

Gian Rinaldo Carli (1720-1795): Diagnosis and treatment of a monetary plague

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Abstract

Gian Rinaldo Carli was an “expert” of money who lived in the 18th century, in an economic environment revolving around national and international trade. Belonging to a community of scholars who lived in a sort of golden age of pre-classical studies on money, Carli stood out for his insistence on the need to intervene to contain monetary imbalance, seen as a serious impediment to the expansion of trade and economic dynamism. Carli curved his analysis, which was theoretical in its depth, to political action and initiative. He sought to craft those rigorous empirically based measures that should underlie the practical work of a reformer. The paper aims to understand how Carli introduced rigor into his approach to monetary advice, in order to make it more adequate to meet what he believed was a growing need expressed by the governors of the time, starting with the Empress of Austria.

Jel Classification: B11, B31

Keywords: Gian Rinaldo Carli, monetary reforms, eighteenth century

Submission: 2020.08.24

Accepted: 2020.11.23

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Introduction

“Some mathematicians maintain that money is like water, which flows and swirls around until it finds its equilibrium again. The fact of the matter is totally different, especially in Italy” (Carli 1751: 164-165). This quotation from one of Gian Rinaldo Carli’s main works, *Dell’origine e del commercio della moneta e dei disordini che accadono nelle alterazioni di essa* (*On the origin and trade of money, and the disruptions that occur in its alterations*) (1751), makes it clear that Carli treated monetary imbalance as a normal condition in an effort to find suggestions for restoring monetary stability – or equilibrium, as he repeatedly put it. Monetary imbalance was not just an increase in prices, but something broader and more complex that concerned the workings and the management of money as a means of intermediation.

Gian Rinaldo Carli was an “expert” of money who lived in the 18th century, in an economic environment revolving around national and international trade¹. Belonging to a community of scholars who lived in a sort of golden age of pre-classical studies on money, Carli stood out for his insistence on the need to intervene to contain monetary imbalance, seen as a serious impediment to the expansion of trade and economic dynamism. In fact, the erudite Carli, far from being a theorist focused on the abstract meaning of money and aspired to be considered an expert of money called to solve monetary troubles.

Carli thought it legitimate to ask for the substitution of juriconsults, trained mainly in law and philosophy, with experts in monetary matters, like Carli himself. Money had to be treated “scientifically” and only a monetary expert could offer to the ruler advice based on a scientific analysis of money. In this way, Carli recognized that the monetary sphere, and finally the economic one, had the status of an autonomous sphere which required specific studies, and erudition regarding the past money system. Finally, he began to apply to the management of money what he considered to be objective rules. Among the latter, specific political measures capable of ensuring that the legal value of a currency would correspond to its intrinsic value. It was on this premise that coins could be accepted, used for trade, and not hoarded.

¹ Carli’s contributions related to his work as a monetary consultant at the Duchy of Milan have been analyzed quite extensively. See, among others, Vianello (1938), De Stefano (1942), Apih (1973), Costa (1993), and Trampus (2006). Among the works, not many to tell the truth, that have deepened his monetary theory or monetary policy, should be remembered: Marcelli (1955) and Nuccio (1966). Specific interest was then aroused by his proposal for an index number, often cited in the relevant literature. Recall: Mitchell (1921), Sackley (1965), Diewert (1997, 2005), and Levell (2015)

Monetary relationships could be objective, based on numbers, not subject to the moods of rulers. In developing this objective view of money, he saw himself as a “doctor” (1754: 296), who intervenes on the strength of given certainties deriving from a thorough, erudite knowledge of the world of coins. For Carli, being a money doctor meant advising rulers on the basis of monetary expertise, not philosophical or legal proficiency².

In a period of lively monetary debate, it was after meeting Ludovico Muratori (1672-1750) that Carli became convinced that a more scientific approach should be proposed for monetary matters. Muratori had written: “This subject [monetary topic] is one of the most intriguing that public government deals with, and which is not inferior to metaphysics and geometry” (1749: 379). Carli conceived monetary intervention as part of a science of administration, in this he was in common with other important monetary thinkers of the second half of the eighteenth century, such as Pompeo Neri (1706-1776) and Pietro Verri (1728-1797).

The purpose of this paper is to understand how Carli introduced rigor into his approach to monetary advice in order to make it more adequate to meet what he believed was a growing need expressed by the rulers of the time.

So, what can be expected from reading Carli’s numerous texts on monetary problems? An accurate analysis of monetary errors, in particular what he considered a monetary plague, debasement, i.e. a reduction in metal content of currency, which had as an obvious consequence the demand for new monetary measures and policies (see Marcelli 1955: 50). Carli curved his analysis, which was theoretical in its depth, to political action and initiative. He sought to craft those rigorous empirically based measures that should underlie the practical work of a reformer. The rhetorical figure of the “doctor” applied to money and economics was intended to signify an effort to unite science and politics, both of which were necessary for the construction of this new professional figure. Let us see if Carli’s proposal was successful.

The paper is organized as follows. Section 1 contains some biographical background on Gian Rinaldo Carli. Section 2 identifies some coordinates drawn from Carli himself to place him in the monetary debate of his time. Section 3 analyzes Carli’s interpretation and remedies for the debasement of money, ‘plague’ in his words. Section 4 sketches the Carli’s interpretation of the then great inflation focusing on the index number he proposed. Section 5

² Carli was not the first monetary scholar to use the rhetorical figure of the “doctor” to indicate a monetary expert. The book *Discourse on Common Weal* published in 1581 (and possibly authored by John Hales) contains a dialogue involving a doctor expert on money matters (see Dewar 1966).

describes how Carli applied his ideas to reform the Milan monetary system. Finally, some final considerations have been added.

1. Living to be an encyclopedic expert

Carli was born at Koper (now in Slovenia) in 1720 into a modest bourgeois family, but his education brought him into contact with the more advanced Italian culture of his time. As a teenager, he was a pupil of the abbot Giuseppe Bini, who introduced him to the work of Ludovico Muratori. This man of letters was famous both for his erudite method and for his ideas about Italian unification, and on both these aspects he was an important figure in Carli's life and work³. Muratori was also the author of an interesting essay entitled *Della pubblica felicità (On Public Happiness)*, published in 1749, which revealed him as an exponent of that moderate Enlightenment spreading in Italy after the election of Prospero Lambertini as Pope Benedict XIV in 1740⁴.

