The Problem of Small Change in Early Argentina

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Many economies, during the early stages of monetary development, experienced what appear to be sporadic relative shortfalls of small denomination means of payment. These episodes have been broadly documented in the literature under the label of "shortages of small change." Sargent and Velde (2002), for example, review in great detail the evidence for Europe. Hanson (1979) provides an interesting survey of the evidence for the British colonies in North America. The purpose of this paper is to present evidence of similar events occurring in the early monetary history of Argentina.

The provision of small change in modern economies has become almost a nonissue.[1] In fiat money systems, the monetary authority controls the aggregate supply of monetary balances (of all denominations) and stands ready to exchange at par any denomination for an equivalent amount of any other denomination. It is, then, demand that determines the relative amounts of the different denominations that circulate in the economy. There are, of course, costs of providing the demanded amounts. Low-denomination coins tend to be relatively more costly to produce (at least, per unit of value). Yet, in general, governments in modern societies have considered these costs worthwhile.

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[1] Some high-inflation economies sometimes experience imbalances in their denomination structure, resulting in relative scarcity of small change. The monetary authority becomes reluctant to provide large quantities of low-denomination means of payment, which are relatively costly to produce and, due to high inflation, have a short useful lifespan.

Under a commodity money system it is also possible, in principle, to solve the problem of the relative supply of denominations. Basically, it requires issuing token coins that can be readily exchanged at par with the monetary authority for full-bodied coins.[2] This monetary arrangement is commonly known as the "standard formula" (see Sargent and Velde 2002, 5). For some time, the production of token coins represented a significant technological challenge. Since token coins are worth more than their intrinsic value, counterfeiting is a very profitable activity under the "standard formula" system. To avoid counterfeiting, the coins need to be fairly sophisticated, which increases their production cost. In the history of monetary systems, before the technology for production of coins was well developed, token coins were at best a very imperfect solution to the problem of small change.

When all coins are full-bodied coins, as was the case in Spanish America, the potential for mismatches on the demand and supply of denominations becomes more likely. The minting cost per value is normally lower for high-denomination coins. To the extent that coins circulate at par value (i.e., without discounts), there are incentives to mint only high-denomination coins. The historical record on the shortages of small change is the story of monetary authorities that struggled to sustain the proper mix of (full-bodied) high- and low-denomination coins.

Imperfect private solutions to the shortage problem are possible. For example, coins could be cut in portions to circumvent the indivisibility barrier. Also, small change can be offered at a premium. However, all these partial solutions bring forth the problems that arise when high- and low-denomination coins do not exchange in convenient and fixed ratios. These issues are most relevant in cases where the need for small change originates in domestic transactions. Systematic negotiation over discounts and measurement of effective coin weight, in this case, involve very low-value amounts, most likely not worth the trouble.

In Search of a Formal Definition

Providing a precise theoretical definition of a shortage of small change is no simple matter. Sargent and Velde (1999; 2002) consider a model where low-denomination money can be used for "small" and "large" transactions but high-denomination money can only be used for "large" transactions. They then define a "shortage" as a situation where the agents in the economy have to adjust their consumption pattern to their holdings of low-denomination money while, at the same time, holding an "excess" stock of the high-denomination

[2] A full-bodied coin is one that has metallic content worth as much as the coin's face value. Token coins are subsidiary coins that have lower intrinsic value than the value at which they can be exchanged with the monetary authority for full-bodied coins.

money. In other words, at the time of consumption decisions, the agent's holdings of low-denomination money act as a binding constraint (see Rolnick and Weber [2003] for a good summary).

Such a definition provides an interesting prediction that can potentially be confronted with the data. Basically, shortages of low-denomination money (as defined by Sargent and Velde) coincide with the persistent depreciation of low-denomination money relative to high-denomination money. The economic intuition for this result is simple. During shortages, low-denomination money is effectively more useful in transactions than high-denomination money. However, both monies are being voluntarily held by agents. For this situation to be an equilibrium, the low-denomination money has to be losing value with respect to the high-denomination money. In other words, while low-denomination money is more useful in transactions, its value is depreciating with time. The two effects offset each other in equilibrium and leave agents indifferent (at the margin) between holding low- and high-denomination money.[3]

Wallace (2003) strongly criticizes Sargent and Velde's definition. Wallace points out that the historical "shortages are reports by contemporaries concerning the difficulty of carrying out trade in the face of a sudden disappearance of some kinds of coins." However, in Sargent and Velde's model, agents are "freely choosing quantities while taking prices as given," and "nothing in the model looks like a shortage or a disruption of trade."

