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ABSTRACT

The huge and accelerating Castilian copper money stock drove silver out of domestic monetary circulation by mid-1620s and caused a substantial silver premium. In 1626, 1627 and 1628 the Castilian government implemented several deflationary monetary reforms intented to eliminate the silver premium and to halt inflation. This paper describes such reforms and analyze their results. We document that their lack of success can be traced to the existence at the time of self-fulfilling expectations about their failure on the part of the public.

JEL Classification: N23, N43

Keywords: commodity money, monetary reforms, Castilian billon inflation

José I. García de Paso Departamento de Análisis Económico Facultad de Ciencias Económicas Universidad Complutense (Somosaguas) 28223 Madrid Spain E-mail: jipaso@wanadoo.es There has been a recent outburst of interest in academic circles about the monetary history of 17th century Spain (Castile) spurred by the work of Motomura (1994, 1997). In these papers, he presents some Castilian mint output and seigniorage data for the first half of 17th century and interprets these data as being consistent with a modern quantity view of the evolution of nominal prices. Velde and Weber (1997) present a good chronological summary of the monetary events for the period 1598-1680. Moreover, Sargent and Velde (1999) have built a commodity money model, a variant of which they use to interpret Castilian monetary data for the period 1598-1628.

Sargent and Velde's (1999) monetary model explains why episodical huge increases of petty money issues (copper coinage) beginning in 1597, but accelerating after July 1617, pushed silver money out of Castilian domestic monetary circulation by mid-1620s. As a result, silver was traded at a rather small premium over copper from 1603 to 1619, but then the silver premium accelerated, reaching 1.84 on August 7, 1628. On that day the government cried down all copper currency by a proportion of one-half to eliminate the silver premium but its attempt was not successful, since the silver premium did not disappear and silver currency did not return to the domestic monetary circuits.

In Sargent and Velde's words (p. 157):

"This regime is useful in understanding certain monetary experiments, particularly that undertaken by the government of Castile in the seventeenth century... In that experiment, a conversion of full-bodied pennies [copper currency] to token..., led to a complete replacement of the [silver] money supply with pennies, followed by redenominations as the government struggled to gain control of the price level".

Their "Castilian" model could be thought of as incorporating demands for and supplies of silver and copper coins. In addition, the government mints exogenously huge volumes of copper coins, which eventually lead to rising prices (in copper terms), to a premium of silver maravedis (1) in terms of copper maravedis and to the crowding-out of silver from domestic monetary circulation. Once silver has disappeared, the Castilian economy became a standard cash-in-advance fiat currency one, with its price level being governed by a copper currency quantity theory.

In that context, further issues of copper currency (in order to raise seigniorage revenues for the government) result in rising prices (in copper terms) and silver premia. If the government tries to eliminate the silver premium and to reduce the price level, it can do so by reducing the nominal stock of copper currency through an overnight redenomination of the copper coinage. Being a standard cash-in-advance fiduciary economy, if the government cries down the copper currency, the nominal copper money stock, the current price level (in copper terms) and the silver premium should fall proportionately to the crydown, since the demand for real copper money balances does not change. Since the 1628 redenomination reduced the nominal stock of copper currency by a proportion of one-half, the cash-in-advance model predicts that the silver premium and the price level would have fallen in the same proportion. Thus, the silver premium should have fallen to unity (prior to the crydown

it was 1.84), triggering the minting of silver coins and reintroducing them into the domestic monetary circulation. In addition, in the cash-in-

advance model the silver premium is proportional to the current price level, so that the immediate fall in the silver premium should have been reflecting a equiproportionate fall in the price level.

Those predicted effects are at odds with empirical evidence. First, the silver premium fell overnight to 1.1 without any further fall. Second, the price level diminished immediately in a much smaller proportion than the silver premium did and it went on falling for seven years. Third, silver currency did not return to the domestic monetary circuits. However, those discrepancies are not surprising for Sargent and Velde (1999, p. 159) themselves write:

"We have assumed that the government carries out this operation [the crydown] in an unanticipated manner. Expectations of further operations would alter the demand for pennies [copper coins], but our simple model is not equipped to pursue the analysis in that direction".

In this paper, we document that the 1628 deflationary plan failed due to expectational effects in the sense that Castilian people was expecting either subsequent crydowns or even the full demonetization of the copper currency. In addition, we compute the montly net profit (loss) the Castilian crown obtained by the minting of copper currency from July 1617 onwards.

This well established, recent literature, on early 17th century Castilian monetary policy is related to an older corpus of works on European monetary regimes in the period of *Kipperzeit und Wipperzeit* in which several German states of the Holy Roman Empire prepared for the Thirty Years' War by creating new mints and debasing their copper subsidiary coinage. The resulting hyperinflation expressed in copper terms began in 1619 and was terminated early in 1623 by an agreement to return to the Imperial Augsburg Minting Ordinance of 1559 (Kindleberger, 1991). That 1623 stabilization was worked out on a silver basis by demonetizing all subsidiary copper coins previously debased.

In fact, Redlich (1972) argues that the Spanish copper-currency crisis of 1627-28 was an echo of the *Kipperzeit und Wipperzeit*. We agree with this interpretation because the German and Castilian inflationary problems were due to the same cause, namely the manipulation and excessive minting of the subsidiary copper currency in order to raise revenues to finance warfare. In addition, rising inflation triggered in both places the need to promulgate deflationary reforming ordinances. However, the German solution negated the legal tender nature of the copper coinage while the Castilian one simply halved its legal face value.

