Papers, vol. 4 #105.

¹⁸ Examples: Trumbull and Hoadly, *Public Records* III, pp. 170, 175, 198, 218.

¹⁹ Trumbull and Hoadly I, pp. 70, 208, II, pp. 161-2, III, p. 234.

²⁰ PRO SP 128/42, E 121, Commission on Public Records – Ireland, *Annual Report*.

²¹ Bodge, *Soldiers*, p. 133, Shurtleff V, p. 71. Perhaps this mortgage of public land was inspired by earlier English kings who mortgaged their own land upon taking loans (Ashton, *The Crown*, pp. 60-4, 127).

²² Nettels, p. 251.

included war veterans, wartime suppliers and creditors, English creditors who helped lobbying in London, and magistrates on special missions²³.

Land backing was also used in financial institutions. Land banks would lend banknotes in return for mortgages. In case of default a borrower's land could be sold and the proceeds could be used to redeem outstanding notes held by others²⁴. These ideas were used in Boston in clearinghouses which operated in 1671 and 1681-83,²⁵ and in the aborted land bank of 1686-88.

In addition to this *institutional* experience with land as the basis of credit and as an alternative to specie, there are *personal* connections between that monetary tradition and the 1690 paper money. The presumed architect of the paper money is Magistrate Elisha Hutchinson, who headed the paper money committee and dominated war finance issues that year²⁶. He had been an officer of the aborted land bank. Apart from the treasurer, the other committee members all shared similar backgrounds: Adam Winthrop had been a trustee of the second clearinghouse and a bank officer; Speaker of the House Penn Townsend had been a bank officer; and Timothy Thornton had been a clearinghouse

²³ Shurtleff V, pp. 343, 408-9, 441-2, 490, 515, MA 3:353a, 354, 69:173a, 70:119-20, 126:269, Lewis, *Massachusetts*, p. 165. For Plymouth examples see MA 128:27, MHS Collections (1861), p. 178. Charity cases, such as wounded veterans and veterans of England's wars, applied for land without claiming a legal right (MA 45:201-2, 70:148, 112:398-9, 126:358a, 127:234, 303, 128:69, 240). Some of them did get land.

²⁴ Horsefield, *British, passim*, Davis, *Currency* II, ch. I-III.

²⁵ Davis, *Colonial* I, pp. 112, 116, Dorfman, p. 94, Davis, "The Fund," p. 258.

²⁶ He was listed first in the order, even before the treasurer. He was the only man on all the main war-related fiscal committees (M-S, pp. 228, 249, 251, 277-8, 284), and is the only one on record relying on expected Canadian loot to pay that expedition's costs (PRO CO 5/855 #75). One of two open letters about the money was addressed to him (Davis, *Colonial* I, p. 197).

customer²⁷. The magistrates in 1690 included: Wait Winthrop, one of the bank's four senior officers; James Russell, treasurer during the 1680s when land dominated debt repayment, and a bank officer; and Isaac Addington, a bank officer. Commissioner William Stoughton had been a senior bank officer and was one of those magistrates who had been personally paid with land²⁸. Many other legislators were among those who voted for such payments in the 1680s.

The leaders of both the clearinghouses and the bank were not in office in 1690. However, they still held influence. The presumed manager of the clearinghouses, John Woodbridge, communicated with the General Court in December 1690 on another issue, and could have contributed to the monetary discussion²⁹. More importantly, the bank leader, Englishman John Blackwell, was the foremost financial expert in America. As Cromwell's Treasurer of Army his opinion was widely sought, especially on financial matters³⁰. He actively promoted the paper money right after it was issued³¹. There can be no doubt that he was consulted about it. The conditional convertibility clause in the paper money order was probably inspired by an identical clause in the prospectus of

²⁷ The people involved with the bank and clearinghouse are listed in MA 127:66, 69, and Davis, "The Fund," pp. 259, 262, respectively. Office holders in 1690 are listed in M-S, pp. 241-2, 285.

²⁸ Shurtleff V, p. 343.

²⁹ M-S, p. 294.

³⁰ He had been consulted with "on all affairs" (Toppan, *Randolph IV*, p. 113) and had chaired a standing committee on trade (Toppan "Dudley Records," pp. 248-9). He had just returned from a short governorship of Pennsylvania (PRO CO 5/855 #94). Back in England in 1691, both the Crown and Massachusetts agents consulted him regarding the charter (CO 391/7 pp. 7-8, Mather, *Diary*, 15 Sep., 30 Oct.).

³¹ In January 1691 he wrote an open letter about it (Davis, *Colonial I*, pp. 206-7).

Blackwell's bank³². Interestingly, decades earlier he had personally dealt with the wartime conversion of debentures into confiscated enemy land in England and Ireland³³.

Given the success and prevalence of this financial use of land in all previous wars³⁴, and the numerous personal connections to land-backed financial institutions, it is remarkable that land is *completely absent* from the records in 1689-90. Before and after each of this period's three expeditions, troops were promised a share of the plunder, while loans were secured by future tax revenues or plunder. Land was not promised before any expedition nor given after it³⁵. The notes were neither convertible into land nor backed by it. Even an empty promise was not made regarding land backing, as was made about specie and goods.

3.3. No Land Backing: An Explanation

The most likely reason for the lack of land backing is the land policy of Sir Edmund Andros, the royal governor of the Dominion of New England (1686-89). He voided *all* the land titles in Massachusetts³⁶. His main legal argument was that with the revocation of the charter all the lands reverted to the Crown. I argue elsewhere that this policy killed Blackwell's land bank in 1688.³⁷ Andros's land policy was so shocking that it served to unite all political parties against him, and led to the 1689 revolution that deposed him.

³² Davis, *Colonial I*, p. 139.

³³ Dorfman, p. 97. He represented himself and other debenture-holding troops (PRO E 121/4/8 #35).

³⁴ In earlier wars many new lands were eventually won from the Natives, notwithstanding initial losses. Land losses as of late 1690 were "not fourth" of the desolation in King Philip's War (PRO CO 5/856 #150).

³⁵ MA 35:52a, 107:271a, 288a, M-S, pp. 248, 256, 284.

³⁶ Barnes, *Dominion*, ch. VIII, Lewis, ch. X.

³⁷ Goldberg, "Rise and Fall."

However, the implications of his land policy lingered on. The warring new king delayed his policy decisions about Massachusetts until the fall of 1691. Only then was Andros's claim of royal ownership of all the lands explicitly overruled. Until then it was doubtful whether either the colony or the colonists really owned any land.

It is clear that land was still a major problem when paper money was created. In November 1690 and January 1691 the London agents asked for a blanket confirmation of all old land titles in a draft of a new charter. It was erased from later drafts, but at the last moment chief lobbyist Increase Mather managed to put it back in³⁸. In October 1691 Mather informed the colony about the new charter. His letter opened as follows:

The charter for the Massachusetts colony passed the great seal on the sixteen instant [i.e., October 16th]. The king reserves power to himself to appoint the governor, deputy governor, and secretary.