In 1739, Carli obtained a grant from the Koper local authority that enabled him to move to Padua and enroll at the Faculty of Law (the alternative was the Faculty of Arts, which was attended by philosophers, physicians and theologians). He soon swapped studying law for the experimentalism and classicism of his new friends: the naturalist and biologist Antonio Vallisneri (1661-1730); the physicist and engineer Giovanni Poleni (1683-1761), who was one of the first to be given a teaching post at Padua University to lecture on experimental physics; and the poet, Latinist and writer Jacopo Facciolati (1682-1769), who taught logic (see Apih 1973).

Carli's interests included theater, poetry and history, which he condensed in his erudite reflection on *Della spedizione degli Argonauti in Colco (About the Argonauts' shipping to Colco)*, published in 1745. Going against his father's expectations, who wanted him to follow a law career, in 1749 Carli was appointed by the university to teach *Theory of the nautical arts* (a topic

³ On the steps of Ludovico Muratori, for Carli erudition meant looking at history as source, that is, the adoption of an historical approach to explain money and other current phenomena. In his turn, Muratori's thinking about an active approach to history and erudition cannot be understood without mentioning his teacher, Benedetto Bacchini (1651-1721), a Benedictine who contributed to import in Italy from France the method of Father Maurin stressing the importance of comparison and interpretation of documents in the historical analysis. As detailed by Golinelli (2003: 11 ff), Bacchini was also influenced by a friend of Galileo, Francesco Maria Fiorentini (1603-1673), who equally claimed the application of a severe method in historical research. Carli together with Muratori belonged to this world of historians that, finally, were trying to make history more rigorous, far from being a mere tale of facts.

⁴ See J.I. Israel (2006), and particularly the chapter "Italy, the Two Enlightenments, and Vico's 'New Science'": 513 ff.

of interest to Venice) with the support of Poleni and Marco Foscarini, a man of letters and future *doge* of the Venetian Republic. Taking a more practical than theoretical approach, Carli wrote an essay entitled *Intorno alla declinazione e variazione della calamita (On the declination and variation of the magnet)*, which goes to show his interest in practical matters.

After that his marriage to a young heiress, Paolina Rubbi, in 1748, solved all his financial problems, Carli was able to turn towards the topics that really interested him. Once he had become a “prince” (or president) (1748-50) of the *Accademia dei Ricovrati* in Padua (later renamed as the *Accademia galileiana di scienze, lettere ed arti*), he broadened his horizons to social and economic topics. In 1747, in his *Parere sull’impiego del danaro (Opinion on the use of money)*, he supported Scipione Maffei (1675-1755), another important scholar of the time, who claimed that loans with interest were lawful.

In 1749, on the sudden premature death of his wife, Carli came into a sizeable inheritance. His economic standing allowed him to take part in the public debate on theater, witches, and so on, in which he always took a moderate stance. His new financial situation also enabled him to leave the chair of nautical arts at the university in 1750, bringing to an end an academic career that he had never really sought. Carli produced his early works on money at around the same time. In 1751, he published *Dell’origine e del commercio della moneta e dei disordini che accadono nelle alterazioni di essa (On the origin and trade of money, and the disruptions that occur in its alterations)*, which represented the prodrome to his *magnus opus* on money (eleven dissertations) *Delle monete e dell’istituzione delle zecche in Italia (Of the coins and of the institution of the mints in Italy)*⁵, published between 1754 and 1760. Of this great work, we mention here *Digressione su la proporzione media fra i metalli monetati (Digressions on the average proportion between monetized metals)* (1754) and *Del valore e della proporzione dei metalli monetati con i generi in Italia prima delle scoperte dell’Indie col confronto del valore e della proporzione de’ tempi nostri (On the value and proportion of metals monetized in Italy before the discovery of the Indies, with a comparison of the value and proportion of our times)* (1760). These works established his as an “expert” on monetary issues, and it became clear that Carli was interested in the practical management of money.

⁵ The full title is: *Delle monete e dell’istituzione delle zecche in Italia dell’antico e del presente sistema d’esse e del loro intrinseco valore e rapporto con la presente moneta sino al secolo XVIII per utile delle pubbliche e delle private ragioni (Of the coins and of the institution of the mints in Italy of the ancient and of the present system of them and of their intrinsic value and relationship with the present currency up to the century XVIII for profit of the public and private reason)*.

The historical nature of Carli's monetary research must be understood. Carli meant history not as description "how the thing is", but as *Historia*, as attempt of explaining why things are so (see Pomata and Siraisi 2005). History of past monetary systems and experiences could provide a wide basis of case studies on which any analysis of current issues can be grounded.

After his second marriage to Anna Maria Lanfranchi Chiccoli (Sammartini's widow, who came from a noble family in Pisa), Carli left the Republic of Venice for places he saw as having a more reforming approach, where his services as a money technician would be more appreciated. The new destinations of this well-travelled thinker (by Italian standards) were Turin, Tuscany and Milan, and Carli had the opportunity to work with several important people of his time, like Pietro Verri.

Between 1754 and 1760 he published other important books (mainly in Tuscany), including the *Saggio politico ed economico sopra la Toscana (Political and economic essay on Tuscany)* (1757). His publications did not yield the expected outcome in terms of appointments, however, and he was obliged to go back to Koper, partly to sort out some inheritance issues after his father's death. The shift in his scientific interests towards local history coincided with some attempts to set up some businesses, which failed miserably, negatively affecting his financial situation. His marriage also became a problem, leading to a lengthy legal battle over the maintenance of his second wife.

In 1764, Carli moved first to Emilia Romagna, and then to Lombardy, where he succeeded in obtaining a post as technical money consultant when the Empress Maria Theresa of Austria, appreciating his talent and independence, appointed him president of the new Supreme Council of Economics, and Councilor of the New Deputation for Studies in the Duchy of Milan. Throwing himself headlong into his new assignments, he published several interesting reports, including: *Osservazioni preventive al piano intorno alle monete di Milano (Preventive observations on the plan regarding the money of Milan)* (1766); the *Saggio sull'economia pubblica (Essay on the public economy)* (1769); and *Nuove osservazioni sulla riforma delle monete (New observations on money reform)* (1770). These were the years of ideological and human conflict with Pietro Verri, fueled by the preference that the Empress and Chancellor Kaunitz accorded to the moderate Carli over the innovator Verri.