The relationship between the *Kipperzeit und Wipperzeit* episode and the Castilian one offers some insights on the subsequent course of the Castilian copper inflation and on general monetary history. The 1627-28 deflationary episode was followed by similar attempts (1642, 1659, 1664, 1680). The 1642, 1659 and 1664 episodes were subsequent crydowns of the copper currency, 1642 being the more drastic. However, they were not able to eliminate the silver premium and to reintroduce silver into the domestic circulation. The 1680 program demonetized most of the circulating copper currency and when combined with a 25% cryup of the silver currency in 1686, it stabilized the Castilian economy by allowing the return of silver to the domestic monetary circuits (Hamilton, 1947; Domínguez-Ortiz,

1973).

In addition, the successful 1620s German stabilization was worked out by the demonetization of the copper currency. Thus, the main European monetary disorders of the 17th century had to be stopped by stabilizations based upon a silver basis. It seems that at the time people had no confidence on the ability of rulers to refrain from subsequent manipulations of the petty copper coinage. Therefore, a true stabilization from the people's viewpoint could only succeed by either drastically reducing or even eliminating the role of copper currency from monetary transactions. We show how the 1627-28 Castilian episode was not seen by Castilian people as such a true monetary stabilization and, accordingly, the behavioral reaction to it contributed to its undermining.

In her account of England's adoption of the gold standard, Redish (1990) questions herself why the English government's attempts to establish a coinage of copper tokens to provide a medium of exchange for small transactions since Queen Elizabeth's times failed. She interprets this failure as supporting the hypothesis that it was not technically or institutionally feasible to manage a token currency prior to the 19th century. The success of the Castilian trimetallic regime (gold, silver, and copper) from 1497 to 1596 shows that such a system could work appropriately provided there were rigid quantity limits to the circulating copper currency. This paper's story shows, on the contrary, that difficulties arise when the government tries to obtain seigniorage from the minting of copper currency on its own account since then the economy ends up with a fiduciary coinage which can result in spectacular inflationary crisis as the German and Castilian experiences make clear. Having suffered these experiences, the people were reluctant to rely on copper currency regimes and considered them as unable to provide monetary stability.

Thus, the failure of English experiments with copper tokens in early modern England mentioned by Redish (1990) could be traced to the acknowledgement that they were prone to monetary disorder.

HISTORICAL BACKGROUND

After a long and turbulent period of medieval monetary history, the Catholic Kings reformed the Kingdom of Castile's monetary system in 1497. The new system was based upon three metals: gold, silver, and an alloy of silver and copper, called billon. The abstract unit of account was the maravedi. The basic gold coin was the ducado, representing 375 maravedis. The basic silver coin was the real, equivalent to 34 maravedis. The basic billon coin was named the blanca, corresponding to 0.5 maravedis. As a result, there were high-denomination gold coins, medium-denomination silver coins and low-denomination billon coins. It established the free coinage of gold, silver, and billon but the circulating nominal stock of billon was limited to ten million maravedis. Furthermore, Castilian mints were privately-owned but they operated under governmental regulation and supervision.

This system remained fundamentally unchanged (2) until a decree of King Philip II of December 31, 1596 eliminated the silver content from the billon coinage. Previously, the silver cost and the copper cost were each around 30% of the legal tender value of a blanca, so that the total mint fee was around

40% (brassage was 30% and net seigniorage was 10%). This decree limited the annual minting of the new copper coinage to 37.5 million maravedis and, furthermore, it mandated that the same quantity of previous billon coinage be retired from the domestic circulation. The nominal amount minted between 1597-1602 was 186 million maravedis. In addition, that ordinance attempted to centralize all copper coinage in the one state-owned mint (Ingenio de Segovia). From 1597 onwards, private minting of copper currency was forbidden and all of it was coined on government account since the crown aimed at extracting all net seigniorage in the kingdom arising from the difference between the legal tender value and the intrinsic value of copper coins. Contemporary estimates for the nominal stock of billon before 1597 were approximately 1.125 billion maravedis (Domínguez-Ortiz, 1960; de Santiago, 1992; Motomura, 1997). Velde and Weber (1997) use estimates of both Castile's population and per capita money balances at the time in England and France to offer a plausible range for the Castilian overall nominal money stock (gold, silver, and billon) before 1597 in between 3.75 and 6.375 billion maravedis if identical per capita balances are assumed in Castile. Since it seems that money was more abundant in Castile at the time, we think that a plausible point estimate would be about 7.5 billion maravedis.

On June 3, 1602 a King Philip III's decree reduced the weight of new copper coins by a proportion of one-half. The new currency minted between 1602 and 1606 was 960 million maravedis (Motomura, 1997). Moreover, on September 18, 1603 Philip III decreed the restamping of the pre-1597 billon coins at twice their original nominal value. The governmental estimate of pre-1597 billon coins included in the restamping order was about 750 million maravedis (García Guerra, 1997). The new nominal value put into circulation due to the restamping operation amounted to 463 million maravedis (Motomura, 1997).

After an agreement between the King and Parliament (Cortes de Castilla), a decree of November 2, 1608 stopped the minting of new copper coinage. Thus, the nominal currency minted in 1607 and 1608 amounted to 145 million maravedis, while no currency was minted between 1609 and 1616, apart from a small volume minted in the Ingenio de Segovia in 1612 (30 million maravedis).