But all men's properties are confirmed as before the judgment against the old charter³⁹.

Mather then mentioned some of his greatest achievements: an elected assembly, limits on the governor's powers, the annexation of Plymouth, Maine, and Nova Scotia, and the first ever shipment of desperately needed ammunition. The fact that Mather started the good news with "properties" (i.e., land⁴⁰), proves how critical the issue was to the colonists, and attests its uncertainty until October 1691. The letter was addressed to a close friend, John Richards, one of the few Massachusetts leaders who were *not* heavily involved in the real estate market⁴¹. Mather's leading apologist – his son Cotton – wrote "political

³⁸ M-S, pp. 468-9, 518, 555-6, PRO CO 5/855 #130, CO 5/856 #158XXXI, 158XXXIV, 158XXXV, 183, 192, CO 391/7 p. 42, Whitmore, *Andros II*, pp. 283-4.

³⁹ Modernized spelling. See M-S, pp. 620-1.

⁴⁰ This interpretation of "properties" is proved by Mather's other writing (e.g., Whitmore II, pp. 121-122).

⁴¹ Lewis, p. 429.

fables” to market his father’s achievements to the ungrateful colonists. In half of them he emphasized that all land owners owed gratitude to his father for the confirmation of their titles⁴². Even the charter’s confirmation was not enough to ease concern, so a 1692 act guaranteed title to those whose land possession had been uncontested for three years⁴³.

To return to the climate of late 1690, land anxiety must have been at its peak because the late Dominion’s entire leadership had been exonerated in England and seemed to be returning to high ranking jobs in America and perhaps even in Massachusetts⁴⁴. This possibility was terrifying. Leading legislators were personally hurt by his policy, notwithstanding their involvement with Blackwell’s bank⁴⁵. Magistrate Hutchinson lost his Maine land in 1686 to Maine’s Deputy-Secretary John West due to a supposedly defective title. West then became Andros’s Deputy-Secretary and Registrar of land titles. Similar persecution of land titles suspiciously began in Massachusetts immediately thereafter⁴⁶. Hutchinson had also led the most important land speculation venture (Atherton), which was sabotaged by Andros. He went to England to lobby for Andros’s removal. Andros’s worst attack on land titles was the issue of writs of intrusion against

⁴² Whitmore II, pp. 317, 326, 330.

⁴³ Hutchinson II, p. 49, Goodell, *Acts I*, p. 41.

⁴⁴ Andros was rumored to return as governor of Massachusetts or New York (also in the Dominion) (Sewall, *Diary I*, p. 333, Hall, *Randolph*, p. 131, Hall, *Last*, pp. 233-4, Lovejoy, p. 342). Others were Lieutenant-Governor Nicholson (Sewall, pp. 270, 321-2), President Dudley (PRO CO 5/1081 #161, 180) and Attorney General Graham (Graham to Nicholson, April 6th, 1691, Blathwayt Papers X, folder 5). Eventually, they all ended up in either New York or Virginia.

⁴⁵ For details and references see Goldberg, “Rise and Fall.”

⁴⁶ Hutchinson had also been a specialist in government’s grants of vacant land (MA 45:183-183a, 100:291, 382-3). These lands were to become Andros’s most favorite target.

five landowners. Three of them would be legislators in 1690.⁴⁷ Magistrate Wait Winthrop was also an Atherton partner and his sisters were also hurt by Andros's policy. The possibility of an Andros return startled the colonists to the point of publishing an insider account of his reign in February 1691.⁴⁸ Some of his former councilors strongly condemned his land policy in this *signed* document. This is significant because most political publications were anonymous and Andros had been exonerated in 1690 because no colonist dared signing the allegations against him⁴⁹. The persistent rumors of his return prompted the colonists to take this unusual measure. Signatories included Stoughton and Winthrop, senior bank officers and members of the 1690 government.

In conclusion, as of December 1690, all the land possessed by the colony and any land that could have been won in the war apparently belonged to the king. The king could have confirmed Andros's policy and could have been angry at the General Court for giving *his* land away, or for promising *his* land as backing for the colony's paper money. Avoiding any reference to land seemed like the safest course of action while the colony's new charter was being drafted in London.

Such caution is consistent with general colonial behavior. Rhode Island and Connecticut were very friendly to the Crown while waiting for a charter in the 1660s.⁵⁰

⁴⁷ These were Magistrates Sewall and Russell and Deputy Joseph Lynde. Would-be committee member Townsend and Magistrates Winthrop and Addington were formally involved in Sewall's 1687 taking possession of the land that would be targeted by Andros in 1688 (Sewall, p. 176, Sewall Papers at MHS, after 20 July 1688 entry).

⁴⁸ Whitmore I, pp. 133-147.

⁴⁹ PRO CO 391/6 p. 323.

⁵⁰ Hall, *Randolph*, p. 11, Lovejoy, p. 128.

Most New England colonists were very risk averse in 1689-90 regarding their constitutional status, fearing royal disapproval. They did not revive their old charters after unilaterally dissolving the Dominion, even though the Dominion had been established, and the charters revoked or suspended, by the new king's enemies (the deposed Stuarts)⁵¹. Before the new king explicitly approved the revolutionary Massachusetts government, its members feared exercising authority on taxation⁵². It also made sense to wait for a royal statement on land before acting as if it was theirs.

4. Legal Tender for Debts?

Legal tender laws are very limited by nature. They only settle disputes about the medium of payment of an obligation that *already exists*. One such obligation is a contractual debt that needs to be discharged after a commodity had been delivered. Another example is a tax. Contrary to common belief, legal tender laws do not force anyone to sell on the spot for legal tender currency (there is no debt to settle yet), and they do not prohibit parties from agreeing on another medium of payment⁵³.

Massachusetts regularly made its currency legal tender for all debts. From the opening of the Boston mint (1652) to the prohibiting Currency Act (1751), only one other act authorizing new currency did *not* make it legal tender for debts⁵⁴. Why was the 1690 currency an exception? Or was it? I will first discuss the absence of formal legal tender

⁵¹ Sosin, *English America*, pp. 216, 221.

⁵² Lewis, p. 334.

⁵³ For some official explanations, see <http://www.federalreserve.gov/generalinfo/faq/faqcur.htm#2> , <http://www.bankofengland.co.uk/banknotes/about/faqs.htm> . Also see Goldberg, "Legal Tender."

⁵⁴ It was in the first issue of *provincial* notes (1702). The omission was fixed later (Goodell I, pp. 504, 701).

provisions regarding debts. I will then show that another, seemingly unrelated order, practically made paper money legal tender for debts albeit in an indirect way.