Wallace goes on to discuss what is, in his view, at the heart of the problem of small change. He starts by specifying the four desirable properties of a medium of exchange: portability, divisibility, durability, and recognizability; and he describes the history of coinage as "mainly about the technological difficulties of achieving a full-bodied coinage system that comes close to having those attributes." Formal economic analyses that explicitly model *all four* attributes of a medium of exchange and study the denomination structure of money are not readily available. Wallace (2003) provides an introduction to the formal treatment of these matters within the framework provided by the random matching models of money pioneered by Kiyotaki and Wright (1989).[4] He discusses how the indivisibility of coins, for example, could limit the set of transactions that agents undertake and how such limitations would clearly be perceived as shortages of small change by the agents in the model. These are interesting theoretical avenues that should eventually improve our understanding of the historical records.

The objective of this article is not to answer the theoretical questions that surround the issue of the appropriate provision of small change. Those

[3] Sargent and Velde (2002) do, in fact, find some supporting evidence for this hypothesis in their review of the historical record of many European countries. Unfortunately, as we will later see, such an evaluation is not possible with the data available for the colonial period in South America.

[4] See also Wallace and Zhou (1997) and Lee, Wallace, and Zhu (2005).

are difficult questions that involve theoretical concepts that are not yet well understood in the literature and require much further study. Here, instead, we will limit ourselves to reviewing the historical evidence that indicates that the availability of small change was a problem around the turn of the 18th century in the region that is today Argentina. As noted above, similar evidence is available for other parts of the world. However, in view of the intricate nature of the problem involved, it seems important to collect and analyze as much evidence as possible on this matter.

A Caveat

Before turning to the main subject of the article, a general clarification is in order. When reading the historical records, one has to be especially careful in differentiating the scarcity of means of payment from the general scarcity of resources prevailing in the area. The confusion between those two different phenomena was common at the time (for example, official resolutions would sometimes associate the general scarcity of resources with the inability to issue coins).[5] The territory of Argentina was relatively poor at the end of the 18th and the beginning of the 19th centuries and it relied on imports from Europe for many essential needs. Furthermore, the recurrent military conflicts at the beginning of the 1800s only contributed to further reducing the availability of economic resources. But the general stringency of resources is not the subject of this article. Instead, I intend to report evidence that suggests that the relative scarcity of certain means of payment, and in particular *fractional* money, constituted a problem in itself.

The remainder of the article is organized as follows. In the next section, I discuss the evidence from 1776 to the 1810 Revolution, that is, the latter part of the colonial period. Classic manifestations of the scarcity of small change appear in this period: attempts by the government to ban the export of fractional money; extreme difficulties in persuading the population to remint low-quality, low-denomination coins; and the development of imperfect substitutes for use in payment of small transactions are among the main ones being reviewed. In Section 2, I present evidence that suggests that the shortage of small change continued to be a problem during the 15 years after the revolution. I explain how the government struggled with the decision to issue copper coins for 10 years, and how it finally injected the coins in 1823 with great initial success. Also, in 1822 the first bank in the region was created and allowed to issue notes of moderate denominations after some initial reluctance. I discuss the genesis of that decision in some detail. To conclude, in Section 3, I provide

[5] Supple (1957, 244–45) reports that this kind of confusion was also common in 17th century England.

some further discussion of the economic issues highlighted by the evidence discussed.

1. EVIDENCE FROM THE PERIOD OF THE VICEROYALTY OF THE RIO DE LA PLATA

Spanish settlers were in the area that is today Argentina since the mid-1500s. For the early colonial period, the available evidence indicates that there was no widespread monetary exchange occurring in the region and that instead barter was the predominant way of exchange (Prebisch 1921, 193; Elía 1942a, 416). Since the beginning of colonization, Spain implemented a system of international trade restrictions in the colonies. The port of Buenos Aires could only trade with Spain and such trade was subject to heavy taxation. These restrictions significantly slowed down economic development for more than two hundred years. Only in 1776, with the creation of the Viceroyalty of the Rio de la Plata, the representative of the king, Viceroy Ceballos, declared free trade in the port of Buenos Aires.[6] As a result, a significant increase in the level of internal and external trade took place in Buenos Aires and its area of influence.

During most of the early colonial period, Buenos Aires maintained a trade deficit with Spain. This deficit resulted in a constant outflow of gold and silver (in the form of coins, bars, and silverware).[7] Coins came to Buenos Aires from the regions of Upper Peru (the area occupied today by Bolivia and Peru). The Royal Villa of Potosí was the major center of economic activity in Upper Peru, with its adjacent silver mines and the regional mint house. Smuggling of European linen and relatively inexpensive Brazilian products was common in the port of Buenos Aires. Most of these products were sent to Upper Peru to be sold in exchange for gold and silver coins. The proceeds, especially high-quality coins, were then exported to Europe via Buenos Aires.