In the second half of the 18th century, Carli was cited as the money "technician" who could "face the difficult subject of the monetary crises of the time, remedy them with reforms, or even just understand them" (Marcelli 1955, 46). These were the years when he published: *Breve ragionamento sopra i bilanci economici delle nazioni (Brief considerations on the econo-*

mic budgets of nations) (1770); *Relazione del censimento dello stato di Milano* (*The Milan census*) (1770); *Del commercio dei grani* (*On the grain trade*) (1771); and the controversial *Meditazioni sull'economia politica del Verri* (*Meditations on Verri's political economy*) (1771). He also found a renewed interest in education, writing: *Nuovo metodo per le scuole pubbliche in Italia* (*New method for public schools in Italy*) (1774).

New family conflicts with his divorced wife, and then with his son too, combined with a gradual decline in his authority as a technical reformer to drive him towards increasingly conservative positions, and a greater interest in politics.

In 1779 he published *L'uomo libero* (*Free man*), taking a stance in opposition to Rousseau's and revealing an increasingly convinced justification of absolute power that is expressed in his *Lettere americane* (*American letters*), which he began publishing in 1780. Meanwhile, the arrival of Joseph II on the throne in Vienna put a stop to his career as a reforming consultant, with serious repercussions on his financial situation. He rejected a post as consultant to the Republic of Venice to devote himself to researching and writing on history and other subjects, including medicine. This led to the publication of *Delle antichità italiane* (*Italian antiquities*) (1788-1791), and *Ragionamento sulla diseguaglianza* (*Considerations on inequality*) (1792). Carli died near Milan in 1795.

2. Looking for a place in the monetary debate of the time

Carli was not particularly original in his analysis of monetary issues. He did not pull a rabbit out of a hat like Bernardo Davanzati (1529-1606) a century before him, when he spoke of the value-in-use of money.⁶ Ferdinando Galiani's refined theory of value was a long way off. But any comparison could be misleading if we do not adequately clarify the scope of Carli's contribution: as Velve (2020: 449) points out about seventeenth-century Neapolitan money doctors, "experts [...] have thought the problem through. In doing so they all resorted to a different mix of theory and observation." Carli's goal was not to formulate a coherent and refined monetary theory. Carli started from specific statements or points of view, the result more of observation than of theoretical insight, to identify appropriate solutions to monetary problems. Considering himself a policymaker, certainly not an "economist" without any qualifying adjective, as he defined the then French

⁶ Marget emphasizes Davanzati's insight into the usefulness of money (1938: 14).

physiocrats (1771: 106 and *passim*), he focused more on the development of policy instruments than on abstract theorizing.

The most important of the statements at the heart of his monetary policy design was his opposition in every way to monetary debasement, that is, a decrease in the real (market) value of currencies in relation to the nominal value of them decreed by law⁷. That practice would have induced foreign partners to refuse payments in domestic currency, causing an increase in import prices. Carli was persuaded that he was tackling a thorny topic: “To date, as far as I know, there has been nobody who has dared to raise the curtain to reveal this mysterious stage [money disorder], for which various comedies were written, and on which not a few tragedies were presented” (1751: 197).

Discussion on the debasement of coins had been around for a long time. As Nuccio (1966: XXII-XXIV) well underlined in the appendix accompanying the reprint of the Custodi volumes dedicated to Carli, it is possible to understand the latter’s position on monetary alterations by recalling the then widespread distinction between monetary unit of negotiation and unit of payment (Nuccio XXIII). The lira of account was the bargaining unit, imaginary, in which bonds, declarations and so on were expressed. It was not, however, the currency – zecchini, florins and many others – used for payments, in gold, silver or low alloy. The alteration of currency could also occur through the raising of the nominal value of coins, by decree, without any corresponding increase of the noble metal. This variation was reflected in the ratio between high and low currency. But Carli seems to be less interested in this alteration, well analyzed by Broggia (1743), than in the one deriving from the reduction of the quantity of noble metal contained in a coin that kept its legal value unchanged. Referring to all these cases, Carli talks about the debasement of currency whose effects were produced, through the market, on the prices of goods.

Carli anchored his appeal to solve the debasement problem to the writings of John Locke (1632-1704), and Nicolas Dutot (1684-1781). While Carli frequently mentioned Dutot’s analysis⁸ of how the devaluation of international coins was transmitted to domestic prices (1754: 278), he explicitly complained about the lack of an Italian Locke and an Italian Newton (1954: 263) capable of raising and solving the problem of monetary decline. He was likely thinking of the controversy that had pitted Locke against William

⁷ Venturi wrote “Carli combats arbitrary alteration, that is, any form of manipulation that is not based on the consensus of the market, but draws its origin from the desire to increase the rents of the state or to privilege this or that element of economic life” (Venturi 1969: 460). On debasement in Medieval era see Rolnick, Velde, and Weber (1996)

⁸ Carli cited Dutot’s work, *Réflexions politiques sur le finances et le commerce* (1738). On Dutot, see Velde (2012).

Lowndes (then a Treasury official charged with planning the recoinage of silver coins), who suggested increasing the value of official silver coins by 25 percent – precisely the sort of idea that Carli rejected. Lowndes was practically ignoring John Locke’s earlier warning that raising the coins’ legal value would not prevent people from continuing to melt them to sell the silver in bullion because the value of silver would have remained above the mint (see Kleer 2004: 539). Carli did not mention Lowndes’s monetary reform of 1695, but we imagine he disagreed with the idea of reducing the weight of the shilling to the level it had been worn down to in use (see also Rist 1938: 106). Carli would have preferred to adopt the market price of money, thus establishing a rule for the politicians of the time: to ensure that the legal value of a currency respected the intrinsic value set by the market. It was clear that Carli believed in a long-term stability of the price of gold and silver, not conditioned by the discovery of new mines.

Focusing on the debasement problem led Carli to state another crux in his analysis, that concerning the consequences on prices of European gold imports: he argued that the importation of precious metals from the Americas had no inflationary effects in Italy. In this case, his target was Jean Bodin (1530-1596), variously quoted in Carli’s works, but only to emphasize his opposition to some of Bodin’s most important statements. True to traditional quantity theory, Bodin said: “c’est l’abondance qui cause le mépris [it is abundance that causes contempt]”. He came to this conclusion after accepting that gold and silver imports from the New World were causing inflation (Bodin 1568). As we will see, Carli firmly opposed this view, which he saw as the French scholar’s most important message. To be fair, we should remember that France was experiencing a severe inflationary process at the time, particularly during the second half of the 16th century.