4.1. Not Legal Tender for Debts (*de jure*)

In early Massachusetts the lack of a convenient medium of paying obligations hampered the settlement of contractual debts. In 1652 the colony started minting its own coins and made them legal tender for debts: if a contract denominated in pounds had been created without specifying the medium of payment, these coins were good enough to discharge the debt at face value, and the creditor could not sue for breach of contract⁵⁵.

After the Restoration the mint had been repeatedly portrayed as one of the colony's worst offenses against the Crown. While other offenses involved violations of Parliamentary laws (e.g., Acts of Navigation), coinage was a direct violation of the royal prerogative⁵⁶. To add insult to injury, the 1652 coinage order referred to Massachusetts as "this commonwealth⁵⁷." Some royalists considered this high treason. The first complaint was made by visiting English commissioners in 1665.⁵⁸ Edward Randolph, who led the fight to revoke the colony's charter, made the coinage offense one of his favorite targets. He mentioned it tirelessly, often at the top of his list, and he was not alone in doing so⁵⁹. The king forced the colony's agents to beg for his pardon only for this particular offense. He was furious when he later learned that coinage continued nevertheless⁶⁰. The

⁵⁵ Shurtleff IV-I, p. 84.

⁵⁶ The charter was almost lost already in 1635 due to other violations of the prerogative (CO 5/856 #158I).

⁵⁷ Shurtleff IV-I, p. 84.

⁵⁸ Shurtleff IV-II, p. 213.

⁵⁹ PRO CO 1/41 #35, 50-1, CO 391/2 pp. 96, 104, Toppan, *Randolph III*, p. 96, CO 1/47 #44, CO 1/52 #4.

⁶⁰ PRO CO 1/41 #29-31, CO 1/42 #15I, CO 1/47 #79, CO 5/904 p. 177, CO 391/2 pp. 103, 240-1.

complaints referred to the debasement of coins, the absence of the king's portrait or name, and – more importantly – the legal tender status⁶¹. Only the king could force the acceptance of a certain object in settlement of debts. Later on in England, plans for note-issuing banks would be disqualified for asking that their private notes be legal tender. The Bank of England was approved by Parliament only after dropping this request⁶².

In 1684 the charter was revoked even though the mint closed. The colonists asked to re-open the mint in 1686, but the Crown objected because of the debasement⁶³. In 1689 Mather tried to revive the old charter in London. This attempt only revived the details of the colony's offenses, including coinage⁶⁴. Mather learned his lesson and only asked for liberty of coinage in 1691 when it was clear that the old charter could not be revived⁶⁵.

Officially issuing paper money with a full legal tender status in 1690, while charter negotiations climaxed, would have been a colossal mistake. While England repeatedly objected to the Massachusetts coins which were 22.5% debased, the paper money issue would amount to opening a mint with 100% debasement. In general, the colony's leaders were aware that the charter battle in London was tough and nasty, and they did not want

⁶¹ Toppan, "Dudley Records," p. 244, PRO CO 1/41 #50, CO 1/47 #44, CO 5/940 p. 139. It was especially a problem that England-based creditors were forced to accept these debased colonial coins.

⁶² Horsefield, pp. 126, 160, 211.

⁶³ Toppan, "Dudley Records," p. 244, PRO CO 5/904 pp. 319-26.

⁶⁴ PRO CO 5/905 pp. 55-6, 79, 142, Hall, Leder, and Kammen, *Glorious*, p. 69, Whitmore II, p. 140, III, pp. 5, 16, 226). Most of these documents were presented before the Lords of Trade or Parliament.

⁶⁵ M-S, p. 514, PRO CO 391/7 p. 76.

to give ammunition to their enemies⁶⁶. At least four of the leaders knew how damaging it could be to violate the coinage prerogative again. Richards (a former and soon-to-be magistrate) and Stoughton (one of the two commissioners) were among the agents who had begged the king to pardon the original coinage offense years earlier. Samuel Sewall (the other commissioner and a magistrate) and Hutchinson (one of two commissioners-in-reserve and a magistrate) had helped Mather's lobbying in London in 1689 and witnessed first hand the lingering damage of that old coinage offense⁶⁷. The positions of commissioner and commissioner-in-reserve were diplomatic ones, which meant that during the May 1690 elections, these were the most trusted persons in diplomatic affairs.

While the colonists got away with the coinage offense for decades under Charles II, they could not hope to be so lucky with the new king. New to London from the world's financial center (The Netherlands), William of Orange and his advisors were much more sophisticated in these matters⁶⁸. The conclusion was clear: while paper money had to be issued to please the troops, it had to *look* as if it was not money.

The solution was to make the paper money look like a simple credit instrument, an IOU, which happened to be issued by a colonial government. There was nothing illegal or

⁶⁶ In November and December 1690 the General Court warned both Crown and agents that the colony's actions would be maliciously "misrepresented" by others (M-S, pp. 288, 412-3).

⁶⁷ As heir of the closed Boston mint (Sewall I, p. xviii), Sewall had to be interested in money. He and Hutchinson toured the London Mint in 1689 (Sewall I, pp. 253, 256). He also gave a rare 1712 testimony on the 1690 issue (Sewall II, p. 366).

⁶⁸ The colonists may have known that in July 1690 he revalued the token coin that his enemy James I was issuing in Ireland (National Museum of Ireland – Decorative Arts and History, *Airgead*).

sovereign-like about that, as anyone was allowed to issue IOUs.⁶⁹ At the time, a typical IOU included the following five features: first, it was convertible into specie or goods; second, it had an indenture as the symbol of contract⁷⁰; third, it was not forced on anyone; fourth, the issuer was expected to accept it in offsetting debts owed to him, following the Common Law's setoff rule⁷¹; and fifth, it was not called "money."

Massachusetts gave its 1690 money all these features. First, it made an (empty) promise of convertibility (see Subsection 3.1). The order's preamble explicitly stated that the notes would merely postpone the *real* payment to a more "convenient time." Second, the notes were indented. Third, the letter of the law did not force the money on any person. Nobody, including the troops, had to receive it for the government's debts or private debts, use it in trade, or pay taxes with it. Fourth, the order did force the government itself to accept the notes in offsetting the government's debts (notes) against its credits (taxes), if taxpayers chose to pay taxes with the notes. Fifth, the notes were called "bills" in both the authorizing order and on the face of the notes, rather than "paper money" or "money"⁷². The convenient denominations and easy transferability did not disqualify the notes as IOUs. Assignability of bonds was standard there⁷³.

⁶⁹ Horsefield, pp. xii-xiv, surveys these instruments in England. For usage in Massachusetts see MA 36:281, 100:389, 128:121, M-S, p. 121, Jeffries Papers, vol. 4 #2, 13, 148. Also see Davis, *Colonial I*, p. 191, Trumbull and Hoadly I, p. 512.

