PANDEMIC RECESSION, HELICOPTER MONEY AND CENTRAL BANKING: VENICE, 1630 [*]

Charles Goodhart[**]   Donato Masciandaro[***]   Stefano Ugolini [****]

January 2021

Abstract

This paper analyses the monetary policy that the Most Serene Republic of Venice implemented in the years of calamities using a modern equivalent of helicopter money, precisely an extraordinary money issuing, coupled with capital losses for the issuer. We consider the 1629 famine and the 1630-1631 plague as a negative macroeconomic shock that the incumbent government addressed using fiscal monetization. Consolidating the balance sheets of the Mint and of the Giro Bank, and having heterogenous citizens – inequality matters - we show that the Republic implemented what was, in effect, helicopter money driven by political economy reasons, in order to avoid popular riots.

JEL Classification: N1,N2, E5,E6,D7

Keywords: monetary policy, central banking, helicopter money, pandemic, Venice 1630

[**] .London School of Economics
[***] Bocconi University.
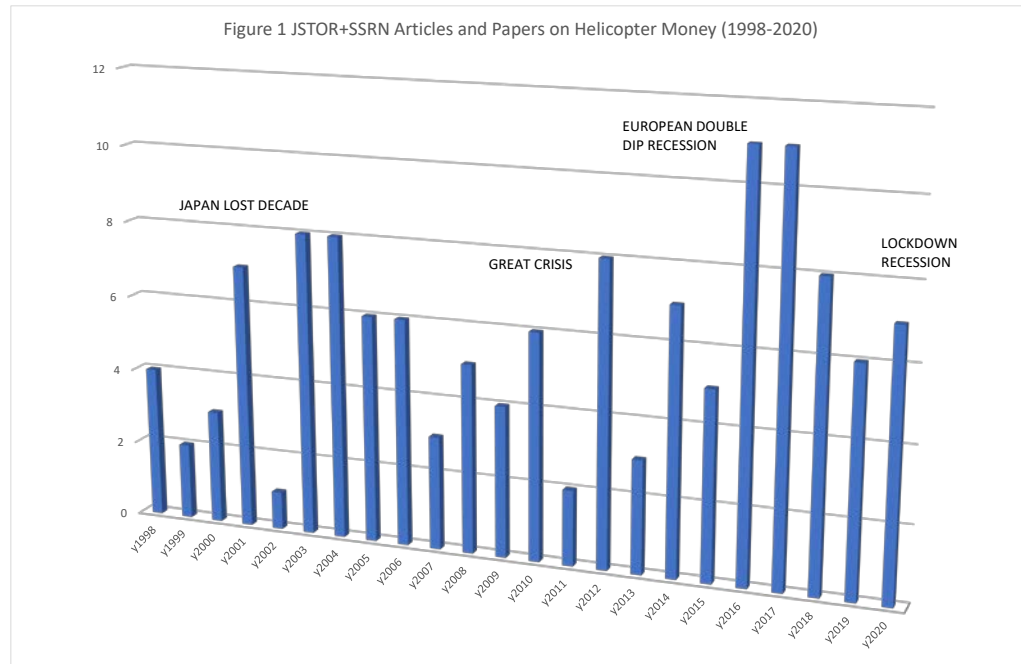[****] University of Toulouse.

1. Introduction

Let us suppose now that one day a helicopter flies over this community and drops an additional $1,000 in bills from the sky, which is, of course, hastily collected by members of the community. Let us suppose further that everyone is convinced that this is a unique event which will never be repeated. (Milton Friedman, 1968)

"100,000 ducats in small change in copper shall be minted and distributed, especially to members of the silk and wool trade who needed it, to repay the debt" (Most Serene Republic of Venice, 29 July 1630)

The COVID-19 pandemic forces swept away some of the conventional taboos in economic thinking, such as the radical idea of helicopter money (Benigno and Nisticò 2020a, Cukierman 2020, Galì 2020, Yashiv 2020, Kapoor and Buiter 2020, Velasco et al. 2020). The term uses the fanciful imagery that was originally invented by Milton Friedman (1968).

Starting from the end of the 1990s this Friedman idea has received more attention in academia and policy circles. Figure 1 shows the evolution of academic papers focused on macroeconomic issues that contain in the title, in the abstract or as a keyword, the expression "helicopter money", showing that whenever the economic conditions become critical, the radical idea of helicopter money re-emerges.

