

# ***The Italian Way to Seignorage: Public Finance, Personal Power and Inflation Shocks in the Po Valley between the XVIth and XVIIth Centuries***

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## **1. The ambiguities of early modern finance**

The monetary history of the early modern period appears to have been dominated by a variety of contradictions. On the one hand, by doctrine and by law (by the 'canon', in one word) money was held to be a sacred object.<sup>1</sup> On the other, it increasingly became the focus of speculation as an end in itself. Moreover, an unresolved divide was already evident between the cult of the metal idol, the intrinsic value of coins (with its own totemic vestiges), and the need for liquidity imposed by the frenetic increase of currency exchanges.

Two literary examples in Dante's *Divine Comedy* alone examine the subject of monetary manipulation: the Righteous Kings' invective against Philip the Fair of France (*Par*XIX, 118-120), and the case of Master Adam, burned at the stake and condemned to dropsy for eternity for having "counterfeited the currency imprinted with the Baptist" (*Inf*XXX, 73-74, Longfellow). One detail makes this second episode doubly interesting and, I would say, paradigmatic: Adam de Anglia did not act alone but in the service of the Romena Counts, who met with the same destiny: "For them am I in such a family;/ They did induce me into coining florins,/"

<sup>1</sup> This adjective is used by A. De Maddalena, "Valori reconditi nella storia della moneta: il pensiero del denaro e le radici dell'economico", foreword to M. Amato, *Il bivio della moneta: problemi monetari e pensiero del denaro nel Settecento italiano*, (Milano 1999), p. 9.

Which had three carats of impurity" (*ibid.*, 88-90). This is one of the earliest testimonies of a praxis that was destined to continue and consolidate itself during the sixteenth and seventeenth centuries: the pact between a lesser prince and the head of a mint, who not only clipped his own coins but also counterfeited foreign currency for financial gain.

The common denominator linking seignorage practised in Italy and other parts of Europe lay in the ill-defined and shifting distinction between the spheres of public and princely finance. In a world still unfamiliar with strong claims of autonomy of the private from the public domain (and vice versa), where the state was a malleable concept in the early stages of development and the long and troubled process of enclosure had only just begun to transform the face of the land itself, the monarch was not bound by other responsibilities to his subjects beyond ruling the state according to justice, in compliance with Thomist doctrine. It was therefore to be expected that the coffers of the state and the strong boxes of the nobility tended to overlap.

According to the understandable view of Kindleberger, the origins of modern finance date back to the late seventeenth century.<sup>2</sup> These were indeed the origins, given that most of the continent was still immersed in the system of the *ancien régime* in the eighteenth century. The shift could only have taken place in, broadly speaking, the Anglo-Saxon world, due to the sense of civic ethics that had grown up there, instilled by the events of a country that in 1649 had beheaded its own king – a real epiphany of the new age – definitively sanctioning the primacy of Parliament over the Crown,<sup>3</sup> and the purely functional, secondary nature, of the latter.

Pre-industrial monetary manoeuvres have been explained in many ways, with reference both to changes to the extrinsic value and to the manipulation of the intrinsic one. Some of these reasons were inborn and endemic to the system; some were regrettable but unfortunately inevitable.<sup>4</sup> Others were related to the chronic lack of raw materials (even

<sup>2</sup> C.P. Kindleberger, *A Financial History of Western Europe*, (London 1984), pp. 158, 160 *et seq.*

<sup>3</sup> See: M. Ashley, *England in the Seventeenth Century, 1603-1714*, (London 1978).

<sup>4</sup> M. Bloch, *Esquisse d'une histoire monétaire de l'Europe*, (Paris 1954), pp. 53 *et seq.*

in the middle of a regime of importing precious metals),<sup>5</sup> which can be attributed to the politics of administering resources that might be judged thoughtless or even rash, but was the only solution at a time when war was both a necessity and a pastime. Yet more were purely fanciful. All princes often resorted to these tricks to varying degrees and many writers censured them, within a European-wide debate that continued from the sixteenth to the end of the eighteenth centuries,<sup>6</sup> considering them to be a threat to good faith and trust.

However, once a prince becomes a businessman and an activity that should be justified above all as a public good is practised solely for financial gain – a contradiction that Davanzati, a sophisticated observer of Italian life in the late Renaissance,<sup>7</sup> had well noted – it is necessary to seek further explanations. I would argue that these could be found as much through the study of the socio-cultural attitudes of the primary players, as through the relevant institutional contexts.

## 2. Towards a definition of seignorage

*2.1. One size fits all?* We will begin with the ‘classic’ definition of seignorage. According to Cipolla’s famous formula, it corresponds to the (positive) difference between the value of the metal brought to the mint in order to be coined and the market price of the money into which it is made, increased by the costs of coining. This can be translated into the equation:

$$M = P + (C + S),$$

where  $M$  represents the stock of coarse metal to be coined,  $P$  the amount returned to the supplier of  $M$  (which, according to Cipolla, is equal to the *price*),  $C$  the production costs (sum of the variable costs and the average depreciation allowance on fixed assets),  $S$  the quantity of

<sup>5</sup> Probably the most significant example is that of Spain, recently reconsidered by E.M. García Guerra, *Las acuñaciones de moneda de vellón durante el reinado de Felipe III*, (Madrid 1999).