⁷⁰ Weeden, p. 330.

⁷¹ Offsetting debts is known to have been practiced by neighboring colonial treasuries: Trumbull and Hoadly I, p. 34, II, p. 142, Konig, *Plymouth*, vol. 1, pp. 204, 207.

⁷² The latter is also noted in Rabushka, *Taxation*, p. 360. Sewall mentioned "bills" in unsecure correspondence to England (MHS Collections [1886], p. 115). In his private business papers in January

This tactic was in line with the colonists' new rhetoric, which emphasized their rights as Englishmen⁷⁴. As Englishmen, they could not create legal tender money but did have the right to issue IOUs.⁷⁵ As mentioned in Section 2, the troops first received debentures, which they could use in tax payments. The paper money order merely allowed them to convert these debentures into other debentures, which were conveniently denominated and easily transferable. While for economists the latter would be considered money, for the Crown the ultimate test for money was the formal name "money" or a legal tender status for debts. In general, hair-splitting rhetoric was a second nature to the colonists when dealing with England. For example, after deposing Andros this revolutionary government governed "according to the rules" of the old revoked charter without formally reviving the charter itself⁷⁶. Analogously, one might say that the notes functioned *according to the rules* of money but were not formally money.

The government's fear of being caught issuing money was well founded. The money issue and its dismal performance were reported to London by the government's enemies,

1691 he used "bill" once and "money-bills" twice (Sewall Papers at MHS). Leading contemporary colonists scolded those who called it "paper money" (Davis, *Colonial I*, pp. 189, 204). The name "bills of credit" was officially used only from February 1691 (M-S, pp. 296-7). Earlier Connecticut debentures had been called "bills of debts" (Trumbull and Hoadly I, p. 273).

⁷³ See references in footnote 69. In 1687 Connecticut authorized assigning all the private bills given to the treasury to pay the treasury's debts (Trumbull and Hoadly III, p. 224).

⁷⁴ It was mainly used to justify the 1689 revolution and the first ever plea for English military aid. See Lovejoy, pp. 292-3, 377, Johnson, pp. 129-34, 196, fn. 27, PRO CO 5/855 #71.

⁷⁵ Leading contemporary colonists also wrote about the money as an ordinary credit instrument (Davis, *Colonial I*, pp. 189-206, Mather, *Pietas*, p. 45).

⁷⁶ M-S, p. 89.

who were quick to employ the terms “bank,” “money,” “paper money,” and “a new mint raised here of paper money.” One letter explicitly claimed that the prerogative had been violated⁷⁷. As these letters arrived to London in 1691, several memoranda on the old charter revocation were prepared in Whitehall to facilitate an informed decision on the colony’s future. Some of them again raised the old coinage offense⁷⁸. And yet, there is no evidence that anyone in London compared the new paper money to the old illegal coins. It seems that the trick worked. The colony got away with issuing paper money and received a reasonably good charter in October 1691.

The new charter did not allow coinage, but it provided political insurance. It created a new mechanism that sent all new acts to England for approval. This guaranteed that the new charter could not be revoked like its predecessor just because the king disapproved of certain acts. With the risk of revocation removed, the colonists immediately restored their own monetary tradition: in the very first legislative session under the new charter, all future notes were formally made legal tender for both debts and taxes⁷⁹. In the worst case this act would have been vetoed by the king, without endangering the charter. Since the colony had formally made all earlier currencies full legal tender and made this change only after the new charter was secured, it proves that political considerations were the only impediment to a formal full legal tender status in 1690.

⁷⁷ PRO CO 5/856 #131, 136, 138, Foxcroft to Blathwayt, April 16th, 1691 (Blathwayt Papers V 5).

⁷⁸ PRO CO 5/856 #158VII, 158X, 158XI, 158XII, 158XIV, 158XVI. It often topped the list of offenses.

⁷⁹ Goodell I, p. 36. Since the notes already circulated at par, it was probably done just to solve standard contractual disputes. There was no such benefit from giving land to the 1690 troops. The latter happened only when public sympathy favored them as they were passing away in the 1730s (e.g., MA 36:246-7).

4.2. Legal Tender for Debts (*de facto*)

On the same day that the paper money order passed, another, seemingly unrelated order passed as well. It did not refer to the war or to paper money. The *entire* order stated:

Ordered that all country pay with one third abated shall pass as current money to pay all country's debts at the same prices set by this court; except what has been borrowed in money shall be paid in money⁸⁰.

“Country pay” meant grain and other goods authorized as legal tender for taxes. Because some of the colony's leaders privately lent specie to buy supplies for the expedition, they guaranteed that they would be paid back in specie⁸¹.

But the key is the first sentence. Why is this order (henceforth, *the commodity money order*) relevant for paper money? Recall that the paper money order offers troops “*who so desire*” paper money as wage payment (Section 2). Consider, for example, a soldier who had a debenture for 60s. He could exchange the debenture for 60s in paper money. According to the latest tax order of October 25th, 1690, barley was priced for tax purposes at 4s per bushel. Since this pricing was adopted in the commodity money order, a debt of 60s was worth fifteen bushels of barley. But this commodity money order had “one third abated,” so the treasury actually could discharge the debt with *ten* bushels of barley. A soldier not believing in paper money faced the risk of being offered ten bushels of barley. A refusal to accept this low quantity of barley would void the colony's debt to him.

This casts a heavy shadow on the paper money order, for troops who rejected paper money actually could have been punished. In fact, this commodity money order that made grain legal tender for government debts indirectly made *the paper money* – to some

⁸⁰ Modernized spelling. See Massachusetts Court Records VI, p. 171 (reprinted in M-S, p. 292).

⁸¹ One of them, Timothy Thornton, was in the paper money committee (MA 100:452).

extent – legal tender for government debts. To see why this is the case, note that if the abatement had been 100% rather than one third, a soldier rejecting the notes would have the government debt to him discharged with exactly zero bushels of barley. He would have lost his entire wage as a penalty for rejecting the notes. That is what legal tender means: a creditor who rejects it cannot insist on getting paid in any other way. While the penalty was not 100%, it did apply to a huge debt (£40,000), which dwarfed any private debt in 1690 Massachusetts. Therefore, *de facto*, until the government finished paying the troops, the paper money *was* somewhat legal tender for debts.

Why did Massachusetts choose one third rather than, say, one half? Its legislative history of commodity money was full of anti-grain abatements. The tax orders which set grain prices for tax payments regularly discriminated against grain, in order to encourage tax payments in specie. An abatement of one third for payment in specie had been the standard, and was used four times in one year just before December 1690.⁸² The abatement of December 1690 mirrored these abatements: instead of benefiting those who would *give specie* as payment of an obligation *to* the government, this order benefited those *receiving* an *intrinsically useless* object as payment of an obligation *from* the government. This analogy justified using the same measure of one third.