The constant outflow of coins from the port of Buenos Aires was perceived as creating significant liquidity problems in the area of the Rio de la Plata (Elía 1942a, 420–21). For example, as a result of numerous local complaints, in October 1618 the King of Spain passed a resolution allowing these colonies to use "products of the land" (instead of gold and silver coins) to pay the "Indies taxes" (Elía 1942a, 418).[8] Interestingly, there is very similar evidence of

[6] Before 1776, the colonies of the Rio de la Plata were under the control of the representative of the king residing in the Peruvian area.

[7] Halperín Donghi (1972, 48) reports that exports of gold and silver from Buenos Aires amounted to about 80 percent of total exports in 1796.

[8] Also, in 1622, in an attempt to stop the outflow of precious metals from Upper Peru, the Spanish Crown created the customs of Córdoba, an inland post that was supposed to control all trade between the port of Buenos Aires and the highland regions in the northwest (Upper Peru). The effectiveness of this measure was undermined by rampant smuggling.

perceived shortages of specie in colonial Canada at the end of the 18th century. Redish (1984) argues that these common complaints about a *general* scarcity of specie in Canada should really be interpreted as reflecting the discomfort of merchants with what was actually a scarcity of *high-quality* coins. Redish provides evidence indicating that most of the coins in circulation in late 1700s Canada were old coins whose weight had been reduced by intentional clipping or sweating (and the normal wear and tear of very old coins), i.e., low-quality coins. The idea behind Redish's interpretation is that, in accordance with modern versions of Gresham's Law, low-quality coins tended to drive high-quality coins out of circulation.[9]

In principle, it seems that Redish's hypothesis could be applicable for interpreting the complaints about general scarcity of specie during the early colonial period of Argentina. However, more research is needed in this area before reaching a more definite conclusion. Here, though, the focus will be on trying to identify situations where the shortage could be associated exclusively to low-denomination media of exchange, and I will restrict my study to only the latter part of the colonial period (that is, since the creation of the Viceroyalty of the Rio de la Plata in 1776).

The Monetary System

The foundations of the monetary system in the Viceroyalty of the Rio de la Plata resembled those of the system in place in Spain at the time. Basically, there were in circulation gold and silver coins minted in Spain, Mexico, and Peru. The two main mints in the Spanish colonies of South America were located in Lima and Potosí. Most of the coins circulating in the territories of the Rio de la Plata (today Argentina) were silver coins minted in Potosí (Elía 1942a, 429).

The Potosí mint was under the direct control of the Spanish Crown, which held a monopoly for issuing coins. Mining, on the other hand, was a private enterprise. The Crown, though, provided miners with most of the essential inputs and heavily taxed their production. One of the most notorious institutions of the time was the *mita*, an annual recruitment of forced Indian labor that was assigned to the different miners according to a system of concessions. In 1779 the Spanish Crown created the *Banco de San Carlos* that provided credit and other basic inputs to miners in Potosí and monopolized the purchase

[9] Sargent and Velde (2002, 125) discuss the "bullion famine" of medieval Europe in the context of their model and also conclude that talking about general shortages of coins is difficult to rationalize. Instead, they maintain that the monetary anomalies involved were the consequences of shortages of small change.

Figure 1 Silver Pesos Minted in Potosí Between 1767–1770

Source: http://www.historiadelpais.com.ar/

of silver in the region (Tandeter 1992, 198–99). The *diezmo*, a 10 percent tax, was charged on all silver production.

The mint issued coins according to general orders from the Spanish Crown.[10] The relative supply of different denominations of coins was in principle determined by directives from Spain and decisions by the mint's administrators (part of the Crown's bureaucracy). Under this scheme the supply of fractional money, in principle, did not automatically adjust to its demand, and imbalances became common.[11] During the second half of the 18th century, a system of two-year concessions was instituted for the administration of the mints on behalf of the Crown. The concession contracts stipulated targets for the cost of production and the proportion of fractional money to be minted (Dargent Chamot 2005, Ch. 15).

There were two types of silver coins in circulation at the time of the creation of the Viceroyalty: the coins called *de cordoncillo* and the older, hammered coins (or cobs) called *macuquina*. The coin de cordoncillo had the edges marked to prevent clipping and the macuquina had variations in thickness, weight, and shape, making it a coin of mediocre quality. The macuquina had been in circulation since the time when hammering was the common minting practice (in Potosí, from 1575 until 1773). In principle, both coins de cordoncillo and macuquina of all existing denominations were in circulation.

[10] Romano (1998, 133) reports that the original 16th century royal ordinances creating the mints in Mexico and Peru, including the one in Potosí, stated explicitly the rules for the proportions of the different denomination of coins to be minted. In particular, only a fourth of the coins were supposed to be of low denomination. These original orders, though, were not always strictly followed and changed over time.

[11] In an alternative scheme called "free minting," private agents holding silver or gold are able to go to the mint and exchange their metal for coins of the denomination of their choice. This scheme was predominant in Europe (see Sargent and Velde 2002, 20).