On July 1617, the government asked the Castilian Parliament to be allowed to resume the minting of copper coins in order to obtain resources for warfare in Italy. The Cortes allowed the minting of this new copper coinage, but only to approved amounts (300 million maravedis in 1617 and 375 million in 1618). In 1619, the Parliament forbade again new coinage, since the currency minted had far exceeded the approved amounts. Between 1617 and 1620 the nominal currency minted was 1,688.6 million maravedis. However, one of the first of Philip IV's decrees (June 24, 1621) ordered, without the Cortes' approval, a new copper coinage of 1.5 billion maravedis. The rationale of all those minting programs is easily recognized from the preamble of King Philip IV's order:

"*My main task is the conservation and defense of my kingdom against my enemies, so that this copper minting cannot be delayed*". (Domínguez Ortiz, 1960, p. 14.)

According to a 1623 official statement quoted by Gelabert (1997):

"Copper minting was foundation, the most solid backing of budgetary operations; given the current state of affairs, those operations would have been impossible without it".

Table 3 shows how the minting of copper was increasing due to the need of raising seigniorage from it. At the end of 1624, such a nominal stock had risen to 9 billion maravedis, a volume surely higher than the total stock of money prior to 1597. Since the population of Castile did not increase in the period 1591-1625, the demand for real money holdings was probably similar in the 1590s as in the 1620s (about 7.5 billion maravedis). Therefore, once the nominal stock of copper money reached that figure -as of either 1623 or 1624- inflation ensued as can be seen in Hamilton's (1934) annual price data as shown in Table 1. Thus, prices rose 5.7% in 1624 and 2.8% in 1625. In addition, the explosive increase of copper coinage almost crowded out all silver currency from domestic monetary circulation and the silver premium started on an upward path as shown by Micon's (1668) daily data (see Table 2) (3). The silver premium (as of December 31) was 1.04 in 1620, 1.0525 in 1621, 1.07 in 1622, 1.13 in 1623, 1.215 in 1624, and 1.54 in 1625. An anonymous writer (5) estimated on July 1625 the circulating silver stock to be 240 million maravedis while the circulating copper stock to be 40 million ducados (i.e. 15 billion maravedis). Thus, his estimated proportion of "circulating silver to circulating copper" was very small, about 1.6 percent. This estimate is consistent with anecdotal evidence reported by Hamilton (1934) and Urgorri (1950) on the scarcity of silver coins within the domestic monetary system.

The Castilian government minted copper in order to obtain resources that it had to transform into silver to finance its warfare expenses in Europe and elsewhere. However, the seigniorage raised from increasing volumes of copper minted fell dramatically over the years. There were three reasons. First, the cost of copper rose in the international markets. For instance, the Castilian mints paid about 46 mrs per marc of copper in 1618 whereas that cost rose to about 75 mrs in 1625. Second, the seigniorage obtained in copper terms had to be transformed into silver terms. With a rising silver premium, the seigniorage in silver terms diminished. Third, the Castilian government financed its military expenses with silver coins but its main revenues were raised in copper coins. Governmental estimates point to an average of 5 million silver ducados (1.875 billion silver maravedis) the warfare expenses the Castilian crown used to make yearly. The average governmental proceeds coming from the Americas in silver maravedis for the period 1621-1625 amounted to 505.3 million maravedis (Alvarez Nogal, 1998). Thus, on average the Castilian crown had to obtain about 1.37 billion silver maravedis per year from its copper money taxpayers in order to finance its military expenses. The higher the silver premium, the higher the revenues raised in copper terms needed to obtain a given amount of silver maravedis. The difference between the revenues raised in copper terms and the same amount expressed in silver terms is what we call the "premium cost" in Table 3.

Table 3 shows that in 1622 the net profit (in silver maravedis) obtained by the Castilian crown out of one copper maravedi minted was about 0.65, whereas on January 1625 that net profit had fallen to 0.36. The government's economic advisors forecasted that this net profit would be further reduced causing the failure of the copper minting strategy. For instance, Fray Hernando de Salazar, prime minister's (the Count-Duke of Olivares) main advisor and also a member of the Consejo de Hacienda, estimated as of January 1625 (with a 1.25 silver premium) that in future years the silver premium would rise to 1.5 so that the benefit of minting copper would be reduced by 40%; the smaller benefit would force to mint much higher volumes of copper which would cause a much more accelerated silver premium. Therefore, he recommended to implement a monetary reform and rejected the minting of copper as the solution to fill the gap between revenues and expenses (4). After those forecasts, since

early 1625 the Count-Duke pressed for a crydown of the copper currency (i.e. a reduction of the legal value of copper currency).

In fact, there exists some evidence that in the summer of 1625 a reduction of the legal face value of the copper coin was expected. This expectation increased the expected opportunity cost of holding copper currency, diminished the demand for it and further increased the silver premiun and the price level expressed in copper maravedis. For instance, the anonymous author that wrote on July 1625 said the following (5):

"Another damage caused by the billon currency is the suspicion everybody has about it. People expect a fall in its nominal value, so that its owners will suffer a loss. Thus, all transactions are made by exchanging the billon coin and everyone attempts to hoard silver and gold in order not to exchange them for billon, due to the well-known loss everybody expects from the latter".