For Davanzati, Geminiano Montanari (1633-1687) and many others, the economic arena was not local or national, but international. In an age when states defined their international as well as their national roles in political terms, the international monetary system was a topic of pivotal concern in their analyses. Carli, on the other hand, retained a national view of economics, although he grounded his monetary analysis on international trade and international money exchanges. In a logical sequence that linked the proportions between the precious metal (and especially silver) coins used in international exchanges and the base metal coins used in his home country, Carli retained a national or domestic perspective on the effectiveness of monetary measures. In actual fact, the relationship between the noble coinage and the low (or small) coins used within a country did not always reflect their legally declared proportions. International currency was pegged to precious metal

prices, while the value of national currencies was guaranteed by national institutions themselves. Carli spoke explicitly of two values and two measures being applied (1754: 274). This implicitly means that the two coins do not necessarily go in the same direction: the low coin may depreciate while the noble one remains unchanged (1754: 277). Distinguishing the “major transactions”, those that took place in gold and silver coins, from those related to work that employed “bad” copper coins (see Braudel 1977: 57), Carli appeared, in the first place, interested in the former.

However, the central role given to economic policy was evidence that the state was re-emerging as the supreme player in economic initiative. Proof of this comes from the fact that, in the 18th century, neither British nor Italian scholars’ monetary analyses could be isolated from the eudemonological purposes of the state. The aim of the economy and politics was to assure citizens the greatest possible overall well-being. This could be seen with Francis Hutcheson (1694-1746) in Great Britain, and then with Antonio Genovesi (1713-1769), Pietro Verri and Cesare Beccaria (1738-1794) (among others) in Italy. Even Muratori dedicated his book to *public happiness*. Scholars reflected a widespread need for state intervention in the public interest. Carli was heading for the same goal, public well-being, but gradually he developed a personal opinion on public intervention. After his experience as a reform consultant in Milan he wrote: “The condition of the people becomes better when discipline and order are established through the power of a sovereign; that is, when the parts that make up society are in harmony; and this harmony can only be sustained by means of opinions”, but opinions scientifically based on numbers and proportions (Carli 1779: 171). This explains much of the rigor he promoted in dealing with monetary issues.

3. Dealing with a monetary plague

At first sight, G.F. Knapp’s notion, re-proposed by J.A. Schumpeter,⁹ of ‘Practical Metallism’ seems to fit perfectly with Carli’s applied use of monetary theory. For Carli, however, the point is not so much or only the correspondence between monetary unit and some commodity, but almost paradoxically its political consequence: the need for an arrangement among the

⁹ Schumpeter wrote: “By Practical Metallism we shall denote sponsorship of a principle of monetary policy, namely, the principle that the monetary unit ‘should’ be kept firmly linked to, and freely interchangeable with, a given quantity of some commodity” (1954: 288).

many possible trade partners (countries) on the value of a commodity-currency, a value that should not deviate from its market value.¹⁰

3.1. From the value of coins to the price of goods

Carli's reading of monetary debasement can be understood by considering the three values that a coin made of a noble metal could take. First, it had a *decreed* or *legal* value, also defined as *imaginary* money (1766: *passim*),¹¹ which was essentially the coin's value expressed in liras as stated by the authorities. Second, it had an *exchange* value, which was the *intrinsic* value of the coin calculated on a given price of its content in grams of fine gold and silver, which were in strict proportion to one another. Third, it had an *abusive* value, meaning the exchange value proposed by money-changers, lenders, and cashiers (1766: 38). Skipping the third concept, the other two are useful when considering Carli's monetary theory.

Money had a decreed value because the authorities at the time would announce the legal value of a given coin (usually gold and silver, sometimes copper too) by decree. Carli described this value as *legal*, and sometimes as *imaginary*, to emphasize the fact that it might or might not coincide with the *commercial* or *real* value of the piece of metal employed as a coin. The legal value of a coin usually exceeded its real value because governments needed to recover the cost of minting it. If the value of the coin corresponded to the

¹⁰ The point has been recently evoked by Cesarano, who, discussing of nature of money and, particularly of advancement concerning theoretical cartelism, wrote: "The coexistence of this progressive view with the prevalence of commodity standards, far from being a mere historical curiosity, demands an explanation inasmuch as it testifies to the elusive interaction of the multifaceted nature of money with policy rules and the design of monetary arrangements, an issue still unsettled" (Cesarano 2014: 178). Rosselli, too, analyzes the distinction between theoretical and practical metallism in Galiani, highlighting its difficult application (Rosselli 2001: 47).

¹¹ Galiani wrote: "An imaginary money is the one that does not have a whole piece of metal that corresponds precisely to its value" (1751: 152, T. III). Luigi Einaudi, an Italian economist, returned to this subject in a masterly essay, *Teoria della moneta immaginaria nel tempo da Carlomagno alla Rivoluzione Francese (Theory of imaginary money over time from Charlemagne to the French Revolution)* (1936). He said that imaginary money was "an abstract entity that peoples longed for and princes managed sometimes for profit and mostly for public benefit" (1936: 265). Carli considered legal tender as a modern version of the imaginary money: "The theory of the imaginary came modernly, and it was the law men who – misunderstanding the feelings of their predecessors – strove to make people believe it was a universal sentiment of the jurists that the law has the power to make the imaginary real, and to make fourteen equal twenty-one, although *naturam mutare pecunia nescit*" (1754: 260). On this topic see also Fantacci (2002).

commercial value of the piece of metal, its legal value would include its intrinsic value plus an additional value justified by the work needed to make it and the ruler's right to seigniorage (1751:93-106). Taking all this into account, the decreed value of a coin was clearly going to be higher than the value of the precious metal it contained, but – providing it was kept within reasonable margins – this added value could even be necessary to prevent coins from being melted down and used for other purposes.

Problems could arise if the use of decrees becomes pathological, i.e., when authorities change the ratios between currencies too frequently without adjusting the quality of contained metal. With the same quantity of noble metal, they could then mint a larger number of coins in order to reduce public debt, finance ongoing expenditure or increase the nominal value of gold reserves. This was the money altering much criticized by Carli and amounted to a devaluation. Why did Carli, unlike other authors, such as Galiani, consider this practice so devastating?