This order, which must have induced troops to accept paper money, has gone completely unnoticed by the government's enemies, England, and monetary historians⁸³. Even the Massachusetts Archives composer, Joseph Felt, missed it upon composing his

⁸² Shurtleff V, *passim* (beginning in p. 139), M-S, pp. 173, 224-5, 280, 283.

⁸³ It affected only the troops, while the government's enemies who sent letters to England were not among the troops. The published account attributed to Thomas Savage, an officer who fought in Quebec, includes a discussion of paper money which he never wrote. See Goldberg, "Savage," for an analysis of this forgery.

widely used collection of monetary laws⁸⁴. The order has two features that make it inconspicuous and hard to relate to paper money. First, in all the analogous tax orders, the anti-grain discrimination was *always* made upfront in the same order. The December 1690 anti-grain measure should have been in the paper money order itself, as follows: “Bills will be given to those troops who so desire, while others will get grain with one third abated.” Instead, what we have is a paper money order which does not punish anyone, while the implicit sanction is in an order that does not mention paper money. Moreover, this separate order is “buried” in the General Court records. The lengthy paper money order is followed by four short orders regarding debt payments to specific individuals. The commodity money order was inserted in the middle of these orders. It has about the same length as these personal orders, and opens with the same words.

These features are probably an accident, resulting from a bicameral legislature: the magistrates initiated the paper money order, while the deputies initiated the commodity money order. However, it is not inconceivable that this was purposefully done. If England had noticed this order and its meaning, the whole ploy would have been considered merely another violation of the coinage prerogative. Some later Anglo-American governments certainly did display deceptive behavior, using technical tricks to make paper money a *de facto* legal tender for debts⁸⁵. Such a scenario is also consistent

⁸⁴ Felt, *Historical Account*. It is in his errata (p. 250) but misdated as October 24th and thus taken out of context. It was really dated “X^{ber}” (MA 36:259b-c), which meant “December” (e.g., PRO CO 5/855 #127).

⁸⁵ England was reluctant to make the nominally-private Bank of England notes legal tender, so it forced official debt collectors (rather than the creditors) to accept the notes (Nussbaum, *Money*, pp. 47-8). Facing the constitutional prohibition on state legal tender laws, Kentucky enacted a two-year delay to lawsuits by creditors who rejected the state’s favorite private paper money (Hurst, *Legal*, pp. 140-5).

with Massachusetts political history. Its leaders were formidable political players. They promised convertibility into objects they did not have. They did not call their currency as such. They even manipulated the notes' acceptance for taxes (see below). They had a long and very successful tradition of tricks. Using procrastination, pretensions, bribes, subterfuges, hair-splitting rhetoric and half-truths, they secured their autonomy for a generation after the Restoration⁸⁶.

5. Legal Tender for Taxes

Another component of most legal tender laws is acceptance of the money for taxes. As mentioned above, it could be interpreted as offsetting debts between the government and the taxpayers who hold the notes. There was no reason to fear an English response to this measure. If anything, it helped create the impression that the notes were nothing more than private-like IOUs. The problem in this case is different. Given that there was no backing with tangible assets and a limited legal tender status for debts (concerning only the soon-to-be-discharged government debt to troops), the government had to trust that the tax measure *alone* would be sufficient to indefinitely support the money's circulation. With the first scholarly text on the topic almost a century away from being published (Adam Smith), how did the colonists come to trust the power of this measure?⁸⁷

The chronic lack of specie forced all colonies to accept tax payments in goods. To prevent disputes between taxpayers and tax collectors, the government regularly set prices of specific types of goods for tax payments. In December 1690 a tax liability of 60s could be discharged with fifteen bushels of barley because the latest such order set

⁸⁶ Hutchinson I, Johnson, Sosin, p. 11.

⁸⁷ For a mathematical model of this mechanism see Starr, "The Price of Money."

barley at 4s per bushel⁸⁸. The goods had to be of “merchantable” quality and the treasury typically passed the goods on to its own creditors. The set prices were usually adjusted to market rates once a year⁸⁹. Over time sellers learned the minimal quality of goods that the treasury accepted for taxes. Consider a shop keeper in 1690, being offered by a farmer fifteen bushels of barley of sufficiently good quality as payment. He knew that this barley could at the very least be used to discharge 60s of his (or others’) tax liability. A drop in the market price of barley did not matter. The tax law’s prices put a lower bound on the value of these goods. It is likely that during the half century that this system existed, many sellers accepted grain at a certain price, only because they knew it had a sure value in tax payments. This increased the demand for grain, including grain of marginal quality.

Producers of other types of money understood how important this mechanism was for increasing the value of money. John Hull, the monopolist mint master and the colony’s treasurer, proposed to legislate an exceptionally large discount in taxes for those who would pay them in his coin rather than grain. He probably pushed for those rare tax laws that even forced taxpayers to use coin for a fraction of their payments⁹⁰. He might have been more concerned with demand for his coins than efficient tax collection. Similarly, Blackwell’s *private* banknotes were made legal tender for all debts and taxes when the bank’s directors controlled the government in 1686.⁹¹ Hull’s heir (Sewall) and the many

⁸⁸ M-S, p. 279. The first such law is from 1635 (Shurtleff I, p. 140).

⁸⁹ Shurtleff, *passim*.

⁹⁰ MA 100:239, 261, Shurtleff V, pp. 156, 324, 376-7, 417, 505.

⁹¹ MA 126:103-7. In addition to Blackwell, the bank’s directors were President Dudley, Deputy-President Stoughton, and Councilor Wait Winthrop (MA 127:66).

bank officers who were involved with the 1690 paper money knew the power of this mechanism. Their trust in it is therefore not surprising.

In some sense there was only one novel aspect in the 1690 money, compared to grain, local coins, and Blackwell's banknotes: being intrinsically useless and unbacked, it took this mechanism to its mathematical limit. It promised that pieces of paper would discharge tax liabilities according to their face value. Every seller was supposed to understand that no matter what the acceptability of notes in the market was, they were still useful for tax payments. The guarantee that 1s in paper discharged a 1s tax liability was supposed to put a lower bound on the notes' value. The intrinsic uselessness of the notes was not supposed to matter to sellers any more than they had cared about the quality of grain as commodity money (so long as it was acceptable at the treasury). The only difference from Gresham's Law is that they just wanted to get the "bad" money to circulate and cared far less about the fate of "good" moneys.

This mechanism is related to the tax-backing theory which was argued in the later colonial context⁹², but the crux of the matter is different. The issue here is whether the currency's value will be bounded away from zero, i.e., whether it will be accepted at all. The tax-backing theory takes the currency's acceptance as given and argues about the price level. The colonists may have viewed tax acceptance as not only sufficient for circulation but also as necessary, given the absence of other backing: if the issuer itself would not accept the notes, why should anyone else accept them?