Table 1 Silver Coins—Main Denominations

Cuartillo	1/4 real
Medio Real	1/2 real
Real	
Real de a Dos	2 reals
Medio Peso	4 reals
Peso	8 reals

However, a high proportion of the stock of circulating low-denomination coins were macuquina, as these were the coins that had been minted for a longer period of time.[12]

The high-denomination, full-bodied silver coins were commonly called *plata doble* and the low-denomination coins, *plata sencilla* (Bonura 1992, 40; Tandeter 1992, 157). Most plata sencilla was of the macuquina type and not full-bodied (due to intentional clipping and the normal wear and tear resulting from their use and age). The plata doble, on the other hand, were mostly high-quality, full-bodied silver coins that were relatively scarce and especially useful for payments of imported goods from Spain.

In terms of the denomination structure, the main denominations were the *peso*, also called *peso fuerte* and the *real* with a nominal value of one-eighth of the peso. There were also coins of half, two, and four reals (Elía 1942a, 432). *Cuartillos,* coins of one-fourth of a real, were only minted in Potosí after 1794 and in very small quantities (Dargent Chamot 2005, Ch. 17).

Gold coins were very scarce in the area and of relatively high purchasing power. The most common gold coin was the doubloon of eight, which was equivalent to approximately 16 silver pesos and was mostly used for international trade and hoarding. Overall, gold coins were not used in small domestic transactions, and for this reason they play no major role in the discussion that follows.

In 18th century Spain, small change was partly provided by the issuing of *vellón*, a low-denomination coin made with a mixture of copper and small quantities of silver. According to Bonura (1992, 39–40), the vellón did not circulate in the region of the Rio de La Plata (see also, Cortés Conde and McCandless 2001, 384). These token coins were not commonly minted in Potosí, probably because of their high minting costs and an alleged (yet, somewhat surprising) reluctance of the general population to accept them in exchange. Interestingly, Romano (1998, 133) reports extensively on a similar

[12] Low-denomination coins were minted in relatively low proportions and, hence, most of the stock in circulation was fairly old. High-denomination coins were minted more intensively and were exported in large proportions, resulting in a stock with a lower average age.

phenomenon taking place in colonial Mexico (see also Hamilton 1944, 35). The reason for this phenomenon, however, is not yet well understood.[13]

The Problem of Small Change

On several occasions between 1770 and 1810, the local elites complained to the Crown about the shortage of small change. In 1773 the king, partly as an attempt to deal with the scarcity of small change, banned any export of fractional money from the colonies. Specifically, the king prohibited the shipment of pieces of half, one, and two reals to Spain and instructed the Viceroys to intensify their efforts to ensure that the royal mints coin enough silver in those denominations "for the vast commerce of America" (Hamilton 1944, 37).[14]

The macuquina was heavily used in domestic transactions, usually circulating at par value. However, its poor quality complicated its normal use and generated many complaints among the locals.[15] Its irregular shape made the macuquina very susceptible to clipping, creating uncertainty about its intrinsic value. Furthermore, by 1784 all circulating macuquina was at least ten years old (hammered coins were last produced in Potosí around 1773) and, hence, in very bad shape. At that time, the king issued an order to collect and remint all the macuquina in the colonies. After five years, in 1789 the order was reissued, allowing for a fixed two-year period to complete the process. In fact, after those two years, Viceroy Arredondo again postponed the recovery period with no explicit time limit. This process suggests that the officials in the colonies were reluctant to enforce the order to remint the macuquina as they perceived that doing so would only aggravate the shortage of small change. In fact, during the same period, Viceroy Arredondo proposed the creation of a token coin to be used in domestic trade. He explicitly pointed to the scarcity of small change as a justification. The Spanish Crown denied the proposal and instead ordered that all mint houses in the area start minting cuartillos (Elía 1942a, 425–26; Dargent Chamot 2005, Ch. 15).

[13] Vellón was issued in colonial Mexico in 1542 and the general population refused to accept it. The experiment was a complete failure. Hamilton (1944, 36) argues that the vellón was so grossly overvalued that the population preferred to continue using cocoa beans as a mean of payment. Romano (1998, 134–35), instead, suggests that the local elites actually opposed the issuing of vellón based on political motivations. The reason vellón was not issued in the Spanish colonies in America is an unanswered question in the literature.

[14] Butlin (1953, 81–82) reports that the government in Australia (a British colony) used similar legal instruments to avoid the export of coins in 1813. Sargent and Velde (2002) report legal restrictions on the export of coins in medieval England (p. 132) and in Venice on May 1268 (p. 163). See Wallace and Zhou (1997) for a rationalization of this type of official restriction.