Carli wrote that the price of goods exchanged within a country was always decided by the low or petty currency (1754: 281), but the point was that domestic prices were affected by the alteration of the noble currencies used in international trade. In order to understand this supposed effect, one must clarify the following statement from 1766 that refers to internationally traded goods: “good prices are always proportional to the real [intrinsic], and not to the imaginary value of money” (1766: 47). Carli hypothesized that foreign partners are always rationally able to attribute market value to currencies whose value has been fictitiously distorted. Indeed, a country that arbitrarily reduction of the contained noble metal will see an increase in the price of its imports, as a result of the reactions of international partners to maintain a stable relationship between the price of goods and the real or commercial value of the currencies used for international payments. In its turn, the increase in the price of imports will affect domestic products traded for imported products.

Debasement had only nominal effects, then? Not really. Several times in his works, Carli emphasized that the wages and remuneration of the less well-off classes of workers were not settled in noble currency, but in the local petty coinage, which in most countries was not adjusted to the trend of the noble currency. Since rising prices affected all goods, whether they were expressed in noble or base metal coins, wages and lower incomes lost purchasing power. In short, the end-result of a debasement, which caused an increase in prices while leaving wages unchanged, was an impoverishment of the less well-off classes of workers.

On the other hand, a currency may be overvalued when its legal value is lower than its commercial value. In that case it would be destined to be

hoarded and to disappear from the market. Carli recalled how this had sometimes happened to the Venetian *zecchino*.

It is worth emphasizing that the intrinsic value of a particular gold coin, or rather the price of gold, was not invariable but depended on its mining and marketing. So, a solution had to be found to cope with the need to have an internationally-accepted invariable measure of the noble metal's value from which to establish the value of a given national currency. Carli's idea was that countries should agree on the price of a gram of fine gold or silver.

Opinions on the debasement were divided, however. Galiani¹², among others, argued for the legitimacy of raising the legal value of a coin when this concerned not the relationship between the metals it contained, but its value as a whole. In this case, according to Galiani, there would be no "obstruction" to the movements of the currency". He added that "the general raising is a gain made by the prince over his creditors, that is the wealthier people" (1751: 58, T. IV). This different interpretation actually reflects two opinions on government: Carli was very critical, also because he focused on international trade. Galiani much more compliant. The market and not the state was considered by Carli to be the regulator of the value of money.

3.2. An agreed metallic standard

Carli suggested a single solution to all national and international monetary problems. Clearly, it was the authorities who decided on any recourse to debasement, but Carli wanted to tie governments' actions to the international stage. He recommended fixing the value of a given quantity of precious metal (gold or silver), and anchoring the currencies used in international trade to that value. Basically, he sketched an early silver (and then gold) standard for currencies used to trade between countries, and said that domestic currencies should be related to the value of their respective silver coins. Gold and silver currencies clearly have an intrinsic value that legitimizes their circulation, but they cannot circulate smoothly without a mutual acknowledgement of that intrinsic value when they are used for international payments.

In fact, Carli's metal standard was not based on the noble metal per se, but on the agreement signed between countries around the value of a gram of fine silver or gold. He wrote that countries should find "the common proportion of metals" (1751: 187). This applied to the small states in Italy and

¹² Galiani published his *Della moneta* in 1751, at 23 years of age. Carli's *Dell'origine e del commercio della moneta*, his first important book on money, was published in the same year.

to the larger ones elsewhere in Europe. The only rule that interested Carli was respect for the proportions between currencies, without which there would immediately be negative effects on the trade balance. Once an agreement on the value of their respective coins had been reached, the countries could ratify the value of their domestic currencies by decree, while also allowing for recognized foreign money to circulate.

This anchorage of metallism to political agreements helps us to understand why Carli was vague about the role of paper money, by definition a matter of money policy. Thinking that paper money would give the government too much power, Carli stuck to metallic money, taking his opposition to paper money almost as a given and not grounding it on theoretical arguments.

3.3. Monetary tables and the comparative balance

To help states agree on the proportional values of their respective currencies, depending on the quantity of noble metal they contained, Carli constructed two tables that he added to his *On the origin and trade of money, and the disruptions that occur in its alterations* in 1751, listing the exchange rates between currencies. His aim was to establish the ratios of gold to silver in the coins¹³, postulating the shared value of a gram of fine gold or silver. Carli considered these ratios essential to improving trade and the wealth of the city-states and republics involved (Carli 1751: 206). Monetary order could not be left in the hands of the jurisconsults because they did not understand it. The value of money should be fixed according to the rule whereby the quantity and price of the metal in a coin decided its value, which was then made official by decree. In Carli's intentions, his tables could be used to solve trade and financial controversies.

Pompeo Neri, an important political advisor and professor of law in Pisa, being equally concerned about the practices of currency alteration, appreciated Carli's tables of exchange rates, judging them a good starting point for reorganizing the exchange rates in the Italian peninsula (see Apih: 127). Neri promptly reprinted the tables in his volume, *Osservazioni sopra il prezzo legale delle monete* (*Comments on the legal price of coins*) (1751). They were consequently adopted in negotiations on monetary relations between the cities of Turin and Milan underway at the time, and they continued to be

¹³ A ratio of 1 to 14, according to Carli (1754: 346).

used after Carli's death, as in Bologna in 1796, when the municipal government was dealing with a potential default (see Marcelli 1955: 46-47).

Stable exchange rates could also be seen as a premise for another, more pervasive kind of stabilization, i.e. Italian monetary unification. It is hardly surprising that Ludovico Muratori and Gian Rinaldo Carli, more than other monetary experts, voiced hopes of Italian unification (Marcelli 1955: 62)¹⁴. After Muratori died in 1750, Carli published his *Della patria degli Italiani* (*On the Homeland of Italians*) (1766) and became the Italian monetary scholar most vehemently calling for national unity.

Returning to his tables, Carli's great intuition lay in his realization that, in an economic context characterized by international exchanges, one state's monetary decisions did not remain within its borders; it "infected" the others. The only way to avoid monetary contagion was to respect the proportions between the values of different coins, or in other words to anchor their legal value to their intrinsic value, calculating the latter according to the agreed price of noble metals.