There was some manipulation regarding this measure as well. The colonists knew that it would be even more effective if the paper money would be the *only* acceptable medium

⁹² E.g., Smith, "Some Colonial Evidence."

of paying taxes. But such a status would be inconsistent with the IOU-like appearance that they gave the money. The government therefore proceeded gradually. In February 1691 those paying taxes in notes got a 5% discount. In May 1691, paying in goods involved a one third penalty⁹³. All later taxes were imposed without the traditional mentioning of goods at all, meaning that goods were no longer legal tender for taxes. The treasury was thus allowed to reject them or accept them at any rate it wanted.

6. Conclusion

Massachusetts faced a unique combination of imperial regulations: it could not formally grant a full legal tender status to its money *and* it could not back it with land. Issuing money with a full legal tender status would have been injurious to the king's sovereignty. Backing it with his(?) land would have added insult to injury. The government was aiming to maximize political profit. In the short run this required pacifying the troops (i.e., issue money), and in the long run it required getting an autonomous charter from the king (i.e., don't issue money, especially with land backing). Stuck between a rock and a hard place, Massachusetts invented a currency that did not rely on land and looked as a private-like IOU, although it really was an inconvertible legal tender.

It is sometimes problematic to analyze innovation as a profit-maximizing activity⁹⁴. However, this invention did not come out of the blue since all the ingredients had already been there. One can imagine the government writing a checklist of all the ways it could support paper money, and then taking out those which were too risky. It was the peculiar combination of constraints that resulted in a unique outcome.

⁹³ M-S, pp. 296-7, 316. Both measures were relative to payment in specie.

⁹⁴ Mokyr, *Lever*.

My hypothesis regarding the government's intention is based on the serious and otherwise inexplicable differences between the 1690 paper money order and the Massachusetts monetary legislation beforehand and afterwards: the lack of a formal legal tender status for contractual debts, the lack of land backing, and the roundabout way in which paper money was supported (i.e., anti-grain discrimination). I also explain the anomalous policy of promising to convert the notes into everything the government did not physically have (movable assets), but *not* promising conversion into the only thing the government *did* physically have (land). All these odd facts do make sense if a *single* behavioral assumption is made; namely that the government maximized political profit subject to constraints. At the very least, the hypothesis follows Occam's Razor.

The idea that lack of specie automatically means no backing with *any* tangible assets is widely accepted today and is based on numerous historical instances. However, it is anachronistic to assume that early Americans thought the same way. The 1690 currency was not a simple wartime substitution of convertibility with a legal tender law. The colonists definitely had land in mind. In fact, it was the success of the 1690 innovation under unique circumstances which proved a general principle in monetary theory: *convertibility and backing with real assets are not necessary*. As Cotton Mather predicted⁹⁵, Massachusetts inspired other legislatures all over the world to easily abandon specie convertibility in favor of legal tender laws in times of crisis, typically without consideration for convertibility into goods or backing with land.

This precedent was not simply one more variation on the legal status of money. Most pre-1690 currencies had had intrinsic value, while token currencies had been supported

⁹⁵ Mather, *Pietas*, p. 43.

by forcing the government to convert them into goods, and/or by forcing private sellers to do so in the marketplace. Legal tender laws had been mainly used to solve legal disputes. The 1690 paper money was a conceptual shift from tangible assets (specie, goods, land) to monetary obligations (taxes and the government's debts) as the foundation of the monetary system. This was a critical landmark in monetary history. Its consequences will stay with us long after paper money gets completely replaced by electronic money.

References

- Ashton, Robert. *The Crown and the Money Market*. Clarendon Press, Oxford. 1960.
- Bailyn, Bernard. *The New England Merchants in the Seventeenth Century*. Harvard University Press, Cambridge. 1955.
- Barnes, Viola F. *The Dominion of New England: A Study in British Colonial Policy*. Frederick Ungar, New York. 1923.
- Bodge, George M. *Soldiers in King Philip's War*. Boston. 1891.
- Commission on Public Records - Ireland. *Fifteenth Annual Report*. 1825.
- Davies, J. D. *Gentlemen and Tarpaulins*. Oxford University Press, Oxford. 1991
- Davis, Andrew M. *Currency and Banking in the Province of the Massachusetts Bay*. Macmillan, New York. 1901.
- Davis, Andrew M. "The Fund at Boston in New England." *Quarterly Journal of Economics* 18, 1904: 255-268.
- Davis, Andrew M. *Colonial Currency Reprints, 1682-1751*. B. Franklin, New York. 1910.
- Dorfman, Joseph. *The Economic Mind in American Civilization, 1606-1865*. Augustus M. Kelley, New York. 1946.
- Felt, Joseph B. *Historical Account of Massachusetts Currency*. Boston. 1839.
- Goldberg, Dror. "A Savage Manipulation by Randolph." Working paper, <http://www.drorgoldberg.com/savage.pdf> . 2007.
- Goldberg, Dror. "Legal Tender." Working paper, <http://www.drorgoldberg.com/tender.pdf> .
- Goldberg, Dror. "The Rise and Fall of America's First Bank." Working paper, <http://www.drorgoldberg.com/blackwell.pdf> . 2008.

- Goldberg, Dror. "Invention and Diffusion of Hyperinflatable Currency." Working paper, <http://www.drorgoldberg.com/CA.pdf>. 2008.
- Goodell, Abner C., ed. *Acts and Resolves of the Province of the Massachusetts Bay, 1692-1714*. Wright & Potter, Boston. 1869.
- Hall, Michael G. *Edward Randolph and the American Colonies*. University of North Carolina Press, Chapel Hill. 1960.
- Hall, Michael G. *The Last American Puritan: The Life of Increase Mather 1639-1723*. Wesleyan University Press, Middletown. 1988.
- Hall, Michael G., Lawrence H. Leder, Michael G. Kammen. *The Glorious Revolution in America: Documents on the Colonial Crisis of 1689*. University of North Carolina Press, Chapel Hill. 1964.
- Horsefield, J. Keith. *British Monetary Experiments: 1650-1710*. Harvard University Press, Cambridge. 1960.
- Hurst, James W. *A Legal History of Money in the United States, 1774-1970*. University of Nebraska Press, Lincoln. 1973.
- Hutchinson, Thomas. *The History of the Colony of Massachusetts Bay*. Harvard University Press, Cambridge. 1936 [1765-8].
- Johnson, Richard R. *Adjustment to Empire: The New England Colonies 1675-1715*. Rutgers University Press, Piscataway. 1981.
- Konig, David T. *Plymouth Court Records 1686-1859*. Michael Glazier, Wilmington. 1978.
- Lewis, Theodore B., Jr. *Massachusetts and the Glorious Revolution, 1660-1692*. Ph.D. Dissertation, University of Wisconsin. 1967.