THE 1626 HALT OF COPPER MINTING

In 1625 the government was badly divided as to the best method to cope with the rising inflation and the silver premium. On the one hand, the Count-Duke and his closest economic advisors preferred a quick deflationary program through a 75% crydown of the legal face value of copper currency. On the other hand, the two most powerful governmental councils, the politically-orientated Consejo de Estado and the economically-orientated Consejo de Castilla, and las Cortes were opposed to the crydown -since it could carry major political costs such as riots (Elliot, 1986). As a matter of fact, the silver premium had exceeded 1.5 so that the net profit of minting copper approached zero dangerously (see Table 3). The Consejo de Hacienda (April 5, 1626) expressed this fact by saying that as of 1600 the benefit from minting a marc (230.065 grams) of copper had been 70.735 maravedis whereas the current benefit was just 82.915 maravedis (even after the doubling of the face value of the billon currency) because of copper dearth and the huge current silver premium (1.68). For March 1626, our estimates are the following. The Crown minted 280 copper maravedis out of one marc of copper. The cost of copper was about 80 copper maravedis while the brassage amounted to some 28 copper maravedis. Thus, the gross benefit amounted to some 172 copper maravedis. However, with a 1.68 silver premium, those 172 copper maravedis were exchanged for 102.38 silver maravedis. In addition, there was a further silver premium cost due to the additional revenues in copper maravedis the Crown had to raise in order to finance a given quantity of silver maravedis. Altogether, the net profit in silver maravedis the Crown could obtain out of one marc of copper minted as of March 1626 amounted to just 30 maravedis.

Given the decreasing profits obtained from the minting of copper currency, the Consejos favored less drastic measures such as the halting of minting. Due to all those circumstances, King Philip IV agreed with the Cortes such a halting on February 8, 1626 (de Santiago, 1992). The agreement was made public on April 1 and Micon's daily data show how the silver premium fell overnight from 1.7 to 1.46. In addition, the Consejo de Castilla decreed price caps similar to market prices as of 1624.

The large-scale program of minting copper was finally stopped by the royal decree of May 8, 1626.

When the minting of copper was halted, the nominal copper money stock amounted approximately to 11.4 billion maravedis, equivalent to 30 million ducados. Domínguez-Ortiz (1960) quotes contemporary estimates, including government estimates, to be also about 28-30 million ducados. However, other contemporary writers estimated a plausible range to be between 30 and 40 million ducados (7).

The nominal stock of copper currency rose by 26.6% between the end of 1624 and the moment when minting was halted in the spring of 1626. In the same period, the silver premium rose by 40%. Thus, the real stock of copper in silver maravedis fell. The explanation of this behaviour is the following. On the one hand, the silver premium was rising at the same pace as the expected nominal stock of copper currency since the demand for real balances was saturated. Therefore, the real stock of copper money should have been constant. On the other hand, however, there existed expectations of a future crydown of the copper currency. As a consequence, there was another element which called for an additional reduction of the demand for real copper money balances. Thus, the stock of copper currency. The immediate fall of the silver premium from 1.7 to 1.46 on April 1, 1626 can be traced to the disclosure of the future halting of the minting of copper after the agreement between King Philip IV and las Cortes. On hearing the news, people expected lower quantities of newly-minted copper coins and lower nominal stocks of copper money. Therefore, the silver premium reacted by falling immediately.

LAS DIPUTACIONES PARA EL CONSUMO DEL VELLON (1627)

However, the effect of those soft measures on nominal prices and the silver premium proved to be transitory because since November 1624 the nominal stock of copper currency had exceeded the demand for real balances. Therefore, the expectation of a crydown of the copper currency spread, which gave fresh impetus to the inflationary spiral. Prices rose by 13.3% in 1626 and the silver premium increased again, reaching 1.53 as of December 31, 1626.

Due to the lack of success of those soft measures and because of the strong opposition to a drastic crydown by the Consejos and las Cortes, in 1627 the government implemented several measures in order to halt the current inflation, to reduce the silver premium and to reintroduce silver into the monetary circulation. Firstly, on March 27, 1627 it started implementing an open-market operation (8) in order to withdraw copper currency from circulation and, secondly, on September 13, 1627 it decreed new wage and price controls. To implement the contractive open-market operation a new bank was created (*las Diputaciones para el consumo del vellón*). These institutions would buy copper currency at its current nominal value and, in exchange, they would return to its owners the given copper coins but perforated -so that its new nominal value was four times lower. Moreover, the owners would receive 80 percent of the nominal value in a four-year debt, payable in silver with five percent annual interest.

The ultimate goal was to reduce the existing nominal stock of copper currency to one-fourth of the initial quantity (*consumir el vellón*). Funds needed to buy the copper coins would be obtained, in part, from the government budget and, the rest, from the bank's profits. This bank would be run by Genoese

(Italian) bankers who were given the monopoly to be engaged in a vast array of financial activities including deposits, loans, foreign exchange and even lotteries (Urgorri, 1950; Ruiz-Martín, 1970; Hamilton, 1949). There was a widespread opposition to the measure and it was believed to be a complete failure (Urgorri, 1950; Ruiz-Martín, 1990; Elliot, 1986). For instance, Lisón y Viedma (1627) thought it impossible to achieve the goal of reducing the nominal stock of copper currency to one-fourth in four years. His open opposition to this measure granted him the Count-Duke's displeasure and the threat of imprisonment (Lisón was ultimately exiled) in a meeting both men held on June 1, 1627 (9). At the time, the public perception was that the government's monetary policy had been completely inconsistent. For instance, Lisón y Viedma (1627) wrote:

"If the government was looking for some means to reduce the billon currency stock, why was its minting not interrupted. And if billon was being minted, why was the government seeking so many remedies to reduce its amount. Furthermore, the government paid attention to foreigners without listening to its own subjects...".

In fact, since the private owners of copper coinage suspected that the government would not honor -as usual- its promises, the contractive open-market operation resulted in a failure (10). Las Cortes were forcefully opposed to the contractive open-market operation but King Philip IV replied that if it intended to obstruct the implementation of this contractive operation, he would order the total crydown of the copper currency (11), a measure for which he had obtained the prior approval not only of ministers and theologians but also of the Pope (Urgorri, 1950, p. 166). Since people had been thinking of the Diputacion as a temporary expedient (Urgorri, 1950, p. 172) and nominal prices and the silver premium were continuously rising, the King's statement gave credence to an imminent crydown of the copper currency.