Carli reversed the traditional mercantilist idea that trade determined countries' monetary stock. He saw their monetary conditions (the quality of their coins) as determining their trading trends. Precisely because of the need to carefully monitor these monetary conditions, Carli concluded his work of 1751 stressing the need of identifying and maintaining the proportions between European precious metal coins, i.e. the ratio between gold and silver must correspond to a European average calculated by Carli (1751:225)¹⁵. A recommendation he will not fail to repeat later.

Looking at the relevance Carli attributed to international trade, the trade balance might seem to be the indicator of national wealth, but gradually he developed a different idea. As became clear from his *Brief considerations on the economic budgets of nations*, published in 1770, he considered imports necessary to increase national manufacturing¹⁶ but, disagreeing with the economists who favored a trade balance surplus, he called for a political

¹⁴ Only partly sharing the cosmopolitan views of Pietro Verri and Cesare Beccaria revolving around the publication of *Il Caffè* in the 1760s, Carli was intrigued by the 'national' dimension of the political entities operating in the Italian peninsula in his time. See Carli (1765).

¹⁵ The importance of this average value was reiterated by Cesare Beccaria (1770: 263). On this point, see also Quadrio Curzio and Scazzieri (2014: 226).

¹⁶ About the role of manufacturing, Carli considered arts as a source of wealth, also because a surplus produced in manufacturing expands investments in agriculture. It was in 1771 that Carli, in commenting on Galiani's *Dialogo sul commercio dei grani* (*Dialogue on the grain trade*) (1770), downsized the importance of the international trade in wheat, and emphasized the role of manufacturing. Carli could not have been clearer: "The land undoubtedly gives us food, but – if I am not mistaken – man-made industry is the only one to produce true wealth" (1771: 120).

pragmatism in evaluating the type and usefulness of imports (1770b: 340-45). Carli eventually claimed that even a commercial deficit can be useful temporarily, when needed to develop a country's activities. But it was the importance he attributed to international imports for a country's economic growth that explains his hostility towards practices such as debasement, which weakened trade.

To conclude on this point, Carli did not foresee any mechanism for automatically re-aligning the trade balance. He was inclined to link the inflow and outflow of silver or gold to the trend of the trade balance. It may be because he was aspiring to a modern interpretation of trade balance that he suggested replacing the bilateral trade balance with a multilateral, or *comparative* trade balance (1770b: 353), a document summarizing the outgoings and revenues with all partners. It was only by means of a multilateral trade balance, including all foreign transactions, that the prosperity or economic decline of a nation could be examined (1770b: 358).

4. Subverting great inflation interpretation

The crux of the matter for most scholars of monetary issues has been to establish the causes of inflation in their own times. Here we are speaking of the great inflation from the 16th to the 18th century. The most common explanations for the phenomenon based on exogenous money attributed the upward price trend to two factors: currency debasement and inflow of species.¹⁷ Carli also applied himself to the question and tried to interpret the great inflation in the light of his theory on monetary debasement.

In arguing that centuries of devaluation leading to rising prices coincided in Italy with a gradual but continuous altering of the value of coins, Carli often referred to the works of Henri Poulain (1709), and Nicolas-François Dupré de Saint-Maur (1746), who came to similar conclusions for France (1762: 312; 1766: 25). Carli explicitly set his interpretation in opposition to David Hume's quantitative theory of money, which interprets prices by relating the stock of money to the quantity of goods (1760: 332).

Carli went into more detail in his "seventh dissertation" *Del valore e della proporzione dei metalli monetati ...* (*On the value and proportion of monetized metals ...*), which first appeared in Lucca in 1760. His analysis focused on inflation from the 16th to the mid-18th century. As mentioned earlier, this was a popular topic at the time, but Carli had his own view on the rising

¹⁷ See Arestis and Howells (2015: 187).

prices in Italian states and Europe. He argued that they were not due to any increase in the amount of gold and silver in circulation – quite the contrary since the mints stopped producing coins due to the scarcity of noble metals (1760: 324). Any inflation was due to other causes, and primarily to the debasement of the value of metal coins.¹⁸ This interpretation went against the ideas prevailing at the time, which attributed inflation to European countries importing gold and silver from the recently-discovered Americas. Carli's reasoning can be summed up as follows.

Instead of enriching the Italian states, the discovery of the New World had made them poorer because they suffered from the competition of the American products, and this worsened their trade balance. Italian states exported less, so their gold and silver revenue declined. The New World had reduced, not increased the quantity of species circulating in Italy. The output of the Italian states' mints was consequently reduced as a result of a shortage, not an abundance of precious metal¹⁹. During the 17th century, the Italian states tried to compensate for the smaller amount of circulating coinage by reducing its intrinsic value but maintaining or increasing its decreed value: what Carli called the monetary plague (1760: 323). In the end, the debasement of the coins' value and the loss of competitiveness increased the cost of imports, pushing up domestic prices. Unfortunately, Carli did not dwell on the trends of the market prices of gold and silver as a consequence of the inflow from the New World.

In considering debasement more dangerous than the inflow of gold, Carli could be said to have sided more with Malestroit²⁰ than with J. Bodin (1568)²¹, but what interests us here is that debasement not only inspired his precepts on monetary policy, but became the basis for his pricing theory. Without debasement and a greater tax burden, Carli says, assets would cost less in 1750 than in 1500.

Carli was perhaps the only Italian scholar to support the theory that inflation did not depend on the stock of gold. Galiani wrote that the amount of wealth arriving from the new Indies was so great that everything had become more expensive. Galiani added, however, that the amounts of precious metals (especially silver) varied very little due to the passive trade balance with

¹⁸ Among others, see Romano 1992.

¹⁹ It remains to be seen whether the monetization of gold and silver was a necessary condition for the entry of precious metals to generate inflation. Edo and Melitz think not (2019: 12).

²⁰ There are many similarities between Malestroit's theory of 'real prices' and Carli's view on prices anchored to real values. See Tortajada (1987).

²¹ The well-known controversy was between Malestroit, who considered debasement the more important problem, and Bodin, who identified the increase in the amount of precious metal as the real issue. See, among others, O'Brien (2000).

old India, which needed the metal (1751: 44-47). We know that the issue of the inflationary pressure from imported gold and silver is controversial. Later scholars tended to support Bodin's quantity-based explanation for the great inflation (see Hauser 1932), but more recent studies have been inclined to supplement his interpretation by re-examining real variables, such as demographics²².