[15] See Hamilton (1944, 25–26) for an account of similar problems in the area of colonial Mexico.

The nature of the small change problem was twofold. First, low-denomination coins (that is, coins of two reals or less) were minted in significantly smaller proportions than the silver pesos; and second, the purchasing power of the lowest-denomination coin was very high.[16]

In terms of the relative amounts of low-denomination coins that were minted in Potosí, Tandeter (1992, 157) reports that, in the mid-1700s, 85 percent of the minting was done in plata doble (i.e., coins of four reals and higher). By the same token, Romano (1998, 117) explains that most of the coins minted in the Spanish colonies in America during the 18th century were of high denomination, with the eight-real (peso) pieces amounting to at least 95 percent of the annual issues of silver coins both in Mexico and in Peru.[17] Dargent Chamot (2005, Ch. 15) reports the reluctance of the Superintendent of the mint of Potosí in 1784 to issue large quantities of cuartillos, considering them too costly to produce. In general, cuartillos were issued in very limited amounts, and only later in the period (in Potosí, starting only in 1794).[18]

One way to get an idea of the high purchasing power of the denomination structure that was predominant in the region is to compare the value of silver coins with the level of nominal wages for unskilled rural workers. For example, at the time, a slave in the rural areas near Buenos Aires would normally receive an allowance of one real per week to buy "soap and tobacco." A free rural seasonal worker (a peon) had an average wage of around four pesos per month (although monthly wages fluctuated significantly across workers, from two to seven pesos; see Amaral 1987, 267–72). This monthly wage implied a daily wage of around one-and-a-half reals that amounted to three coins of half real, which was effectively the smallest denomination coin. A similar situation took place in the early stages of other monetary systems. For example, Hanson (1979, 283) reports that, of the common coins in circulation in Pennsylvania and Massachusetts (both British colonies) in 1742, the lowest-denomination coin represented about three days' wages for an unskilled laborer at the time.

Some Consequences

The lack of small-denomination coins resulted in the use of unofficial means of payment in everyday transactions (Bonura 1992, 40). One of these instruments, the *contraseñas*, became very popular. Contraseñas were small metal (tin) discs with the initials of the issuer printed on them (Elía 1942a, 428;

[16] Bonura (1992, 39) recognizes the relatively high purchasing power of the cuartillo and finds it puzzling that no lower-denomination coins were issued before 1794.

[17] The proportion of low-denomination coins *in circulation* was probably higher since high-denomination coins were more intensively exported.

[18] Starting in 1793, cuartillos were also minted in colonial Mexico. According to Hamilton (1944, 38), the cuartillos were "too small for convenient use and struck in inadequate quantities" and, hence, "did not end the disorder in the fractional coinage."

Prebisch 1921, 199). In everyday transactions requiring small change that the parties (buyer and seller) lack, the buyer could make payments in two possible ways. One way was to pay using contraseñas previously issued by the particular merchant participating in the transaction, in which case the transaction would terminate with the payment. The other way was for the buyer to pay in high-denomination silver coins. In this case, when necessary, the change resulting from the transaction would be provided in contraseñas issued by the seller. Sometimes, even the contraseñas issued by a third party were used as change. In general, the third party was a well-known merchant in the area and the individuals engaged in the transaction were holding his contraseñas as a result of previous transactions.[19]

The use of contraseñas did not, of course, solve all the problems. In fact, their extensive use resulted in widespread fraud and falsification. Later on, contraseñas were gradually substituted with private IOUs issued directly on paper.[20] These IOUs were inconvertible and also circulated widely in the region (Prebisch 1921, 199). They are a precursor of the inconvertible paper money that was introduced in the region more than a decade after the 1810 Revolution.[21]

Another way people circumvented the lack of small change was by developing even simpler credit arrangements. Customers would build up a debit at the community store until it was possible to settle the payment using higher-denomination coins that were more readily available (Schmit 2003, 265). Obviously, the use of this kind of informal credit was limited to cases where the owner of the store was relatively certain that the customer had reasons to secure a permanent relationship with the store.

The Premium

There is some evidence that in the City of Buenos Aires during colonial times, the hard peso sometimes circulated at a premium over fiduciary silver coins, i.e., the low-denomination, usually not full-bodied plata sencilla (Prebisch

[19] In colonial Mexico, it was popular to use for payments small wooden disks with the name of the issuer (a merchant) printed on them. These disks were called *tlacos* and they emerged in response to the recurrent shortages of small change that took place in the Mexican territory during the 18th century (Romano 1998, 137; Hamilton 1944, 36–38). Tin-made tokens with similar characteristics as the contraseñas circulated in England in 1576 (Sargent and Velde 2002, 266).

[20] Butlin (1953, 26–27) describes privately issued *promissory notes* that circulated in Australia during the colonial period and the rampant forgery that originated around them.