- Lovejoy, David S. *The Glorious Revolution in America*, 2nd ed., Wesleyan University Press, Middletown. 1987.
- Mather, Cotton. *Pietas in Patriam: The Life of His Excellency Sir William Phips*. Samuel Bridge, London. 1697.
- Mather, Increase. *Diary of Increase Mather*. 1691. At the American Antiquarian Society.
- Mokyr, Joel. *The Lever of Riches: Technological Creativity and Economic Progress*. Oxford University Press, Oxford. 1990.
- Moody, Robert E. and Simmons, Richard C. *The Glorious Revolution in Massachusetts, Selected Documents, 1689-1692*. Colonial Society of Massachusetts, Boston. 1988.
- National Museum of Ireland – Decorative Arts and History. *Airgead, A Thousand Years of Irish Coins & Currency*. Permanent Exhibition. 2007.
- Nettels, Curtis P. *The Money Supply of the American Colonies Before 1720*. University of Wisconsin Press, Madison. 1934.
- Nussbaum, Arthur. *Money in the Law*. The Foundation Press, Brooklyn. 1950.
- Rabushka, Alvin. *Taxation in Colonial America*. Princeton University Press, Princeton. 2008.
- Savage, Thomas. *An Account of the Late Action of the New Englanders, Under the Command of Sir William Phips, Against the French at Canada*, London. 1691.
- Sewall, Samuel. *Diary of Samuel Sewall, 1674-1729*. Collections of the Massachusetts Historical Society. Vol. V-VII, 5th Series. John Wilson & Son, Boston. 1878.
- Shortt, Adam. (ed.) *Documents relating to Canadian Currency, Exchange and Finance during the French Period*. Canadian Archives, Ottawa. 1925.

- Shurtleff, Nathaniel B., ed. *Records of the Governor and Company of the Massachusetts Bay in New England*. William White, Boston. 1853-1854.
- Smith, Bruce D. "Some Colonial Evidence on Two Theories of Money: Maryland and the Carolinas." *Journal of Political Economy* 93, 1985: 1178-1211.
- Sosin, J. M. *English America and the Revolution of 1688: Royal administration and the Structure of Provincial Government*. University of Nebraska Press, Lincoln. 1982.
- Starr, Ross M. "The Price of Money in a Pure Exchange Monetary Economy with Taxation." *Econometrica* 42, 1974: 45-54.
- Steele, Ian K. *The English Atlantic 1675-1740*. Oxford University Press, Oxford. 1986.
- Sylla, Richard. "Monetary Innovation in America." *Journal of Economic History* 42, 1982: 21-30.
- Toppan, Robert N. "The Dudley Records." *Massachusetts Historical Society Proceedings*, Second Series, vol. XIII, 1899: 226-285.
- Toppan, Robert N. *Edward Randolph*. B. Franklin, New York. 1967.
- Trumbull, J. Hammond, and C. J. Hoadly. *The Public Records of the Colony of Connecticut*. Hartford. 1859.
- Weeden, William B. *Economic and Social History of New England, 1620-1789*. Houghton Mifflin, Boston. 1890.
- Whitmore, William H., ed. *The Andros Tracts*. The Prince Society, Boston. 1868-1874.

Bar-Ilan University
Department of Economics
WORKING PAPERS

- 1-01 **The Optimal Size for a Minority**
Hillel Rapoport and Avi Weiss, January 2001.
- 2-01 **An Application of a Switching Regimes Regression to the Study of Urban Structure**
Gershon Alperovich and Joseph Deutsch, January 2001.
- 3-01 **The Kuznets Curve and the Impact of Various Income Sources on the Link Between Inequality and Development**
Joseph Deutsch and Jacques Silber, February 2001.
- 4-01 **International Asset Allocation: A New Perspective**
Abraham Lioui and Patrice Poncet, February 2001.
- 5-01 **מודל המועדון והקהילה החרדית**
יעקב רוזנברג, פברואר 2001.
- 6-01 **Multi-Generation Model of Immigrant Earnings: Theory and Application**
Gil S. Epstein and Tikva Lecker, February 2001.
- 7-01 **Shattered Rails, Ruined Credit: Financial Fragility and Railroad Operations in the Great Depression**
Daniel A. Schiffman, February 2001.
- 8-01 **Cooperation and Competition in a Duopoly R&D Market**
Damiano Bruno Silipo and Avi Weiss, March 2001.
- 9-01 **A Theory of Immigration Amnesties**
Gil S. Epstein and Avi Weiss, April 2001.
- 10-01 **Dynamic Asset Pricing With Non-Redundant Forwards**
Abraham Lioui and Patrice Poncet, May 2001.

Electronic versions of the papers are available at
http://www.biu.ac.il/soc/ec/wp/working_papers.html

- 11-01 **Macroeconomic and Labor Market Impact of Russian Immigration in Israel**
Sarit Cohen and Chang-Tai Hsieh, May 2001.
- 12-01 **Network Topology and the Efficiency of Equilibrium**
Igal Milchtaich, June 2001.
- 13-01 **General Equilibrium Pricing of Trading Strategy Risk**
Abraham Lioui and Patrice Poncet, July 2001.
- 14-01 **Social Conformity and Child Labor**
Shirit Katav-Herz, July 2001.
- 15-01 **Determinants of Railroad Capital Structure, 1830–1885**
Daniel A. Schiffman, July 2001.
- 16-01 **Political-Legal Institutions and the Railroad Financing Mix, 1885–1929**
Daniel A. Schiffman, September 2001.
- 17-01 **Macroeconomic Instability, Migration, and the Option Value of Education**
Eliakim Katz and Hillel Rapoport, October 2001.
- 18-01 **Property Rights, Theft, and Efficiency: The Biblical Waiver of Fines in the Case of Confessed Theft**
Eliakim Katz and Jacob Rosenberg, November 2001.
- 19-01 **Ethnic Discrimination and the Migration of Skilled Labor**
Frédéric Docquier and Hillel Rapoport, December 2001.
- 1-02 **Can Vocational Education Improve the Wages of Minorities and Disadvantaged Groups? The Case of Israel**
Shoshana Neuman and Adrian Ziderman, February 2002.
- 2-02 **What Can the Price Gap between Branded and Private Label Products Tell Us about Markups?**
Robert Barsky, Mark Bergen, Shantanu Dutta, and Daniel Levy, March 2002.
- 3-02 **Holiday Price Rigidity and Cost of Price Adjustment**
Daniel Levy, Georg Müller, Shantanu Dutta, and Mark Bergen, March 2002.
- 4-02 **Computation of Completely Mixed Equilibrium Payoffs**
Igal Milchtaich, March 2002.