<sup>6</sup> F. Boldizzoni, ‘Il governo della moneta a Milano dal 1650 alla Guerra di successione spagnola’, *Storia economica*, 6 (2003), pp. 387-95, 413 *et seq.*

<sup>7</sup> *Idem*, ‘Davanzati e Hobbes: nascita e diffusione di un paradigma (secc. XVI-XVIII)’, *Il pensiero economico italiano*, 13.1(2005), pp. 9-30.

metal that could be held by the prince by virtue of his *jus cudendi*, the “seignorage” in other words.<sup>8</sup>

This equation contains at least three simplistic assumptions, two of them analytical and one substantial. To begin with, it is quite inaccurate to express the price as a physical quantity, so much so that from a logical point of view it would seem that the value of coin was *only* determined by monetary forces (yes, it is true, that from a practical point of view, an increase in the rate of seignorage is accompanied by a decrease in the value of the coin –  $P$  decreases – *ceteris paribus*, but the causal chain is much more complicated). Therefore I will limit myself to defining it as the intrinsic value of the coin.

Furthermore, to measure  $S$ , or seignorage, in terms of metal gained would also be misleading; if anything it should be expressed in terms of the ‘potential coinage’ that the prince could attribute to his coffers (but this is an oversight that follows on directly from the above). Finally, as well as neglecting to distinguish between the various monetary classes (almost as though their production methods and costs were analogous), this assumption also takes for granted that during the pre-industrial period it always fell to the private individual to bring his hoard of precious metal to the mint to be made into coins for his own use and consumption. We will see it is essential to make these distinctions in order to understand the phenomena and circumstances with which we are dealing.

Similarly preconceived ideas can also be found in the work of Boyer-Xambeau and her collaborators,<sup>9</sup> as several scholars have pointed out.<sup>10</sup> According to Kindleberger, however, adulteration maximised government profits only in the short-run, while in the long-run profit could be achieved solely by maintaining a qualitatively high standard of emissions. It remains to be seen whether “a given society” tended more

<sup>8</sup> C.M. Cipolla, *Il governo della moneta a Firenze e a Milano nei secoli XIV-XVI*, (Bologna 1990), pp. 44-45; *Idem*, *Before the Industrial Revolution: European Society and Economy*, (London 1993), pp. 170-71.

<sup>9</sup> M.T. Boyer-Xambeau, G. Deleplace and L. Gillard, *Monnaie privée et pouvoir des princes: l'économie des relations monétaires à la Renaissance*, (Paris 1986).

<sup>10</sup> See: M. Cattini, “Piccoli principi grandi falsari: la monetazione dei piccoli stati centro padani fra fine Cinque e metà Seicento”, in E. Fregni (ed), *Archivi territori poteri in area estense, secc. XVI-XVIII*, (Roma 1999), p. 191.

towards the former or latter.<sup>11</sup> Furthermore, a sort of law of averages would have kept seignorage not overly prominent or weak, or even entirely absent (the eventuality that it could ever have been negative appears to me to be nonsense): in the first instance the mint would have risked the refusal of the public to bring metal to be stamped, in the second the melting or exportation of the coin-goods would have occurred as soon as the metal was worth more than the face value of the coin.<sup>12</sup>

Without questioning the validity of similar considerations for the Dutch (or English) case, given their own specific realities, it is important to underline that they have little relevance in a study of the Italian experience. In this regard, the attention paid by M. Bloch, to the broader theme of monetary weakening – to its consequences, in fact, more than its causes – constitutes a warning against tendencies towards generalisation.<sup>13</sup>

*2.2. Italy's feudal mints.* After the treaty of Cateau-Cambrésis, the political weight of the Imperial fiefs in Northern Italy multiplied, responding to the younger branches of the Gonzaga, Este, Farnese and other noble dynasties. The military support of princes was often rewarded by granting *privilegium monetandi*, so that in a short period of time the region boasted a very large concentration of mints.

As I have noted, the type of speculation practised in the microstates of northern Italy had little in common with the monetary manipulations perpetrated in the shadow of the growing powers of continental Europe. If there is an analogy worth studying, it might be found in the financial procedures of the German principalities but there has been little research in this area, partly because of the poor organisation of international research programmes that, after some positive advances,<sup>14</sup> have folded under adverse circumstances. Furthermore, the historiography, strongly influenced by the ideology of the Risorgimento not just in the field of

<sup>11</sup> C.P. Kindleberger, *op. cit.*, (1984), pp. 30-31.

<sup>12</sup> *Ibid.*, p. 31.

<sup>13</sup> M. Bloch, *op. cit.*, (1954), pp. 60 *et seq.*

<sup>14</sup> See: A. De Maddalena and H. Kellenbenz, *Finanze e ragioni di stato in Italia e Germania nella prima Età moderna*, (Bologna 1984).

economics, has overlooked the events of an entire universe or treated it as a bit-player rather than a protagonist on the sixteenth-century stage.

From the evidence of the contracts from the Po valley region, we are dealing with companies driven by financial gain,<sup>15</sup> which gave rise to forms of production whose authentic peculiarity, compared with the results of monetary manoeuvres practised elsewhere, was to obtain, in addition to the usual right to seignorage, a supplementary revenue, in other words extra profits. As well as representing a rather singular political ethic, this choice was doubtless founded on considerations of opportunity cost. Thanks to various mid-sixteenth century innovations (first the discovery of Potosí and the Mexican gold and silver deposits and later the introduction of methods using mercury amalgams), the silver/gold ratio increased vastly in terms of the quantities extracted and imported into Europe, until roughly 1620, when the trend inverted again. The fact that in that space of time silver became relatively cheap, must have acted as an incentive for large-scale coinage of billon, for which it was the base ingredient.