[21] Hanson (1979, 285) convincingly argues that the origin of paper currency in the colonies of North America was the result of the persistent shortages of low-denomination coins. He provides evidence of the issuance of private circulating notes by merchants early in the process. Sargent and Velde (2002, 203) discuss evidence from 1577 France that documents the widespread use of private IOUs in response to the shortages of small change.

1921, 195; Bonura 1992, 40–41).[22] Interestingly, the premium was lower (and even zero) in the periphery (the *interior*), creating a flow of plata sencilla from Buenos Aires to those regions.[23] In 1790 the authorities in Buenos Aires asked the Crown to introduce legal restrictions to abolish "the 3 percent premium of the hard peso." In 1798, after the Crown did not respond, the request was reiterated. The main justification for the request was the constant flow of fractional coins out of Buenos Aires to the interior. The official document stated that this flow had "reduced the quantity of small-denomination coins, . . . creating difficulties in the change or reduction of the plata doble to the sencilla . . . the specie so necessary for making small daily purchases, which are very indispensable transactions" (see Bonura 1992, 41).[24]

With respect to the evolution of the premium over time, it appears that the premium was fairly constant. Bonura (1992, 49), for example, reports that the premium was still around 3 percent in 1812, when the authorities in Buenos Aires engaged in another legal attempt to reduce it. Sargent and Velde (2002) associate periods of shortages of small change with periods of depreciation in the value of fractional money. The evidence from Argentina is too sparse to test this hypothesis (but, in principle, no clear trend in the premium was observed in the region).

2. EVIDENCE FROM EARLY ARGENTINA

In 1810, the *Cabildo* (the town council) of Buenos Aires declared autonomy from the Spanish Crown. With the end of the Viceroyalty of the Rio de la Plata, Buenos Aires lost Upper Peru from its area of influence; and with Upper Peru, the mint of Potosí and the silver mines.[25]

This transitional period was associated with general monetary disarray in the region. The confrontation with Upper Peru (which had remained loyal to the Crown) and the necessary financing of military expenses (including significant imports that needed to be paid in specie) created a sharp contraction in the amount of available means of payment in Buenos Aires (Prebisch 1921, 198). During this period, many government officials proposed a compulsory

[22] Tandeter (1992, 157) reports that the plata doble had a premium over the plata sencilla in the Villa of Potosí in the mid-1700s. He attributes the premium to the fact that the plata doble was the one preferred in long-distance trade.

[23] This kind of geographic dispersion in the exchange rate of coins was also observed across the French territory during the 1570s, a period of monetary "chaos" (Sargent and Velde 2002, 200).

[24] In principle, one would expect shortages of small change to be associated with, if anything, a premium on low-denomination coins. This is the opposite of what is reported here. It seems likely, however, that the premium was not uniform across transactions, and that the 3 percent premium on hard pesos was predominant only in large-value transactions and international trade.

[25] For a good overview of the economic factors that led to the breakup of the Viceroyalty into different countries, see Cortés Conde and McCandless (2001).

remint of all the old coins in circulation. Furthermore, some of these proposals included the imposition of a steep proportional tax upon reminting. In view of these proposals, it seems that hiding and hoarding coins was a natural reaction of the population.

The new government made several attempts at issuing new coins during this period. In 1813, after temporarily recovering the city of Potosí, the first Argentinean coin was minted. A year later, however, the Independence Army lost Potosí to royal forces and the minting stopped.[26] Some minting of silver pesos took place in the province of Córdoba during 1815, but in very limited amounts (Elía 1942a, 433). At that time, illegal private minting of cobs and other (very low quality) silver counterfeits was common in the northwest region of the country (Bonura 1992, 73). In 1817 Governor Güemes officially authorized the circulation of "illegal" coins (after being officially stamped) in the territory under his jurisdiction in the northwest part of the country. He gave as a justification for this resolution the "evils associated with the lack of means of payment" (Elía 1942a, 435). A year later, the federal authority banned the circulation of these "Güemes" coins, establishing a severe punishment for those who accepted and/or held them. Overall, no real progress was made in providing the economy with appropriate means of payment during the first decade after the revolution (Bonura 1992, 81).

Besides the general monetary disorder, some specific episodes suggest the existence of shortages of fractional money. In this respect, two situations appear most relevant: the provision of copper coins approved in 1821 after several years of discussions and the authorization granted to the Bank of Buenos Aires to issue paper notes of relatively low denomination in 1823.[27]

Copper Coins

In June 1815 the newly created government in Buenos Aires started evaluating the introduction of "provisional money" in the form of copper coins (Bonura 1992, 61). For this purpose, the government commissioned an extraordinary consulting body of experts to study the issue. The authority's motivation for the introduction of these coins was twofold. The first was that shortages of small change were a recurrent problem that needed to be fixed. In August 1815 the body of experts presented a detailed report in which they unanimously agreed

[26] Minting of Argentinean coins in Potosí resumed for a short period in 1815.