- 5-02 **Coordination and Critical Mass in a Network Market – An Experimental Evaluation**
Amir Etziony and Avi Weiss, March 2002.
- 6-02 **Inviting Competition to Achieve Critical Mass**
Amir Etziony and Avi Weiss, April 2002.
- 7-02 **Credibility, Pre-Production and Inviting Competition in a Network Market**
Amir Etziony and Avi Weiss, April 2002.
- 8-02 **Brain Drain and LDCs' Growth: Winners and Losers**
Michel Beine, Frédéric Docquier, and Hillel Rapoport, April 2002.
- 9-02 **Heterogeneity in Price Rigidity: Evidence from a Case Study Using Micro-Level Data**
Daniel Levy, Shantanu Dutta, and Mark Bergen, April 2002.
- 10-02 **Price Flexibility in Channels of Distribution: Evidence from Scanner Data**
Shantanu Dutta, Mark Bergen, and Daniel Levy, April 2002.
- 11-02 **Acquired Cooperation in Finite-Horizon Dynamic Games**
Igal Milchtaich and Avi Weiss, April 2002.
- 12-02 **Cointegration in Frequency Domain**
Daniel Levy, May 2002.
- 13-02 **Which Voting Rules Elicit Informative Voting?**
Ruth Ben-Yashar and Igal Milchtaich, May 2002.
- 14-02 **Fertility, Non-Altruism and Economic Growth: Industrialization in the Nineteenth Century**
Elise S. Brezis, October 2002.
- 15-02 **Changes in the Recruitment and Education of the Power Elites in Twentieth Century Western Democracies**
Elise S. Brezis and François Crouzet, November 2002.
- 16-02 **On the Typical Spectral Shape of an Economic Variable**
Daniel Levy and Hashem Dezhbakhsh, December 2002.
- 17-02 **International Evidence on Output Fluctuation and Shock Persistence**
Daniel Levy and Hashem Dezhbakhsh, December 2002.

- 1-03 **Topological Conditions for Uniqueness of Equilibrium in Networks**
Igal Milchtaich, March 2003.
- 2-03 **Is the Feldstein-Horioka Puzzle Really a Puzzle?**
Daniel Levy, June 2003.
- 3-03 **Growth and Convergence across the US: Evidence from County-Level Data**
Matthew Higgins, Daniel Levy, and Andrew Young, June 2003.
- 4-03 **Economic Growth and Endogenous Intergenerational Altruism**
Hillel Rapoport and Jean-Pierre Vidal, June 2003.
- 5-03 **Remittances and Inequality: A Dynamic Migration Model**
Frédéric Docquier and Hillel Rapoport, June 2003.
- 6-03 **Sigma Convergence Versus Beta Convergence: Evidence from U.S. County-Level Data**
Andrew T. Young, Matthew J. Higgins, and Daniel Levy, September 2003.
- 7-03 **Managerial and Customer Costs of Price Adjustment: Direct Evidence from Industrial Markets**
Mark J. Zbaracki, Mark Ritson, Daniel Levy, Shantanu Dutta, and Mark Bergen, September 2003.
- 8-03 **First and Second Best Voting Rules in Committees**
Ruth Ben-Yashar and Igal Milchtaich, October 2003.
- 9-03 **Shattering the Myth of Costless Price Changes: Emerging Perspectives on Dynamic Pricing**
Mark Bergen, Shantanu Dutta, Daniel Levy, Mark Ritson, and Mark J. Zbaracki, November 2003.
- 1-04 **Heterogeneity in Convergence Rates and Income Determination across U.S. States: Evidence from County-Level Data**
Andrew T. Young, Matthew J. Higgins, and Daniel Levy, January 2004.
- 2-04 **"The Real Thing:" Nominal Price Rigidity of the Nickel Coke, 1886-1959**
Daniel Levy and Andrew T. Young, February 2004.
- 3-04 **Network Effects and the Dynamics of Migration and Inequality: Theory and Evidence from Mexico**
David McKenzie and Hillel Rapoport, March 2004.

- 4-04 **Migration Selectivity and the Evolution of Spatial Inequality**
Ravi Kanbur and Hillel Rapoport, March 2004.
- 5-04 **Many Types of Human Capital and Many Roles in U.S. Growth: Evidence from County-Level Educational Attainment Data**
Andrew T. Young, Daniel Levy and Matthew J. Higgins, March 2004.
- 6-04 **When Little Things Mean a Lot: On the Inefficiency of Item Pricing Laws**
Mark Bergen, Daniel Levy, Sourav Ray, Paul H. Rubin and Benjamin Zeliger, May 2004.
- 7-04 **Comparative Statics of Altruism and Spite**
Igal Milchtaich, June 2004.
- 8-04 **Asymmetric Price Adjustment in the Small: An Implication of Rational Inattention**
Daniel Levy, Haipeng (Allan) Chen, Sourav Ray and Mark Bergen, July 2004.
- 1-05 **Private Label Price Rigidity during Holiday Periods**
Georg Müller, Mark Bergen, Shantanu Dutta and Daniel Levy, March 2005.
- 2-05 **Asymmetric Wholesale Pricing: Theory and Evidence**
Sourav Ray, Haipeng (Allan) Chen, Mark Bergen and Daniel Levy, March 2005.
- 3-05 **Beyond the Cost of Price Adjustment: Investments in Pricing Capital**
Mark Zbaracki, Mark Bergen, Shantanu Dutta, Daniel Levy and Mark Ritson, May 2005.
- 4-05 **Explicit Evidence on an Implicit Contract**
Andrew T. Young and Daniel Levy, June 2005.
- 5-05 **Popular Perceptions and Political Economy in the Contrived World of Harry Potter**
Avichai Snir and Daniel Levy, September 2005.
- 6-05 **Growth and Convergence across the US: Evidence from County-Level Data (revised version)**
Matthew J. Higgins, Daniel Levy, and Andrew T. Young , September 2005.
- 1-06 **Sigma Convergence Versus Beta Convergence: Evidence from U.S. County-Level Data (revised version)**
Andrew T. Young, Matthew J. Higgins, and Daniel Levy, June 2006.

- 2-06 **Price Rigidity and Flexibility: Recent Theoretical Developments**
Daniel Levy, September 2006.
- 3-06 **The Anatomy of a Price Cut: Discovering Organizational Sources of the Costs of Price Adjustment**
Mark J. Zbaracki, Mark Bergen, and Daniel Levy, September 2006.
- 4-06 **Holiday Non-Price Rigidity and Cost of Adjustment**
Georg Müller, Mark Bergen, Shantanu Dutta, and Daniel Levy.
September 2006.
- 2008-01 **Weighted Congestion Games With Separable Preferences**
Igal Milchtaich, October 2008.
- 2008-02 **Federal, State, and Local Governments: Evaluating their Separate Roles in US Growth**
Andrew T. Young, Daniel Levy, and Matthew J. Higgins, December 2008.
- 2008-03 **Political Profit and the Invention of Modern Currency**
Dror Goldberg, December 2008.