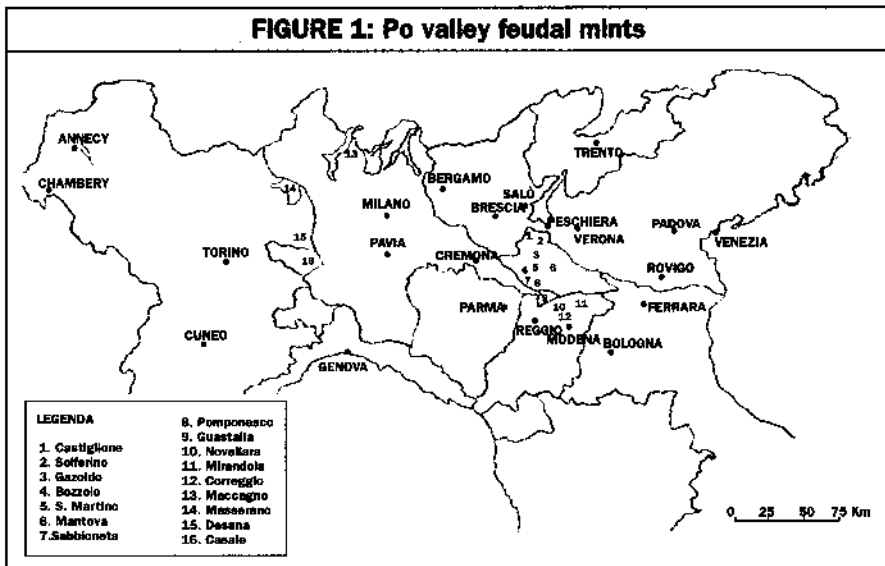
Figure 1 consists of a map of the principal minor mints active in the Po valley area. It could not be said that they all pursued a policy of financial gain throughout the period between the mid-sixteenth and mid-seventeenth centuries (from what we know of the mint at Sabbioneta, for example, it did not follow that path until after the death of Vespasiano Gonzaga (1592)), or that the series is complete. To the original branch belong the mints of upper and lower Mantua: the first ones (Castiglione delle Stiviere, Solferino, Gazoldo, Sabbioneta) stretched out towards the territories of the Venetian Republic, the following ones (Bòzzolo, Pomponesco, San Martino, Guastalla) faced onto the Po; a little to the South, the rings of Correggio, Novellara and Mirandola completed the ideal chain that linked Lake Garda to the Este capital of Modena.

On the right bank of the Ticino, however, and near the western boundary of the state of Milan, in a region eternally contested between the Dukes of Savoy – aggressively advancing as absolute sovereigns from the Alps from the middle of the sixteenth century – the Dukes of Mantua

<sup>15</sup> Unless differently specified, I follow M. Cattini, *op. cit.*, (1999).

(with Guglielmo, also Lords of Monferrato) and the Spanish, several principalities survived in a state of semi-independence. The most famous was, without doubt, Masserano, of the Fieschi Counts.<sup>16</sup> With the addition of Desana and later Maccagno, a sort of triad of mints grew up, well versed in the art of monetary manipulation following the example of the Gonzaga.

A new mint was usually established in the following way. An experienced master of a mint (for example the Xell brothers at Guastalla, David Gaugher from Augsburg, already in the service of the Dukes of Saxony, at Mantua and Gazoldo, or the Italian Gian Antonio Signoretto at Correggio and Novellara), having heard of the fame of the nobles of the Po valley – which was not unusual, given that their activities were discussed as far away as the German courts – arrived with a missive that outlined a personal proposal to the prince on how to run a mint that already existed, or was in the process of being formed. A short or long



<sup>16</sup> For further details on the political context see: C.M. Belfanti and M.A. Romani, "Il Monferrato: una frontiera scomoda fra Mantova e Torino, 1536-1707", in C. Ossola *et al.* (eds), *La frontiera da Stato a Nazione*, (Roma 1987); L. Capuano, 'Un principato conteso: Masserano tra Stato Pontificio, Spagna e Ducato Sabauda nel primo Seicento', *Cheiron*, 33 (2000), pp. 199-242.

correspondence ensued, sometimes even continuing over several years, consisting of a tug-of-war over the disputed issues: the division of profits, above all, and of costs (it was also necessary to establish who was to pay the workers); the logistics of production (who was to obtain the necessary tools, who was to buy what kind of raw materials and how much money to coin); and finally the judicial status of the contractor: a subject, including agreements of safe-conduct and protection, which could not be overlooked by anyone involved in such a dangerous trade.

Different versions of the terms of the contract were sometimes drawn up, until the parties reached an agreement. The ritual game of offers and counter-offers was regulated by the code of honour typical of the courts. For this reason, in November 1588, Gaugher was able to indignantly decline the proposals of the emissaries of Vincenzo Gonzaga, judging them to be inadequate and demanding an increase.<sup>17</sup> Immediately afterwards, however, he concealed his own greed by undertaking to finance the equipment of the mint himself, with the exception of the hydraulic press, the most expensive item in terms of capital costs.<sup>18</sup>

The negotiations were not only bilateral but almost always also involved public functionaries, as well as trusted associates of the aspiring mint masters: Signoretto, for example, constantly asked advice from his friend Francesco Sabbioni, resident in Novellara, who must have fulfilled the function of a veritable inside man; David Gaugher was able to force ever more favourable conditions out of the Duke of Mantua through the go-between Robert Aussirstorfer. On the other side, the archives contain minutes, memoranda or notes written in the hands of the princes' counsellors, disputing conditions, criticising the contract proposals and contesting one point or another.