As a matter of fact, the King and the Count-Duke had pressed in favour of a 75% crydown of the copper currency since 1625 but the strong opposition of the Consejo de Castilla forced them to approve the contractive open market operation. The King menaced the Consejo de Castilla in the following terms:

"If the Consejo de Castilla ties my hands in order to impede the crydown and it approves las Diputaciones, consider whom I can complain of seeing the loss of my kingdoms because of I am executing what I was advised to do and I am not executing what I was impeded to do".(12)

Lisón y Viedma (May 31, 1627) explained the effect of those expectations on prices:

"And I inform Your Majesty that the damage and high commodity prices caused by the policy of reducing the stock of circulating copper does not follow exclusively from the billon coin, because in the six-year interval [1621-1626] that the copper money has been coined, prices did not rise, and they have risen just a year ago, at about the same time the minting of copper ceased. Thus,... it could be said that such a price increase has taken place because the coinage of billon stopped. However, this would be fallacious, because the damage has been caused since people knew of the government project to crydown the value of the billon coin. Upon knowing of this project, people having commodities, livestock and so on preferred not to exchange them for currency

because they did not know the amount of the crydown. As a result, the delay in exchanging goods provoked the confusion and the confusion brought about ruin. Thus, the excessive billon stock has not been the only cause of the damage, and its crydown is not so urgent...".

The effects of the open-market operation on prices and silver premium were mild, if at all. Prices rose 6.5% in 1627. When observed on the silver premium, the -supposedly- contractive effect of that operation cannot be observed. The silver premium as of March 27, 1627 was 1.46. It had risen to 1.70 by mid-August 1627 and then it fell to 1.64 on November 1, 1627. It rose again steadily and on August 7, 1628 it had reached 1.84.

THE 1628 CRYDOWN

Faced with the open-market operation's failure, the Consejo de Castilla discussed in the winter and the spring of 1628 the proportion of a future crydown of the copper currency. Some councillors favoured a 75% crydown but some others preferred a milder 50%. In addition, they were divided as to whether compensation should be given to the losers. At the same time, las Cortes were discussing the best method to implement the crydown. They favoured a method (the so-called *medio de las escrituras*) consisting of a 75% crydown with a compensation to the losers to be given by the Crown up to 750 million maravedis. In addition, when consulted by the government on June 1628, the main cities' municipal authorities were also divided upon whether both the crydown should be put in practice and which redenomination percentage should be applied in the event of its implementation.

As a result of those discussions and consultations, on August 7, 1628 King Philip IV abolished the Diputaciones, repealed the price and wage controls and decreed the reduction of all the circulating copper currency to one-half of its previous legal value. Moreover, it granted discretion to the municipal authorities to compensate the losers from their own funds if desired, but nobody was compensated.

Table 3 shows how after the halting of copper minting on May 1626 the seigniorage had fallen to zero but the silver premium cost was positive because of the gap between the crown's expenses and revenues in silver terms. In addition, the rising silver premium was causing an increasing cost. Therefore, the Castilian government had benefited from the minting of copper in the short-run but that initial net profit had become a net cost in the long-run. On April 5, 1626 the Consejo de Hacienda had expressed the same idea in the following terms:

"We should not deceive ourselves by the help that the minting of copper currency provides, that is, to create money from nothing, because at the same time that this money helps, it causes more harm through the silver premium".

Thus, the crydown intended to eliminate that long-run cost by removing the silver premium. Table 3 shows that as of July 1628, that cost amounted to 58.30 million maravedis, i.e. about 37.3% of Castilian military expenses. If the silver premium either had continued its rising path or had remained at its current level, the Castilian military strenght would have suffered badly. Thus, according to King

Philip IV, the crydown was urgent being its main goal the elimination of the silver premium:

"If the silver premium cost is not eliminated, it will be extremely difficult to improve anything else" (Domínguez-Ortiz, 1960, p. 267)

Despite las Cortes and most municipal authorities favored a 75% crydown, the opposition of the Consejo de Castilla made that King Philip IV would choose to take a prudent first step and to decree a 50% crydown. As a matter of fact, two weeks later, on August 20, the Count-Duke of Olivares wrote a letter to his confidant, the Marquis of Aytona (the Spanish governor of Flanders) telling him that the 50% crydown had been merely the calculated soft first step of a continuing monetary reform because a more drastic measure (a 75% crydown) had been considered too severe. Thus, on August 7, 1628 (with a 1.84 silver premium) the nominal stock of money fell by a proportion of one-half. The day after the silver premium fell to 1.1. It stood at the same level until February 1629, when it started rising again. It never fell below 1.1. Silver did not come back into circulation. According to Hamilton's data, the price level fell 2.14% in 1628, 2.07% in 1628 and 4.18% in 1630. It continued falling until 1635 so that between 1627 and 1635 it fell by almost 16%.

Therefore the silver premium fell immediately by 40.22% after the implementation of the 50% crydown (from 1.84 to 1.1). This amounts to an overnight decrease of the demand for real copper balances (in silver maravedis) from 6.187 billion to 5.174 billion, a 16.37% fall. This decrease must be attributed to expectations of either further crydowns or demonetizations of the copper coinage. Since the nominal stock of money fell by a proportion of 50%, if there had not existed those expectations, the demand for real money balances would have remained constant and the silver premium would have been eliminated (i.e. gone to 1). The reason why the silver premium did not fall to 1 can be accounted for by expectational effects: at the time of the 50% crydown, people were expecting an additional redenomination up to 75% or even the complete demonetization of the copper currency. As a consequence, even after the 50% crydown they anticipated a future positive opportunity cost of holding copper currency and accordingly they reduced their demand for real copper balances, the result being a silver premium falling immediately but remaining positive.