4.1. *The index number*

Nowadays, the name of Carli as a scholar of monetary issues is only remembered for his index number. The origin of this statistical tool is associated with Carli's studies on inflation spanning centuries.

In his *On the value and proportion of metals monetized in Italy before the discovery of the Indies, with a comparison of the value and proportion of our times* (1760), Carli compared the prices of three representative goods – wheat, wine and olive oil – in the years 1450-1500 and in the mid-18th century (his own time), expressing them in liras (numeraire value), silver (intrinsic value), and gold (absolute value). He mainly considered cities and areas of Northern Italy and Naples, first analyzing the prices of the three goods separately, then calculating the mean prices of all three together. He concluded that the average prices (expressed in a common accounting unit, the *lira*) of the three goods had increased over the 250 years considered: in the 18th century, 7,466 liras bought the same amount of goods as 2,000 liras in the 15th century (1760: 353), so the *lira*'s purchasing power had diminished by 270% in 250 years. The point Carli wanted to make was that the proportion of silver contained in a *lira* had diminished in the meantime by 111% (see Sackley 1965).

Carli added that the rise in prices was partly due to higher taxes on agricultural activities which had followed a drop in exports. He calculated that prices had increased by 15% due to this extra tax burden (mainly to finance the army). The 270% loss of purchasing power in 250 years was therefore attributable partly to the 111% lower content of silver in the currency, and partly to the increase in taxes on agricultural activities (up 15%). Then there was a worsening trade balance with an increase in the prices of imported goods that had to be taken into account as well. In short, the inflation caused by the inflow of gold and silver was lower than generally argued at the time.

²² We limit to quote the recent Edo A. and J. Melitz (2019).

Today we might question the reliability of the data drawn from cities' archives that Carli used, and the relevance of his historical series. There remains the fact that his diachronic analysis of prices led to Carli being celebrated as one of the first scholars to use an index number to measure changes in prices (see Mitchell 1921: 7).²³ If N is the number of goods considered (wheat, wine and olive oil in Carli's analysis), p is their price, and 0 and 1 identify the period examined, then the p_1/p_0 ratio presumably includes the recurrent inflation rate, and all other random variables influencing prices. Carli proposed an arithmetical mean of the price ratios, which became his index number (see Diewert 2007: 7):

$$P(p_0, p_1) = \frac{1}{N} \sum_{i=1}^N \frac{p_1^i}{p_0^i}$$

Widely used by the developers of index numbers (the *Economist*, among others), due mainly to its neatness – which was also its strength, as by Irving Fisher (1922: 29) recognized – this simple arithmetical mean of the N p_1/p_0 ratios, was gradually abandoned over subsequent years, as the same Fisher recommended on observing the ratio's upward bias (see Diewert 1995: 4). Carli failed to weigh up the prices. He nonetheless showed that he had a good understanding of a previous analogous attempt made by Dutot (1738: 370-73) to build a so-called "common price" after investigating the trend of 24 prices in 1508 and 1735. It matters little here whether Carli's index number was the first or came after similar attempts made by Dutot or others (see Chance 1966). What is important is the need for rigor that induced Carli to calculate the changes in prices over time in a way that, albeit with some limits, is adopted even today²⁴.

Studies on price trends in Italy from the mid-15th to mid-18th century led Carli to arrive at a sad diagnosis for the Italy of his time: the country was poorer than it had been some centuries earlier. His analysis was not a mere exercise in monetary comparisons. He saw it as a basis for political action, primarily to move towards some form of political unity for the Italian peninsula.

²³ According to Schumpeter, Carli should be remembered as an econometrician '*ante-litteram*', who proposed an index number to measure the depreciation of money in 1760 (1954: 213, 292-3).

²⁴ It is worth remembering that Carli's arithmetical index was used by the UK's Office for National Statistics as a retail price index until March 2013, when it was replaced by the Jevons index, based on a geometric mean. See Levell (2015).

5. Emerging as money doctor

Carli's *Observations* of 1766 open with this incipit: "The analogy that passes between the human body and the political body is so great, that both defects and evils, and the method of convenient remedies to one may also be equally adaptable to the other" (1766: 9). It is at this point that we finally see why Carli considered himself as a money doctor, a reformer at large not in economic matters only, a political reformer perfectly consistent with his time of Enlightenment reformers. But why was the figure of the 'money doctor' and not of an engineer taking shape? Carli's expert needed to identify and diagnose a problem instead of concentrating only on finding a technical solution.

A diagnosis of the fundamental questions of the economic policy of the State of Milan was what was contained in the *Plan raisonné* that he presented to the court of Vienna in 1765, proposing himself as an expert capable of providing a solution to the problems identified²⁵. The institution of the Supreme Council of Public Economy, a body that he presided over from 1765 until its dissolution in 1771, was his proposal, dictated by the need to give institutional legitimacy to the action of reform aimed at sensitive issues, such as taxation or currency reform. The fact that monetary and economic reforms required a new jurisdiction can be seen in the proposal to establish the Supreme Council, whose activation would have taken away the monetary matter from the Milanese Senate, a body that Carli considered to be in the hands of the judges. A position he also held when he occupied, from 1781 to 1790, was the presidency of the new *Magistrato Camerale*, the institution that took the place of the Supreme Council.

It was probably the very fact that the Plan contained an organic vision of the Milanese situation, not a mere enunciation of guiding principles, that allowed Carli to get the job, winning the competition of his friend/rival Pietro Verri, who was called, moreover, to be part of the same Council²⁶. Carli's broad view of monetary problems was always contextualized in the workings of a national economy. The trend of the balance of payments could not be separated from demographic movement, land value, and changing interest rates (1770:333 and *passim*)²⁷. Carli concluded that: "The wise physician

²⁵ See Costa 1993. Having gone to Vienna in September 1765, Carli is appointed by Kaunitz to preside over the Supreme Council of Public Economy. See letter to cousin Gravisi dated September 12, 1765 (Ziliotto 1914: 127-28, particularly note 3).

²⁶ On the contrasts between Carli and Verri see the *Introduction* to Vianello (1938).