When, finally, the preliminary phase was considered complete, the

<sup>17</sup> State Archive of Mantua (hereafter ASMn), Archivio Gonzaga, b. 3204, f. 51, Letter of November 13, 1588: "[S]e pure l'A.S. vuole restar servita dela mia perssona, la pregho à farmi dare gli Capitoli realli, che voglio fare gli altri, overo che Io ne stabilirò di novi, essendo [...] altre cose necessarie ad esser p.a dichiarate".

<sup>18</sup> *Ibidem*: "[...] dandomi però l'A.S. Casa et edeff.o del acqua fabricati per farlo caminare, mettendovi per il resto ogni cosa del mio con il capitale, dando al A.S. portione franca, che gli piacerà, et saremo d'accordi, assicurando l'A.S. che non miro à utile mio particolare".

definitive terms of the contract could be drawn up. The structure of the contract was, on the whole, relatively uniform, even in diverse situations, so that it is possible to speak of an average type. At the end of the three-year contract signed in February 1629 at Novellara between Camillo Gonzaga and the master of his mint,<sup>19</sup> each of the parties would have been able to draw up their own ideal cumulative balance sheet, as in Table 1.

**TABLE 1. Share by partners (values expressed as a percentage)**

|                                 | Master of mint | Prince      |
|---------------------------------|----------------|-------------|
| Gross revenue                   |                | Indivisible |
| Fixed costs                     |                |             |
| Building rent                   | 0              | -           |
| Production cost of minting dies | 50             | 50          |
| Other equipment                 | 0              | 100         |
| Taxes on income production      | 0              | -           |
| Assay charges                   | 50             | 50          |
| Variable costs                  |                |             |
| Manpower                        | 90             | 10          |
| Raw materials                   | 0              | 100         |
| Net revenue                     | 50             | 50          |

Undoubtedly, the business had favourable implications for both associates but above all for the prince, who behaved as a natural monopolist. I refer both to his *privilegium monetandi*, and also his 'natural' exclusion from various expenses (such as rent or the acquisition of premises and the subjection to taxation) due to his feudal role. If these elements did not represent a cost (if not in terms of lost earnings) for the prince, it is also true that the situation was not as beneficial in practice as in theory. It was necessary to purchase the raw materials. And, at the risk of scandalizing the prophets of 'classic seignorage', who have always viewed the meagreness of the variable costs attached to it as the motivation behind the *droit de seigneur*, it is necessary to underline that the monopoly in itself was not enough to guarantee an influx of metal to the mint on a regular basis in order to satisfy the financial desires of the partners. Even if it was admitted (but not conceded) that they enjoyed

credit with the public by emphasising their noble associations, how could a handful of workshops squeezed into an area of 4,000 square miles secure enough metal to guarantee the moneymaking instincts of all? On the basis of what territorial jurisdiction were they to function as magnets? The princes soon became aware of this, and prepared themselves in the manner described below.

The contract terms generally only contained vague references to the use of coinage for the company's aims, not surprisingly: as they contained the prince's signature they would have been a lethal weapon for any eventual conspiracy at the Imperial court. If article VI of the cited Novellara contract contained a list of the finest varieties of coin: *dobles*, gold *scudi*, *ongari*, ducatoons, halves and quarters, article VII merely underlined that the head of the mint would be required to coin as much billon as was necessary for the state,<sup>20</sup> pending further information. However, the correspondence contains ample evidence of the ambitions of the different parties, as mentioned earlier, who negotiated at length – one only has to think of the example of Signoretto, Sabbioni and Alfonso in Novellara – over the composition, weight and title of the planned monetary production.<sup>21</sup>

Vincenzo Gonzaga, who had contracted out the Mantuan mint to *mastro* Cesare Bottali in 1626,<sup>22</sup> had to “content himself” the following March with the production of about 70,000 coins per year, two-thirds made up of billon and the rest of gold and silver coins.<sup>23</sup> Half of the billon was to comprise *giustine* with a percentage of 9 ounces to the pound

<sup>19</sup> State Archive of Modena (hereafter ASMo), Archivio Cybo-Gonzaga, b. 160, fasc. 5, *Capitoli con gli quali l'Ill.mo et Ecc.mo Sig.r Co. Camillo Gonzaga Co. di Nuvolara fa per suo Zechiero di Nuolara... conforme agli infrascritti patti.*

<sup>20</sup> *Ibid.*, c. 3: “Sarà obligato il Zichiero à batere tutta quella quantità di monete bas[s]e che farano bisogno per il Stato”.

<sup>21</sup> ASMo, Archivio Cybo-Gonzaga, b. 160, fasc. 5, *All'Ill.mo S.ro Conto Alfonso, S.ro Conto di Nuvolara, suo patrone, in Bagnolo*, Letter from G. Signoretto, December 18, 1569; *Al suo caris.mo M. Fra.co Sabiono da Finale, in Nuvolara*, without date.

<sup>22</sup> ASMo, Archivio Cybo-Gonzaga, b. 160, fasc. 5, *Capitoli con gli quali il Ser.mo S.r Duca di Mantova et di Monfirro conceda ad affitto la Zeccha sua di Mantova a Cesare Bottalli per per persona da nominare da lui per doi anni prossimi da cominciare il primo di dicembre 1626.*

<sup>23</sup> ASMo, Archivio Cybo-Gonzaga, b. 160, fasc. 5, Vincenzo's manuscript, March 9, 1627.

and weighing 1/31 of a mark<sup>24</sup> and the other half coins of 5 *soldi*, 1 *soldo* and *sesini*.<sup>25</sup>

*2.3. A cost production model of minting.* The economy of a small mint located in the Po valley, in other words a typical mint, is not easy to describe due to the many variables in the production organisation. It is, however, possible to provide a general outline. The social revenues  $r$  can be broken down into different parts following the equation:

$$r = w + c_m + d + \pi$$

where  $c_m$  is made up of the costs of the raw materials and (at least theoretically) the depreciation allowance of the minting dies and equipment,  $w$  represents the salaries,  $d$  is the sum of the classic right of seignorage plus other rights (for example, rent on the premises or the minting dies), and  $\pi$  is the (extra) profit.