There are strong arguments backing our hypothesis about the expected lack of success of a 50% crydown to eliminate the silver premium. First of all, at the time it was widely believed that the inflationary problem was due to the difference between the legal face value and the intrinsic value of the copper currency (Arizmendi, 1627). The legal value of a marc of copper minted in 1626 was 280 maravedis, while its bullion cost was about 80 maravedis. Moreover, the brassage cost was 28 maravedis. When the Castilian government stopped its copper issues in 1626, the bullion cost of copper fell abruptly. For instance, the price of Hamburg copper in Amsterdam fell by more than 40% between 1626 and 1628 (Velde and Weber, 1997). Thus, with the halt in minting, the bullion costs fell from 80 maravedis back to the 40s maravedis paid in the early 1620s. As a consequence, in 1628 the intrinsic value (cost of copper plus brassage) of a marc of copper stood about 70 maravedis. Then, the argument goes, a redenomination to one-fourth of the previous legal value (i.e. a 75% crydown from 280 maravedis to 70 maravedis) would have eliminated exactly such a difference and, therefore, the inflationary problem. As of summer 1628, this kind of reasoning had led to most parliamentary and municipal forces, the King and the prime minister to the conclusion that a 75% crydown was needed.

In this sense, the Count-Duke thought of the 50% crydown not as a once-and-for-all measure but as the cautious first step of a continuing monetary reform for political reasons (Elliot, 1986). In addition, King Philip IV had already threatened in 1627 to demonetize the copper currency. The lack of success of the 50% crydown must be found in its lack of credibility: people suspected that its proportion was too small to eliminate the silver premium and to reintroduce silver currency into the domestic monetary circuits and that some further deflationary measures would be needed. These expectations of failure were self-fulfilling since people's behavioural reaction to them by reducing their demand for real copper balances contributed to the effective undermining of the deflationary plan.

CONCLUSIONS

The huge and accelerating Castilian copper money stock drove silver out of circulation by mid-1620s. By that time additional issues of copper coinage brought about price level increases and gave rise to a substantial silver premium, with a decreasing real money stock. The Castilian government sought to halt the resulting inflation by introducing several contractive measures. In 1626 it stopped the minting of copper currency. In 1627 it tried an open-market operation directed at reducing the nominal stock of copper money to one-fourth of the previous amount. Those operations were unsuccessful and in 1628 the legal tender value of the circulating copper currency was cried down by a proportion of one-half. The crydown induced people's expectations of lower prices and therefore the silver premium fell immediately, reflecting those expectations, even though actual prices were sluggish and fell slowly. However, the redenomination failed because the demand for real money balances fell at the time of the crydown. As a result, the fall in prices and in the silver premium was smaller than the reduction of the nominal stock and silver currency did not return to the domestic monetary system.

At the time it was felt that a 50% crydown would be too small to achieve its proposed goals, implying that people expected additional crydown measures, even including the complete demonetization of the copper currency. Therefore, people anticipated a future positive opportunity cost of holding copper money, so that they reduced their real copper money holdings. This inflationary behavior partially offset the fall in nominal prices and in the silver premium brought about by the crydown. Thus, the expectations of failure were self-fulfilling.

FOOTNOTES

(1) The maravedi was the Castilian imaginary money that served as a unit of account. In this paper, the silver premium is defined as the ratio copper maravedi/silver maravedi.

(2) The more important modification introduced in the 16th century was that King Charles I substituted the escudo for the ducado as the basic gold coin in 1537.

(3) The Manuscript 18.433 at the Spanish National Library contains a Madrid silver premium daily series from January 1618 to February 1668 reported by one Cosme Micón, a Genoese man of affairs living there. The series has been recently published by Serrano Mangas (1996).

(4) Spanish National Library, Madrid, Manuscript 904.

(5) Spanish National Library, Madrid, Manuscript 6731, p. 84..

(6) Domínguez Ortiz (1960, p. 276).

(7) The city of Granada's Representative in las Cortes, Mateo Lisón y Viedma, wrote on May 28, 1627 in a report (Memorial) handed to King Philip IV:

"All the mints were opened and they coined to the maximum extent, and in some occasions Your Majesty has given instructions to mint more than six million [ducados]. Moreover, some individuals were allowed to mint copper coins. As a result, there is plenty of them in this Kingdom and, according to the most reliable estimates ever made, there must be about forty million [ducados]. Furthermore, most of the silver -the Kingdom's substance- have been driven out of Castile".

In addition, Francisco de Arizmendi stated in 1627 that the estimates of copper currency at the time fluctuated between 30 and 40 million ducados. It is known that counterfeited copper coins were introduced in Castile from Holland and Germany, but their estimated volume (39 million ducados between 1606 and 1620, according to Carrasco Vázquez (1997) is not reliable.

(8) It was based upon an original idea by Gerardo Basso, a financier from Milan (Manuscript No. 14497, Spanish National Library, Madrid).

(9) For detailed accounts of this fascinating politico-economic episode, see Elliot (1986) and mainly Vilar (1971).

(10) It must be taken into account that on January 31, 1627, the government had declared its intention to default on its interest payments to the cartel of Genoese bankers.

(11) "*Su Majestad se resolverá luego en mandar publicar la total baja de la moneda de vellón...*" (i.e. a full demonetization of the copper currency).

(12) Archivo Histórico Nacional, Consejos, legajo 51359, expediente 6.