²⁷ We can hardly ignore the fact that the recent debate on the origins of "great inflation" revolved around two factors: the arrival of precious metals from the New World and population growth. See Eco and Melitz (2019).

never oppresses nature [country], but helps it, nor does he believe that he can overcome diseases by means of remedies without its cooperation. The true politician is thus content to be a careful and calm observer of the state of the nation. He does not risk setting decisive rules, nor does he claim to do everything, and to be able to do everything, but he gradually proposes remedies proportional to the times, circumstances, nature and habits of the nation” (1770: 354-55). Such a view was novel for the time, and Carli the money doctor proved to be an audacious political reformer.

Carli was 45 when he started his reforming work in Lombardy in 1765, which he had to keep within the limits imposed by the Austrian Court. The organicity of his action reflects the organicity of his thought²⁸. In 1766, he published his *Preventive observations on the plan regarding the money of Milan* that was the basis for implementing the city’s monetary reform. Carli discussed the need to completely change the money circulating in the Duchy of Milan, proceeding with the issue of a new currency, going against Pietro Verri’s proposal to limit the reform to incoming foreign money. Carli insisted on his idea, publishing his *New observations* in 1770, in which he argued for the need to make national currencies proportional to one another. This could be done by issuing a new coin, not by decree (which would only add to the confusion). Carli’s (then secret) plan contemplated “the fusion of the coins of this state to better regulate their proportion” (see De Stefano 1942: 200). There was hot debate, and some feared that the increased circulation of the new currency would weigh on prices. The controversy persisted until 1778, when Carli’s proposal was accepted and the minting of a new currency for the city-state of Milan was decreed.

One of the core elements of Carli’s reforming plan involved equalizing the fiscal contributions paid by the municipalities that made up the Duchy of Milan. The census (the subject of the book *The Milan census*) (1770c) had to provide the information needed to operate tax collections equitably without the tax authorities suffering as a result. One way was to eliminate or reduce ecclesiastical and secular exemptions – a measure opposed by the clergy and the nobility. Carli’s fiscal intervention was wide-ranging and complex, and – once approved in 1768 – it resulted in considerable savings for the administration. Carli’s innovations also included revisions to the way financial statements were drafted, which became standardized to his comparative balance.

It is interesting to note that the reforms proposed by Carli were never independent of the historical events of the State or subject concerned, almost

²⁸ See De Stefano (1942: 175).

as if they were path dependent. But not for this reason did they lack incisiveness and marked, as in the case of the tax reform, a discontinuity with that same past (see Carli 1770). The point was that – in this he differed from Verri – the discontinuity was intended to penalize institutions and corporations that were difficult to control in the name, however, not of the free market, but of greater state authority, the sole condition of political and economic stability (see Costa 1993: 304). A more equitable distribution of the tax burden could also contribute to guaranteeing greater political and social stability, the primary objective of the reformer Carli. History vs. nature, this is the representation of the contrast between Carli and Verri. The goal is the same, socio-economic stability, to be guaranteed politically, according to Carli, to be achieved through the free market, according to Verri (see Costa 1993: 313).

Among the clever minds – Neri, Verri, and Beccaria – who, along with Carli, were asked to reform the administration of the city²⁹, Carli aspired to a more technical role, but suddenly discovered that to be a money doctor he had to be a politician. Carli trusted anchoring his proposals in technical-empirical analysis, but his proposed intervention met immediately with opposition. Carli was the most determined opponent of local monopolies and annuity contract positions in an effort to reduce the costs to both the emperor and the people of Milan. But, finally, his turned into a deeply political action.

Carli's experience in the Duchy of Milan showed there was no room for a neutral reformer who could hope to convince the citizenry of the goodness of reforms on the strength of objective numbers. The money doctor intent on curing monetary evils had to make way for the political reformer battling against vested interests. In the light of his experience with the Supreme Council of Economics, even changing the currency must have seemed to Carli more like a political action, just as his proposals for a metallic standard, monetary reform, and especially tax reforms, were political.

Conclusions

The erudite approach of Carli did not help the diffusion of his works: Giuseppe Pecchio believes that he kept too much on the surface of the arguments (Pecchio 1829: 93). Francesco Ferrara doesn't seem to particularly

²⁹ The *Accademia dei Pugni* (*Academy of Fists*), which brought together the main exponents of the Milanese reformist Enlightenment at Pietro Verri's house between 1761 and 1766, owes its name to the animosity of the discussions over participants' contrasting ideological, methodological, and political views. They all shared the desire to be rid of Austrian despotism, however, and it is from that experience that the *Il Caffè* magazine was born.

appreciate historicity and erudition (Ferrara 1857: XCII). In reality, the analysis of Carli's coins can be considered, together with those of Galiani, Neri and a few others, extremely useful for understanding how complex the monetary phenomenon was in the mid-eighteenth century. Carli's apparent erudite historical perspective had a precise meaning because it was perfectly suited to his purpose: understanding the context and political and institutional initiative. In Carli's works, his analyses were never disjointed from political action, as we can see from the tools he proposed – the table of monetary proportions, the comparative balance, and the index number – to be used to deal with the then problems, not for understanding the past. This explains why Carli ultimately wanted to crystallize his conception of the political economist in the figure of the monetary doctor, symbolic of a way of doing economics that distinguished him from such contemporaries as Galiani and the French physiocrats.

We would be disappointed if we were looking for a money theorist in Carli: we are rather facing a theorist of monetary action, who ties his proposals to some principles. Among them, we have seen, a metallism which nevertheless requires international agreements; the centrality of international trade; more transparency in budgetary accounting and more fiscal equality.

The aversion to the management of the mercantile thing by legal experts, and juriconsults, was not only abstract, but expressed in his Milanese choices, shows how the economic sphere was trying to define its own space of autonomy, characterized by specific knowledge and practices. More than the affirmation of principles, Carli sought the recognition of authority and space for what he considered a new discipline, the administration of the economic and monetary thing.

Carli's money doctor was to be a policymaker and a theorist rolled into one. In a nutshell, the idea of economics as a science of administration, which he shared with Beccaria and Verri, was about a scientifically based political action, where science laid in his wide knowledge if not erudition. Carli anchored his proposal for economic reform, his very idea of stability, to numbers extracted from his historical research. This was the strategy for winning over vested interests. And he did win, because the (albeit laborious) implementation of his reforms in the Duchy of Milan was a success. Nevertheless, that experience showed him that monetary policies – and economic and fiscal policies even more – are issues that have to contend with conflicting interests, struggles between different economic and power groups, and individual ambitions, before they can be a matter of calm and objective scientific reflection.

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