Dividing  $\pi$  it is possible to ascertain immediately the profit of the master of the mint, usually equal to

$$\pi_s = \pi/2$$

To obtain the prince's quota, however, we would have to add the fees  $d$ , which, in the worst of hypotheses, would merely be equivalent to the seignorage:

$$\pi_s = d + \pi/2$$

According to Cattini's estimates,<sup>26</sup> if the total of coin produced equalled 1, the quota of salaries  $w$  should equal 0.03 and  $d = 0.02$ . It follows that

$$\pi = 0.95 - c_m$$

The size of the profits would in practice therefore depend on the costs of the raw materials and the quantity of pure metal. While it appears well-founded that the production of gold coin was carried out at a loss, with a negative effect on both profit factors ( $c_m > 0.95$ ), silver alloy coinage, on the other hand, due to the lower cost of the raw materials and its poor finesses, gave rise to the most substantial positive profits.<sup>27</sup>

<sup>24</sup> *Ibid.*

<sup>25</sup> ASMo, Archivio Cybo-Gonzaga, b. 160, fasc. 5, *Capitoli con gli quali il Ser.mo S.r Duca di Mantova*, etc.

<sup>26</sup> M. Cattini, *op. cit.*, (1999), p. 196.

<sup>27</sup> *Ibid.*

The sector in question is considered, with reason, to have high entry barriers, due to the expertise and *privilegium monetandi* required of potential candidates as well as the extent of the fixed costs.<sup>28</sup> On the basis of Signoretto's minutes, it is possible to calculate that the annual amount of costs (excluding the raw materials), despite constituting less than 10% of the total value of the business, still totalled at least 3,500 Venetian *zecchini*. To take on such a substantial capital risk required an uncommon effort.

As a rule, nine different operations were required in the running of a non-mechanised mint. Four were connected with the activities of control and guarantee: a superintendent oversaw production, a cashier brought the stamps to the mint in the morning and guarded them at night, as well as keeping the accounts; a commissioner took the samples to the assayer and, on the basis of the latter's response, authorised the continuation of works; a fifth operation consisted of the preliminary activity of engraving the dies. A variable number of workers took it in turns to carry out further tasks,<sup>29</sup> namely, drawing out (reducing the metallic pastes into strips), pressing (beating the cut out discs), and adjustments (consisting of the improvement of the product's many imperfections). The prince nominated and paid out of his own pocket the individuals with the most skilled roles (such as the superintendent, cashier and commissioner); he had final choice over the selection of the assayer and engraver and paid half their salaries; the recruitment of all other workers fell to the master of the mint, who was also in charge of the fundamental task of organising all the factors of production. To these activities can be added other, so-called specialised ones, typical of mints that took place far from the reach of daylight,<sup>30</sup> such as bleaching with acids, if the aim was to make coins appear more noble, or oxidisation, which immediately gave the pieces an impression of the patina of time.

Mechanical methods of coining, requiring the use of mills to power

<sup>28</sup> But also the variable costs were quite high due to the prevalence of skilled workers.

<sup>29</sup> See: C.M. Cipolla, *op. cit.*, (1993), p. 168.

<sup>30</sup> Maldotti Library, Guastalla (hereafter BMG), *Miscellanea di manoscritti provenienti dai fondi Gonzaga, Davolio Marani e Provenienze varie raccolti e ordinati da G. Ciroldi*, doc. 91, Statement of Bernardino Bellasi, September 29, 1670.

hydraulic presses, began to be used in Germany during the course of the sixteenth century. As I mentioned, they were referred to in Gaugher's missive, demonstrating that they were adopted in Mantua from 1593. But it would seem that they remained beyond the means of smaller mints. In the mid-seventeenth century in the Novellara workshop run by Galuppi, to whose troubled history we will return shortly, in addition to the head of the mint and various non-specific workers there were also four fixed qualified workers and a fifth man, specialised in the contrived ageing of counterfeit coins.<sup>31</sup>

Until now, I have deliberately omitted the issue of the raw materials from these calculations, as they deserve to be discussed separately. Even though the influx of ingots and pastes to the mint was widely encouraged in various ways, it was nevertheless necessary, for the reasons discussed above, to guarantee an annual minimum level of coinage as specified by the terms of the contract or the company's deeds.<sup>32</sup> It was not by chance that, according to the 1593 contract, the prince undertook to supply the Mantuan mint – anything but small and unknown – with no fewer than 250 kg of silver per year.

#### *2.4. From retailing to wholesale trade: the commercial cycle of money.*

Once coin was produced, it was necessary to introduce it into circulation. The first level of diffusion took place within a local context: the strategy involved exploiting fairs and markets, the first taking place on occasions of religious solemnity, the second on a weekly basis. As is well known, during the pre-industrial age, the control of the institutions of the regulated market manifested itself through an articulated system of incentives and prohibitions intended to preserve its correct functioning. On market days, the suspension of outstanding debts was guaranteed, the carrying of arms in public squares was banned and the sharp-eyed officers of the prince and commune watched over transactions.