Figure 1 JSTOR+SSRN Articles and Papers on Helicopter Money (1998-2020)

Source: Masciandaro 2020

But what we today call unprecedented monetary policies can often have historical precedents (Ugolini 2020). In this paper he wonders if the economic policy implemented during the years 1629-1631, when the Republic of Venice fought first a famine and then a pandemic, can be considered an historical case of helicopter money.[1]

---

[1] But what is helicopter money? In the literature frequently helicopter money has been defined as any policy mix under which expansionary fiscal measures are financed by creating a larger monetary base (Carter and Mendes 2020). The helicopter money concept became more precise when analysts tried to identity when an expansionary monetary policy could be defined as extraordinary. In this perspective two different definitions can be identified: net-worth helicopter money and money- base helicopter money.

First a net-worth helicopter money may be defined as an expansionary monetary policy producing intended losses in the central bank's balance sheet (Galì 2020), reducing its net worth, or the present value of future seignorage (Buiter 2014). Alternatively a monetary-base helicopter money could be defined as a permanent increase in central bank liabilities (Buiter 2014, Bernanke 2016, Di Giorgio and Traficante 2018).

The difference between net-worth and monetary-base helicopter money is clear if we recall the role of seignorage. Seignorage refers to the difference between the face value of a currency and its costs of production and it can be evaluated using two common measures (Buiter 2007): the change in the monetary base or the revenues earned by investing the monetary base, i.e. central bank revenues. Net-worth helicopter money leades to a seignorage loss, while monetary-base helicopter money implies seignorage gains.

Our aim is to show that analysing an historical episode using a modern economic lens - as in the framework of helicopter money– can be a positive sum game, on the one hand in terms of understanding monetary and banking – and in general economic - history episodes, and on the other hand for checking   and refining the robustness of   relevant economic concepts. In other words we share the view that the use of history is a useful tool in exploring economics (Eichengreen 2015), and vice versa. In fact this paper is related to three different strands of literature, respectively on monetary policy, central banking and economic history.

Our study relates to the   monetary   history literature that investigates the different models of central banking and how they eventually influenced the economic and financial development. Our methodology is based on the description of sequences of events using a model-based causality (Monnet and Velde 2020): an exogenous (pandemic) shock is simulated and the model, through its equations, shows the impact of this shock on the economic policy design, as well as on the main macroeconomic variables. Such approach – in the tradition of historical macroeconomics à la Friedman and Schwartz (1963), Sargent (1983), Sargent and Velde (2002), Velde and Weber (2000) -   can be an effective tool to show that modern monetary theory can provide a logical framework to analyse historical facts, offering plausible transmission mechanisms, and at the same time that relevant conclusions can be drawn from historical studies to better evaluate current macroeconomic situations.

The remainder of this article is organised as follows. Section Two describes what can be considered respectively   monetary policy and central banking in the case of the Republic of Venice in the first decades of the seventeenth century, with further information in Appendix A. Then Section Three discusses the action of the Venetian government during the 1629-1631 period, focusing on the economics of the fiscal monetization that was implemented using the Giro bank and the Mint. Section Four offers a political economy perspective to enrich the

---

If we use at least one of these two definitions, it becomes evident that such expansionary monetary policies differ from conventional (and even some unconventional) central bank asset purchases financed by issuing central bank reserves, that usually do not produce either intended losses on the central bank's balance sheet or a permanent change in its money base. In this respect central bank asset purchases, without any further specification, are false helicopter money cases (Masciandaro 2020). In this paper the net-worth definition of helicopter money is applied.

explanation of the Republic choices. The analysis of the historical facts in Sections Three and Four is augmented using a theoretical framework in Appendix B. Section Five concludes.

2. Monetary Policy and Central Banking in the Republic of Venice

In order to analyse historical events using a modern concept such as helicopter money, we need to define what were the forms respectively of monetary policy and central banking in the relevant historical context.

First, we need a definition of monetary policy that has to be general from both the theoretical and historical point of view. Theoretically, given a standard general equilibrium setting with frictions, where money is a good - or a token (that can perform at least one of the three well-known functions – unit of accounts (Loyo 2002), medium of exchange (Kyyotaki and Wright 1993), store of value (Wallace 1980)) a demand for money is likely to exist.

Then we can define monetary policy as the corresponding government issuing policy; the government produces outside money, whatever may be the capacity of the private sector to produce inside money (Holmstrom and Tirole 1998, Brunnermeier and Niepelt 2019). In a sense, our definition is consistent with a Cartalist approach (Goodhart 1998), being centred on the link between political sovereignty on the one hand and money creation – either through mint or central bank, or both – on the other side.