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TABLE 1. Price level

1601	90.76	1606	91.04	1611	81.23	1616	86.99	1621	84.27	1626	107.75
1602	87.10	1607	89.32	1612	80.21	1617	87.17	1622	87.59	1627	114.75
1603	88.15	1608	88.63	1613	82.03	1618	86.60	1623	87.54	1628	112.30
1604	91.56	1609	83.46	1614	86.00	1619	82.78	1624	92.51	1629	109.97
1605	93.89	1610	84.55	1615	83.15	1620	86.69	1625	95.07	1630	105.37

Source: Hamilton (1934), table 7. Average for the three Castilian provinces: Andalusia, Old-Castile and New-Castile (base: 100 = 1621-30)

TABLE 2. Silver Premium (Ratio copper maravedi/silver maravedi)

Before 1602: 1 1603: 1.01 1604-1615: 1.02 1616: 1.01 1617: 1.02

Asientos	Annual average	: 4th quarter	3rd quarter	2nd quarter	1st quarter	Year
1.02	1.0212	1.0237	1.0212	1.0200	1.0200	1618
1.02	1.0340	1.0400	1.0367	1.0325	1.0267	1619
1.02	1.0400	1.0400	1.0400	1.0400	1.0400	1620
1.02	1.0463	1.0525	1.0525	1.0400	1.0400	1621
1.02	1.0571	1.0675	1.0600	1.0533	1.0475	1622
1.02	1.0994	1.1250	1.1092	1.0908	1.0725	1623
1.13	1.1611	1.1992	1.1625	1.1500	1.1325	1624
1.215	1.4172	1.5030	1.4605	1.4082	1.2969	1625
market	1.5542	1.5193	1.5467	1.5577	1.5931	1626
market	1.5858	1.6566	1.6587	1.5197	1.5083	1627
market	1.4784	1.1000	1.3789	1.7389	1.6957	1628
market	1.1467	1.1867	1.1550	1.1350	1.1100	1629
1.15	1.2302	1.2117	1.2300	1.2620	1.2173	1630

Sources:

For the period before 1618, author's calculations based upon Hamilton (1934), table 7. For the period after 1618, author's calculations based upon Micon's (1668) daily data as reported by Serrano Mangas (1996).

For the silver premium paid on "asientos" (i.e. the premium that the Castilian crown had to pay to a banker when the former repaid a silver loan borrowed from the latter by delivering copper currency), Alvarez Nogal (2000).