Indeed, the illicit activities of the feudal mints were discovered, even by the higher ranks of the Italian diplomacy. A preliminary hearing

<sup>31</sup> M. Cattini, *op. cit.*, (1999), p. 199.

<sup>32</sup> *Ibid.*, p. 196.

followed the arrest, one Wednesday in March 1669, of a monk and a Jew who were circulating in the marketplace of Guastalla passing off false coins on behalf of the Novellara mint.<sup>33</sup> The two were called Father Francesco Maria Lodi and Leon Cantoni and were caught, it would be fair to say, red-handed, in an ambush laid by shop owners who had previously been swindled. The monk, “without his habit and who had long since abandoned his faith”, was soon after repudiated by the “Clerical Order of the Ministers of the Infirm”.<sup>34</sup> Leon Cantoni was already infamous, to such an extent that the Duke of Mirandola had put an order out on his life, even though he had consistently managed to evade it. The market at Guastalla was particularly suited to such episodes: the city boasted a very busy river port, with trading links to the western Po valley as well as the Adriatic coast, which also facilitated the medium- and long-range circulation of false coins.

From these extraordinary surviving proceedings it is also possible to describe a typology relating to this second tier of trading, in which the role of Jewish intermediaries was prominent. Their traditional business acumen, the availability of means that distinguished them and their strong network of contacts made them indispensable when it came to settling the debts of the European courts, environments where they were well accepted and appreciated. It might be said that Jewish influence at the Italian courts reached its peak right in the middle of the seventeenth century.<sup>35</sup> In the Po valley, the abundant number of courts had favoured a strong concentration of Jewish communities, which certainly exceeded the average density elsewhere across the Continent.<sup>36</sup> As confirmation of the role played by these groups in the development of the mints, it is interesting to note that one of the first actions taken by the Este regent, Laura Martinuzzi, in order to limit the monetary epidemic in the Duchy of Modena, was to institute the ghetto of Reggio on 31 May 1669.

Two bankers, David Tentori and Israel Zipilli, played a central role

<sup>33</sup> BMC, *Miscellanea di manoscritti provenienti dai fondi Gonzaga*, etc.

<sup>34</sup> *Ibid.*, doc. 15, Letter from Ferrante III to Cardinale d'Este, April 17, 1669.

<sup>35</sup> J.I. Israel, *European Jewry in the Age of Mercantilism, 1550-1750*, (Oxford 1989), p. 123.

<sup>36</sup> See *ibid.*, map on pp. xiv-xv.

in events that took place at the Novellara mint. The two men, one from Reggio and the other from Florence, had previously been involved with more than one Emilian mint and even collaborated with the Modena mint (during a lengthy period from 1653 to 1668). They furnished the mint with raw materials, American silver pastes, Tyrolean copper and commissioned two different ranges of products from counterfeiters: billon, mainly made up of Lucchese *sesini*, to be introduced into the Grand duchy of Tuscany, and silver coin destined for the ports of the Near East. The minimum quantity of fine metal that both types clearly contained guaranteed large profit margins both for the mint and the commissioner.

At this point, another Jew entered the story of Novellara, one Jacob Levi who, thanks to Alfonso II, enjoyed the monopoly on tobacco and spirits in the small Emilian principality from 1660. Levi withdrew money directly from the mint and passed it on to the same Leon Cantoni referred to earlier, who organised its transportation across the Apennines and the Garfagnana region, as far as Lucca or Livorno, from whence it travelled by sea. In the meantime, "a small army of workshop owners, spice sellers, mule-riders, fishermen and mountain dwellers"<sup>37</sup> were hired in order to help carry out the operation.

At least ten bankers and merchants, and as many churchmen and court officials from Novellara,<sup>38</sup> along with Count Alfonso and the tireless Galuppi, had held the threads of this venture, one of many performed close to, but beyond the control of, the other nobler duchies of central-northern Italy.

Immediately after the scandal of 1669, Ferrante Gonzaga, the Count of Guastalla, appointed head of the judicial enquiry by imperial mandate, took the trouble to question with an alarming tone the Italian lords he considered to be injured parties in the affair, certain of being himself a victim. A suggestive list can be drawn up showing the extent of the operation, its reach and the effect that the activities of the counterfeiters threatened to have on the stability of the Italian economy: alongside the Modenese and Mantuan authorities were the Duke of Parma, Ranuccio II Farnese, the

<sup>37</sup> M. Cattini, *op. cit.*, (1999), p. 200.

<sup>38</sup> *Ibid.*

Grand Duke of Tuscany Ferdinando II and the Captain of Brescia, Benedetto Dolfin, defender of the interests of the Venetian Republic, among many others. It is not difficult to imagine how much the happy position of the small principalities, wedged in between the larger powers of the time, encouraged the diffusion of *morbus nummaricus* within the peninsula.

### 3. Seignorage and price revolution in Italy

*3.1. Measuring inflation intensity, 1500-1630.* I will now outline the results of recent research I have undertaken into the Italian price revolution,<sup>39</sup> in order to demonstrate the direct relevance of the perspective of the money supply adopted here.

On the basis of the raw data<sup>40</sup> (expressed in money of account) collected in fourteen sample areas and decimalised, I have constructed a system of independent indices of grain prices on an annual basis, in order to identify the chronological extremes of the inflationary process with more clarity, in relation to different Italian experiences. Having established the minimum and maximum values, I have provided the total differential in percentage terms (in Table 2). For the cases where the minimum was not a 'natural' one (physiologically verifiable during the first decade of the sixteenth century), due to an incomplete series, square brackets have been employed. The same can be said for the indication of the conclusive end of the revolution, which it has occasionally been necessary to select arbitrarily.