[27] Experiences in other countries influenced these two decisions. For example, the general perception in Buenos Aires was that copper coins were being used with great success in Portugal (Bonura 1992, 77). With respect to banking, reports of the benefits associated with the operation of the Bank of England were one of the main motivations for the creation of the Bank of Buenos Aires (Prebisch 1921, 199–200).

Figure 2 Copper Coin Minted at Boulton's Mint

http://www.camoar.gov.ar/CecasProvinciales.htm

that introducing copper coins was essential for eliminating the inconveniences resulting from the persistent lack of small change (Bonura 1992, 65).

The second motivation was the possibility of obtaining extra resources for a government that was in desperate need of financing.[28] This issue was the subject of important disagreement among experts. They discussed the estimated costs of minting copper coins extensively, but they did not reach an agreement, so the implementation was postponed (Bonura 1992, 65). Sporadically, during the next five years, the government authorities in Buenos Aires revisited the possibility of issuing copper coins but never managed to implement the idea.[29]

Finally, in October 1821, a law was passed allowing the government to arrange the minting of 100,000 pesos in copper coins of one-tenth of a real (Elía 1942a, 437). These coins, the first Argentinean copper coins, were minted in Birmingham, England (at Boulton's mint). Fifty thousand pesos of those coins were received and put into circulation in July 1823.[30] Elía (1942a,

[28] Token coins are usually circulated at a value greater than their intrinsic value. For this reason, they have the potential to become a source of revenue for the monetary authority. During 1817, the government was evaluating the possibility of opening a mint in the city of Córdoba. After concluding that the project would not be profitable for the government, the idea was abandoned. The evidence seems to indicate that there was a problem of insufficient scale of production. Apparently, the set-up costs of operating a mint were very high, and the quantity of metal available from the mines of Famatina, the planned source of basic input, was not enough to make the enterprise profitable (Bonura 1992, 72).

[29] The issue of minting copper coins was again extensively discussed in 1818 when the new government was evaluating the possibility of establishing an official mint in Buenos Aires (Bonura 1992, 75).

[30] To put some perspective on these numbers, note, for example, that in 1923 total tax revenue for the province of Buenos Aires was around two million pesos (see Bordo and Vegh 2002,

437) reports that the public immediately absorbed that first lot of coins and the government then requested that the Birmingham mint deliver the rest of the coins as soon as possible. Both the small denomination of these copper coins and their generalized acceptance by the public seem indicative of the high level of unsatisfied demand for fractional money that existed during that period.[31]

Paper Money

In June 1822 the government in Buenos Aires gave a group of local businessmen an exclusive 20-year concession to create the first (and only) bank in the region. The Bank of Buenos Aires (also called *Banco de Descuentos*) was supposed to be fully funded with private capital. Part of the government's justification for allowing the creation of the Bank was the need to provide appropriate means of payment to the community (Irigoin 2003, 65).[32] Trade liberalization after the revolution resulted in a substantial increase in commercial activity, in turn creating the urgent need for more developed monetary and financial institutions in the region.

However, this was not the only motivation for the creation of the Bank. In fact, there is some evidence indicating that the primary reason was to allow the government to access cheaper financing. By 1822 the government was heavily involved in a civil war and was quickly running out of resources (Prebisch 1921, 201). The plan was that the government would take loans from the bank at preferential rates.

Some of the factors that triggered the creation of the Bank of Buenos Aires seem indicative of the persistent shortage of low-denomination money. First, from discussions at the time it is clear that private IOUs (*vales*) and contraseñas were still in circulation when the Bank was created in 1822 (Elía 1942b, 323; Prebisch 1921, 199; Irigoin 2003, 65). The use of vales and contraseñas can be taken as evidence of the need for fractional money. To the extent that parties in a transaction were willing to accept these very imperfect means of payment, which were clearly associated with significant risk of fraud

Table 1). In other words, the gross revenue from the introduction of this first batch of copper coins in 1823 was about 2.5 percent of total annual tax revenue.

[31] The circulation of token coins was never automatic in the early stages of monetary development. It often happened that the population, accustomed to full-bodied coinage, distrusted the validity of token copper coins as an acceptable means of payment. See Butlin (1953, 37) for the case of Australia and Sargent and Velde (2002, 210) for the case of France in the 1590s (see also footnote 13 in this paper). Of course, counterfeiting was always a potential problem in the case of circulating token coins (see, for example, Sargent and Velde 2002, 217–18). The fact that these first copper coins were minted in England using frontier technology at the time probably reduced the risk of counterfeiting making the coins more likely to circulate.