Currency minted	Nominal stock	Real stock	Seigniorage	Premium cost	Net Profit
(copper mrs)	(copper mrs)	(silver mrs)	(silver mrs)	(silver mrs)	(silver mrs)
51.14	2,967	2,909	37.90	27.29	10.60
755.73	3,723	3,637	536.00	27.29	508.71
797.74	4,521	4,347	559.17	27.29	531.87
83.99	4,605	4,427	60.09	27.29	32.80
626.90	5,231	4,970	430.79	28.26	402.52
1,028.32	6,260	5,850	703.56	33.12	670.44
1,308.94	7,569	6,698	838.46	27.26	811.19
1,424.63	8,993	7,402	857.97	99.95	758.01
IA 136.30	9,130	7,253	69.58	19.71	48.49
F 136.30	9,266	7,174	67.83	19.71	48.12
M 136.30	9,402	7,023	65.43	19.71	45.72
AP 140.25	9,542	6,923	65.41	19.71	45.70
MY 140.25	9,683	6,852	63.80	19.71	44.10
IN 140.25	9,822	6,847	62.84	19.71	43.13
IL 140.25	9,963	6,885	62.30	19.71	42.60
AU 140.25	10,103	6,933	61.87	19.71	42.16
S 140.25	10,244	6,935	61.03	19.71	41.33
D 140.25	10,384	6,968	60.49	19.71	40.79
N 140.25	10,524	7,007	60.02	23.83	36.19
D 140.25	10,664	7,033	59.45	23.83	35.62
IA 138.96	10,803	6,978	58.02	45.86	12.16
F 146.49	10,950	6,963	60.28	45.86	14.41
M 144.56	11,095	6,690	56.41	45.86	10.54
AP 144.56	11,239	7,305	60.81	45.86	14.93
MY 144.56	11,384	7,086	58.23	50.84	7.39
IN 0.00	11,384	7,449	0.00	46.54	-46.54
UL 0.00	11,384	7,490	0.00	46.06	-46.06
AU 0.00	11,384	7,384	0.00	47.34	-47.34
S 0.00	11,384	7,212	0.00	49.35	-49.35
0.00 C	11,384	7,536	0.00	45.52	-45.52
N 0.00	11,384	7,483	0.00	32.70	-32.70
O.00	11,384	7,460	0.00	32.90	-32.90
0.00	11,384	6,817	0.00	451.63	-451.63
A 0.00	11,384	6,796	0.00	53.67	-53.67
F 0.00	11,384	6,700	0.00	54.81	-54.81
0.00 M	11,384	6,646	0.00	55.44	-55.44
	Currency minted (copper mrs) 51.14 755.73 797.74 83.99 626.90 1,028.32 1,308.94 1,424.63 IA 136.30 F 136.30 M 136.30 F 136.30 M 136.30 AP 140.25 IX 140.25 IX 140.25 IX 140.25 IX 140.25 S 0 0.00 F 0.00 S	Currency minted Nominal stock (copper mrs) (copper mrs) 51.14 2,967 755.73 3,723 797.74 4,521 83.99 4,605 626.90 5,231 1,028.32 6,260 1,308.94 7,569 1,424.63 8,993 IA 136.30 9,130 F 136.30 9,266 M 136.30 9,402 AP 140.25 9,542 MY 140.25 9,542 MY 140.25 9,683 IN 140.25 9,822 IL 140.25 9,863 AU 140.25 10,244 D 140.25 10,384 N 140.25 10,384 N 140.25 10,524 D 140.25 10,664 IA 138.96 10,803 F 146.49 10,950 M 144.56 11,239 MY 144.56 11,384 IN 0.00 11,384 AU 0.00 11,384 AU 0.00 11,384 AU 0.00 11,384 M 0.00 11,384 M 0.00 11,384 M 0.00 11,384	Currency mintedNominal stockReal stock(copper mrs)(copper mrs)(silver mrs) 51.14 $2,967$ $2,909$ 755.73 $3,723$ $3,637$ 797.74 $4,521$ $4,347$ 83.99 $4,605$ $4,427$ 626.90 $5,231$ $4,970$ $1,028.32$ $6,260$ $5,850$ $1,308.94$ $7,569$ $6,698$ $1,424.63$ $8,993$ $7,402$ VA 136.30 $9,130$ $7,253$ F 136.30 $9,266$ $7,174$ M 136.30 $9,402$ $7,023$ AP 140.25 $9,542$ $6,923$ MY 140.25 $9,683$ $6,852$ IN 140.25 $9,963$ $6,885$ AU 140.25 $10,244$ $6,935$ O 140.25 $10,244$ $6,935$ O 140.25 $10,524$ $7,007$ O 140.25 $10,664$ $7,033$ IA 138.96 $10,803$ $6,978$ F 146.49 $10,950$ $6,963$ M 144.56 $11,239$ $7,305$ MY 144.56 $11,384$ $7,449$ IL 0.00 $11,384$ $7,483$ O 0.00 $11,384$ $7,483$ O 0.00 $11,384$ $6,646$	Currency mintedNominal stockReal stockSeigniorage (copper mrs) 51.14 $2,967$ $2,909$ 37.90 755.73 $3,723$ $3,637$ 536.00 797.74 $4,521$ $4,347$ 559.17 83.99 $4,605$ $4,427$ 60.09 626.90 $5,231$ $4,970$ 430.79 $1,028.32$ $6,260$ $5,850$ 703.56 $1,308.94$ $7,569$ $6,698$ 838.46 $1,424.63$ $8,993$ $7,402$ 857.97 VA 136.30 $9,130$ $7,253$ 69.58 F 136.30 $9,266$ $7,174$ 67.83 M 136.30 $9,402$ $7,023$ 65.43 AP 140.25 $9,542$ $6,923$ 65.41 MY 140.25 $9,9633$ $6,852$ 63.80 IN 140.25 $10,244$ $6,935$ 61.03 O 140.25 $10,244$ $6,935$ 61.03 D 140.25 $10,664$ $7,033$ 59.45 IA 138.96 $10,803$ $6,978$ 58.02 F 146.49 $10,950$ $6,963$ 60.28 M 144.56 $11,239$ $7,305$ 60.81 MY 144.56 $11,384$ $7,480$ 0.00 IL 0.00 $11,384$ $7,483$ 0.00 IL 0.00 $11,384$ $7,460$ 0.00 IA 0.00 $11,384$ $6,646$ 0.00	Currency mintedNominal stockReal stockSeignioragePremium cost(copper mrs)(copper mrs)(silver mrs)(silver mrs)(silver mrs)(silver mrs) 51.14 $2,967$ $2,909$ 37.90 27.29 755.73 $3,723$ $3,637$ 536.00 27.29 797.74 $4,521$ $4,347$ 559.17 27.29 83.99 $4,605$ $4,427$ 60.09 27.29 626.90 $5,231$ $4,970$ 430.79 28.26 $1,028.32$ $6,260$ $5,850$ 703.56 33.12 $1,308.94$ $7,569$ $6,698$ 838.46 27.26 $1,424.63$ $8,993$ $7,402$ 857.97 99.95 IA 136.30 $9,266$ $7,174$ 67.83 19.71 M 136.30 $9,266$ $7,174$ 67.83 19.71 M 136.30 $9,402$ $7,023$ 65.43 19.71 MY 140.25 $9,683$ $6,852$ 63.80 19.71 MY 140.25 $10,244$ $6,933$ 61.87 19.71 N 140.25 $10,244$ $6,933$ 61.87 19.71 N 140.25 $10,524$ $7,007$ 60.02 23.83 D 140.25 $10,664$ $7,033$ 59.45 23.83 D 140.25 $10,664$ $7,033$ 59.45 23.83 D 140.25 $10,664$ $7,033$ 59.45 23.83 D 140.25

TABLE 3. Copper Coin Issue and Copper Money Stock, Castile 1617-1628(Amounts in million maravedis)

1628AP	0.00	11,384	6,608	0.00	55.88	-55.88
1628MY	0.00	11,384	6,558	0.00	56.46	-56.46
1628JN	0.00	11,384	6,475	0.00	57.44	-57.44
1628JL	0.00	11,384	6,401	0.00	58.30	-58.30
1628AU	0.00	5,692	5,174	0.00	12.11	-12.11
1628S	0.00	5,692	5,174	0.00	12.11	-12.11

Sources:

Own calculations using sources from Motomura (1997, Tables 5A-5K), Alvarez Nogal (1998, Tables 1-4), Alvarez Nogal (2000), Hamilton (1934) and Micón (1668).

Notes: Real money stock in silver maravedis, computed using the silver premium as of December 31 of the final year obtained from Hamilton (before 1618) and from Micon thereafter.