At this stage, I isolated the relevant segment from each indexed series, namely the revolutionary chronological arc (the surrounding area, in any case, covers the period between 1501 and 1630), obtaining a scatter of time-price vectors; as a result I extracted the equations of the fourteen interpolating lines,<sup>41</sup> using the method of the least squares. This procedure

<sup>39</sup> F. Boldizzoni, 'La rivoluzione dei prezzi rivisitata: moneta ed economia reale in Alta Italia, 1550-1630', *Rivista storica italiana*, 117 (2005), forthcoming.

<sup>40</sup> For the sources, see *ibidem*.

<sup>41</sup>  $p=2.57t+247.41$  (Siena);  $p=3.16t+192.86$  (Sansepolcro);  $p=3.6t+217.16$  (Arezzo);  $p=4.1t+133.72$  (Rome);  $p=3.86t+105.37$  (Desenzano);  $p=4.2t+95.51$  (Bassano);  $p=4.62t+110.11$  (Verona);  $p=7.77t-17.42$  (Cremona);  $p=11.47t-40.76$  (Parma);  $p=13.3t-56.29$  (Modena);  $p=15.83t-155.51$  (Finale Emilia);  $p=5.24t+56.49$  (Como);  $p=3.76t+139.38$  (Varese);  $p=3.58t+100.58$  (Pavia);  $p$  is price and  $t$  is time.

**TABLE 2. Synthetic values**

| Markets       | Concluding year | Year max | Year min    | $\Delta$ (%)<br>max/min | $\hat{\beta}$ | $\hat{\beta}_1$ | $\hat{\beta}_2$ | $R^2$ |
|---------------|-----------------|----------|-------------|-------------------------|---------------|-----------------|-----------------|-------|
| Siena         | 1631            | 1631     | [1547]      | 660                     | 2.57          | 3.09            | 3.54            | 0.23  |
| Sansepolcro   | 1630            | 1591     | 1510        | 1,031                   | 3.16          | 3.89            | 3.57            | 0.4   |
| Arezzo        | 1630            | 1593     | [1535]      | [907]                   | 3.6           | 4.44            | 3.53            | 0.37  |
| Rome          | 1630            | 1592     | [1553]      | [744]                   | 4.1           | 5.37            | 1.71            | 0.53  |
| Desenzano     | [1625]          | 1591     | [1573-1576] | n.s.                    | 3.86          | n.s.            | n.s.            | 0.57  |
| Bassano       | 1629            | 1629     | 1506        | 971                     | 4.2           | 4.52            | 8.35            | 0.65  |
| Verona        | 1629            | 1591     | 1507        | 1,245                   | 4.62          | 4.55            | 4.88            | 0.67  |
| Cremona       | 1629            | 1629     | 1506-1507   | 2,087                   | 7.77          | 6.2             | 17.96           | 0.66  |
| Parma         | 1628            | 1628     | 1506        | 2,585                   | 11.47         | 9.71            | 41.48           | 0.68  |
| Modena        | 1629            | 1629     | 1507        | 2,510                   | 13.3          | 11.62           | 26.85*          | 0.75  |
| Finale Emilia | 1626-30         | 1626-30  | 1501-05     | 2,353                   | 15.83         | 14.47           | 30.51           | n.s.  |
| Como          | 1629            | 1629     | 1535        | 967                     | 5.24          | 5.09            | 11.71           | 0.73  |
| Varese        | [1612]          | 1591     | [1530]      | [904]                   | 3.76          | 3.77            | 5.26            | 0.54  |
| Pavia         | 1629            | 1597     | 1508        | 718                     | 3.58          | 4.38            | -0.2            | 0.7   |

\* Base year is assumed to be 1603.  
n.s.= value not significant.

reveals some important indicators, which are very useful for a comparison between the series. The first is the estimate of the slope of the interpolating line –  $\hat{\beta}$ , which gives a much more precise measure of the relative intensity of the phenomenon; the second is the determination coefficient –  $R^2$ , which reveals an indirect description of the size of the irregular fluctuations compared with the trend. I then separated  $\hat{\beta}$  into the values  $\hat{\beta}_1$  and  $\hat{\beta}_2$  derived, respectively, from regressing the partial series into two sub-periods (pre-1600 and post-1600), here considered separately. I will return shortly to an interpretation of the tabulated data.

The analysis carried out so far reveals a static picture or, at most, one of close comparison, based on central-northern Italian evidence. The adjusted indicators, although obtained on an intra-series basis, already make it possible to establish comparisons between the various realities, in order to read analogies and differences. However, they do not at this point reveal either reciprocal interactions, if there were any, or causal relationships between the series. To overcome these limitations, it is necessary to undertake a dynamic analysis.

*3.2. New evidence, new conjectures.* The middle of the sixteenth century could be identified as the beginning of the Italian price revolution. Indeed, it is evident that the rise in price level already began during the first decades of the sixteenth century; but it is also true that the intermittent crises of underconsumption lost their restraining effect only during the course of the second half of the century. It is perhaps easier to establish (data permitting) when the process came to an end. There is a dichotomy in this regard: where the phenomenon is strongest it survives the crisis of the 1590s (the structural turning point) and the upward spiral only ends at the conclusion of the second decade of the seventeenth century; where it is weakest it ends in the sixteenth century.