Historically, this definition can be applied in analysing the overall evolution of monetary history, where both commodity money and fiat money can be present. Saying that monetary policy is any public policy aiming to control money issuing – whatever is the definition of money – allows one to discuss monetary policy episodes well in advance of the appearance of modern central banks, for example during the Roman Age (De Cecco 1985, Temin 2013, Bordo and Levin 2017).

Secondly, given such a definition of monetary policy, and assuming the existence of banking - i.e. the existence of firms whose liabilities are inside money, while in their asset side only a fraction is outside money (Rochet 2008) - we adopt the perspective proposed in Ugolini

(2017), defining central banking as a device to implement at least one of a family of public policies aimed at fostering fiscal goals (Goodhart 1985) and/or monetary and financial goals (Capie et al. 1994).

In a nutshell, our conceptual framework is based on the assumption that a government can use the existence of both inside and outside money to pursue its goals; consequently we focus on the relationship between the role of state, money circulation and banking. In this respect, the Venetian economy was special for more than one reason (Ugolini 2017, p.36). For our purposes two features are particularly relevant.

First, Venice reached a degree of monetization unknown for centuries anywhere else; in order to economize on coins – commodity money - citizens commonly used cheques and bank transfers, even for the lower- middle class (Ugolini 2017, p.37, Mueller 1997, p.24, Fratianni and Spinelli 2006, p.271). Then we can assume, as it is in a modern economy, that in Venice consumption on the one side and monetary and financial assets on the other side were strictly correlated.

Second, compared with normal late medieval status, the relative size of State with respect to the size of the domestic economy was extraordinarily high (Ugolini 2017, p.37). In the real sector, the government, via the Grain Office and then the Fodder Office, was active in the grain market, in order to address and to stabilize the volatility of food supply, including its pricing, which was an extremely sensitive political issue (Ugolini 2017, p.37). In banking activities, and starting from the logistic side, the financial district of Venice – the Rialto area – was entirely owned by the Republic, which then rented to the bankers the benches at which they used to operate (Ugolini 2017, p.39). Moreover, the books of the bankers were considered as public records, the bank transfers being a legal way to discharge debt under the Venetian law (Sissoko 2007, p.7, Ugolini 2017, p.39).

Yet the ideal that inspired the Venice government was that, as far as possible, the State should not substitute itself in the place of private initiative in markets (Dunbar 1892, p. 308, Ugolini 2017, p.38). With the Republic being firmly controlled by an oligarchy of merchants, the government goal was just to provide the services that were on the one hand essential for business, and on the other hand too expensive and/or too risky to be provided by the

businessmen themselves (Ugolini 2017, p.38). This feature of the Venice economy implies that in normal times fiscal monetization was not needed. Indeed by 1600 the Republic had repaid all its debt, enhancing its reputation and creditworthiness (Sissoko 2002, p.8, Fratianni and Spinelli 2006, p. 263, Alfani and Di Tullio 2019, p.172).

The Republic of Venice issued both commodity money (coins) and, starting from 1587, scriptural money (bank deposits), through the establishment of two subsequent and overlapping public banks: the Rialto Bank and the Giro Bank (see Appendix A). As usual, commodity money represented the monetary anchor; for example, the estimates of the state revenues were expressed in kilograms of silver (Alfani and Di Tullio 2019, p.32).

Now, to describe what happened in Venice in normal times – i.e. before the period 1629-1631 - we will use a setting where the economy consists of a population of citizens, a government that controls both fiscal and monetary policies, with bankers offering deposits (Dunbar 1892, p.311), funding (Dunbar 1892, p.315-316) and setting the market exchange rate between the different means of payment.

In normal times the financial system in this economy enjoyed a steady state equilibrium, given that inflation was relatively low and constant - whereas during the pandemic inflation significantly increased (Preto 1979, p.114). A stable consumer price was a relevant macroeconomic goal for the government, given that inability to secure, for example, stable flour price would have triggered social unrest (Ugolini 2018, p.6). Also nominal wages were stable, at least in the period between 1605 and 1628 (Pullan 1964,p .415).

Finally, some clarification is needed about the notion of citizenship. On the one hand, in early modern times "to be a citizen took on different meanings and involved different categories according to places and periods" (Pezzolo 2007, p.9). On the other hand, residing and working in Venice were not sufficient conditions to gain access to public services; only the rights of citizenship gave complete access to the local welfare, guaranteeing protection in times of crisis (Alfani and Di Tullio, p.59-60), which is particularly relevant for our analysis.