[32] Redish (1984) reports that a similar justification was used at the time of the creation of the first Canadian banks at the beginning of the 19th century.

and counterfeiting, it must be the case that no better payment methods were available (Prebisch 1921, 199).

Second, while initially the Bank of Buenos Aires was only allowed to issue notes in denominations no lower than 20 hard pesos, in mid-1823 the government agreed to authorize the Bank to start issuing lower-denomination bills. These bills came to replace some Treasury notes of similar denomination that the Ministry of Finance had introduced only months before. The Bank issued bills of one, three, and five hard pesos, convertible to gold and silver coins upon presentation at the Bank's window (Elía 1942b, 326). While these denominations were not, by any means, the lowest of the prevailing structure, they were commonly used in domestic transactions. Also, they were probably considered the natural intermediate step in the move toward lower denominations.

During the first two years of its existence, the Bank issued convertible money notes well in excess of its reserves of gold and silver that resulted in a confidence crisis in 1825. Early in 1826, the Bank was taken over by the government and its money notes were declared inconvertible. The notes stayed in circulation but only based upon government fiat. The perceived insufficiency of means of payment prevailing in the region was then replaced by excessive printing of inconvertible paper money. A regime of high inflation followed, which lasted for many decades.[33]

3. FINAL REMARKS

In this article I reviewed evidence that suggests that shortages of small change were a problem in the economy of the Rio de la Plata area during the colonial period and the first two decades after independence. Evidence of this sort is already available for several other regions around the world. It is interesting

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[33] After 1825 the authorities in both Bolivia and Buenos Aires started a period of sustained monetary expansion and inflation (Irigoin 2003, 60). In Bolivia, the minting and systematic debasement of silver coins (*moneda feble*) was the main fiscal instrument of the new government. These coins circulated also in the northwest regions of Argentina. In Buenos Aires, the government printed large amounts of inconvertible paper money to finance increasing fiscal deficits. The paper peso depreciated around 200 percent during 1826 and continued depreciating in the following years. For a detailed discussion of the monetary history of Argentina during this period, see Irigoin (2003), Bordo and Végh (2002), and Irigoin (2000). In general, the paper money from Buenos Aires did not circulate in the provinces. In the interior of the country, several provincial governments attempted to issue their own paper money but faced substantial problems in inducing its circulation, as the general population deeply mistrusted the viability of fiat money. In 1826 the province of Corrientes issued 3,000 hard pesos in low-denomination notes, but acceptance was limited and the experiment became a complete failure (Irigoin 2003, 67). Sometimes the government introduced extreme legislation to try to encourage the circulation of the money notes. For example, in 1840 the provincial authority in Tucumán instituted the death penalty for those not accepting in exchange the paper money printed by the Northern League, a coalition of northwestern provinces (Halperín Donghi 1979, 91).

to verify that a similar monetary phenomenon took place in Argentina during the early stages of its political and economic development.

Several features made the evidence presented here especially interesting. First, while most of the European evidence comes from economies where free minting was in place, in Argentina during the late colonial period the supply of coins was under the direct control of the Spanish Crown. Minting policies, then, were not uniquely directed to improve the smooth functioning of the monetary economy in the colonies. Spain was the main provider of high-quality silver coins to the rest of Europe during that time. For this reason, a major motivation for the Crown's policies was to maintain an international reputation of high quality for Spanish coins. These competing objectives probably increased the chances of misalignments between demand and supply of denominations.

Second, the evidence clearly illustrates the interaction between money and credit during the early stages of monetary development. To bypass the problem of small change, agents in the economy developed rudimentary credit arrangements that allowed them to trade with one another. Two schemes were prevalent. In one scheme, the buyer would extend credit to the seller through the use of contraseñas; in the other, the seller would grant credit to the buyers by allowing them to accumulate a debit in a temporary account. It is a general principle in monetary economics that money and credit act as close substitutes. In general, however, the emphasis has been on explaining how monetary exchange increases the trading possibilities in an economy where credit is not always feasible (as in Kiyotaki and Wright 1993). The evidence presented here highlights the reciprocal fact that when the convenience of monetary exchange is undermined by, in this case, the lack of small change, agents turn to imperfect credit arrangements to carry out their economic transactions. (See Jin and Temzelides [2004] and Cuadras-Morató [2005] for a formal discussion of some of these issues.)

Finally, it was interesting to see the newly created government confronting all the basic economic issues involved in the provision of small change when deciding to introduce copper coins. On one hand, effective fractional coins needed to be of relatively high quality to avoid counterfeiting. On the other hand, high-quality, low-denomination coins were very costly to produce. The government realized that only a large scale of production could lower the unitary cost of production to an acceptable level. The lack of sufficient mineral input delayed production of copper coins for several years. In the end, the government resorted to importing the coins from England, an international producer of coins for which scale of production was obviously not an issue.

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