The values ( $\hat{\beta}_1$  and  $\hat{\beta}_2$ ) collected in the last columns of Table 2 allow, as I have said, a comparison between the intensity of inflation before and after 1600, the ideal turning point. While the central Italian series show a steady level of price growth rates in the second phase of the 'revolution' (Rome is the only exception, where the intensity appears to be reduced to a third compared with the earlier period), for northern Italy it would not be unfounded to speak of a long preparation during the sixteenth century and an authentic price explosion that took place only during the following century. During the seventeenth century, inflation doubled in vehemence in the Eastern Veneto region, in the Comasco, the Este capital and the countryside of lower Modena; it tripled in Cremona and more than quadrupled in Parma. The rise is even more striking considering that it is generally measured over a period of three decades (compared with the one hundred year period over which the first phase has been deliberately distributed). The market in counter-trend is here represented by Spanish Pavia, which even experienced a modest deflationary turn (-0.2 is the interpolation coefficient).

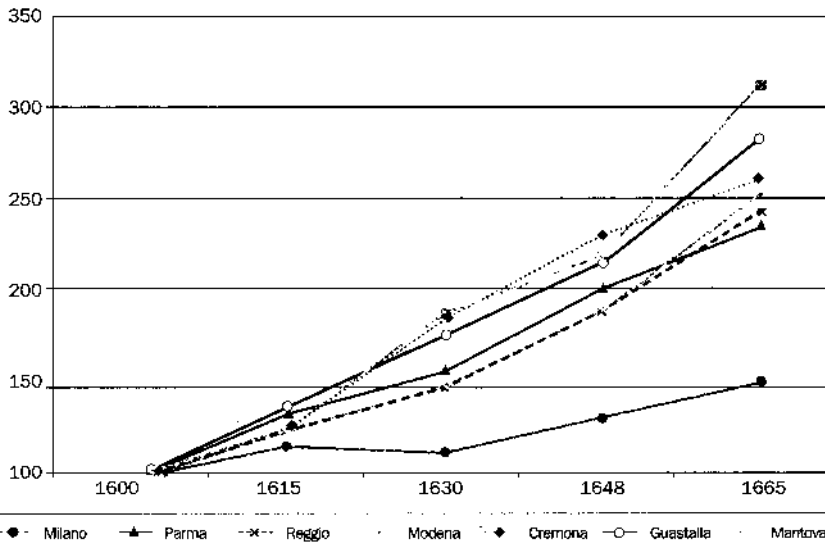
Let us turn our attention to the entire period, of about one hundred and thirty years, and attempt to establish an overall hierarchy, which will highlight the intensity of the price rise along the various latitudes and longitudes of the peninsula. The values of  $\hat{\beta}$ , set out in Figure 2, fulfil this requirement very precisely. The most interesting result is, without doubt, hyperinflation in the region of Emilia, felt even more strongly in the countryside and smaller centres (see, for example, Finale) compared

**FIGURE 2: Inflation Intensity Index across Italy, c. 1500-1630**



Source: Table 2.

**FIGURE 3: Devaluation trends in the bilion money markets (1600=100)**



Source: F. Boldizzoni, 'La rivoluzione dei prezzi rivisitata', cit.

with the cities. The Po valley, the location of the small mints, therefore seems to constitute the epicentre of the Italian price revolution during the period from the mid-sixteenth century to the end of the second decade of the seventeenth century, with cumulative rates in the order of 2,500%. Furthermore, the spiral increases precisely during the period of time (the first three decades of the seventeenth century) when the activities of the monetary workshops were most frenetic. The high peaks and nervous oscillations testify to the fragility of the market structures in a non-irrigated valley,<sup>12</sup> but also to their extreme reactivity. The further we move in all directions from the large area of the peninsula discussed here, the slope of the straight lines diminishes progressively in tandem with inflation rates, which do not, however, sink below 700% (for significant annual average values that exceeded at least 5%).

The most immediate measure of the debasement can be derived from considering the trends of fine silver or gold coin (gold is preferable in a period of endemic depreciation of silver), in terms of money of account. Figure 3 offers a synthetic outline of the situation in the Po valley duchies. Mantova, Cremona and Guastalla hold the record for trend volatility, with the devaluation rate of billon (or rather, the appreciation of the Spanish *doble*) at little less than – solely during the course of the thirty-year period from 1600 to 1630 – 200%. Next in line are Parma, Modena and Reggio, all at about 150%. Only Milan is completely removed from this phenomenon, at 15%. Comparing the rising trend of gold and silver money with that of grain prices, our hypothesis is confirmed. It is useful to point out that the Pavian (and Milanese) deflation kept pace with a monetary situation of substantial stability in the heart of Spanish Lombardy. Cremona and Bassano register a perfect parallel with the interpolating lines; at Parma and Modena the inflationary violence far exceeded the (also notable) strength of the monetary devaluation, being led by a growing demand for consumption goods.

Starting from the 1630s, money and prices took two different paths: if the revaluation trend of gold and silver coin was consolidated, prices, depressed by real factors, collapsed. While the verses of Tasso and Guarini

<sup>12</sup> A. De Maddalena, *Moneta e mercato nel Cinquecento*, (Firenze 1973), p. 57.

were fading away to be replaced by the polemical tones of Tassoni, and the poetic – by now deprived of meaning – was supplanted by the treatises of Bruno and Campanella, Sarpi and Galilei, the curtain lowered over the Italian “long sixteenth century”. In a few years time, famine, disease and war would sweep away the last traces of the Renaissance. In this the demise of the court was intertwined with the destiny of the Gonzaga: any tentatives to resuscitate either would have been in vain.

After thirty years of struggle, from the 1660s, in Italy as elsewhere a new world began to form, which, it would seem, continues to the present day. The “second middle ages” had ended and the modern period commenced.

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