Among the citizens, wealth inequality in the Republic of Venice was a relevant economic and historical issue (Alfani and Di Tullio 2019, p.1). The Republic was characterized by wealth

inequality trends, (unfortunately it is impossible to produce a similar reconstruction for income inequality, due to the lack of the data needed (Alfani and Di Tullio 2019, p.9)). We focus on the macroeconomic consequences of implementing an extraordinary fiscal policy with monetary and financial effects. Our conclusions would be even stronger with heterogeneity also in labour income.

Disposable income and asset holdings, including government bonds (Krishnamurthy and Vissing-Jorgensen 2012, Reis 2020), finance consumption. In normal times, the average Venetian citizen finances her consumption using her income, as well as her monetary and financial assets, that can include coins, bank deposits and Republic bonds.

3. Pandemic Recession, Republic Fiscal Policy and Bank of Venice Helicopter Money

From September 1630 to September 1631 Venice wat hit by a bubonic plague (Lazzari et al., 2020, p.2). Originated in Northern Europe in 1623, this pandemic crossed the Alps in 1629, in the case of the Republic of Venice likely carried by imperial armies on their way to Mantua (Lazzari et al., 2020, p.2). In general, war, famine and epidemics were strictly associated (Alfani, 2013, p.443). In this case French and Spanish troops crossed the Alps to the west and north to participate in the War of the Mantuan Succession (Alfani and Percoco, 2019).[2] The massive outbreak took place later, between September and December 1630 – 20,923 deaths – with a peak in October 1630 (Ell, 1989, p.130) and in total 43,088 deaths were recorded over just three years; the population of Venice was 141,625 in 1624 and became 102,243 in 1633, a reduction of nearly 30% (Lazzari et al., 2020, p.3). Such figures are consistent with the 35% estimated mortality in Northern Italy during the same epidemic, and should be compared to an estimated average annual mortality of between 3.7% and 2.7% in normal times (Lazzari et al. 2020, p.3). Beyond the effect of the epidemic upon total population, its consequences upon

---

[2] The War of the Mantuan Succession (1628-31) was an Italian episode of the Thirty Years' War (1618-1648) fought on a European scale between supporters and opponents of the Habsburg monarchies. After the death of the heirless Duke of Mantua, two claimants to the succession appeared (the Duke of Guastalla and the Duke of Nevers). The Holy Roman Empire, Spain, and Piedmont supported Guastalla's claim, while France and Venice supported Nevers'. The military outcome being unclear, the conflict was resolved by a political accord (Treaty of Cherasco, 1631), confirming Nevers as Duke of Mantua.

various sub-groups were different. Younger people – the zero from seventeen age group - seemed to be relatively more spared; yet the picture concerning the age effects of the plague remains rather confused (Weiner 1970, p.46). The upper classes – nobility and civil servants - seemed to be less affected by the epidemic (Weiner 1970, p.47-48). Moreover, the percentage of females became greater than that of males (Weiner 1970, p.49) and the plague seems to have led to a substantial increase in the marriage rate during the decade following it (Weiner 1970, p.51), while there was a tendency for families to be smaller - up to four members - than were those before the plague (Weiner 1970, p.52).

From an economic perspective, the 1630 plague in Venice has been considered a relevant episode for more than one reason. This epidemic was a turning point in the economic and social development of the Republic (Alfani and Percoco 2019). More specifically, plague provided a structural break in the way in which some macro-level variables – population density, urbanization and taxation per capita - affected wealth inequality (Alfani 2020 et al.).

Previously, in 1629 the Republic had already coped with a famine, where extreme hunger has been on the one hand correlated with war and on the other hand with the plague (Bertagni 1889). In the Italian states the first decades of the seventeenth century were characterized by severe food shortages (Alfani 2018, p. 152). In Venice from 1629 to 1631 we had a combination of war, famine and plague - the Three Horsemen of the Apocalypse – characteristic of the way of thinking at that time (Alfani 2013, p.43). In reality the interactions between wars, famines and epidemics are more complicated than generally assumed, and the relationships between hunger and disease require even more caution, including the commonly held view that recognized a causal link between famine and plague (Alfani 2013, p.44). It is a matter of fact that in Venice, from the economic and social point, the structural break was the 1630 plague (Alfani and Percoco 2019) and not the 1629 famine. Also the daily life dramatically changed with the outbreak of the plague in September 1630.
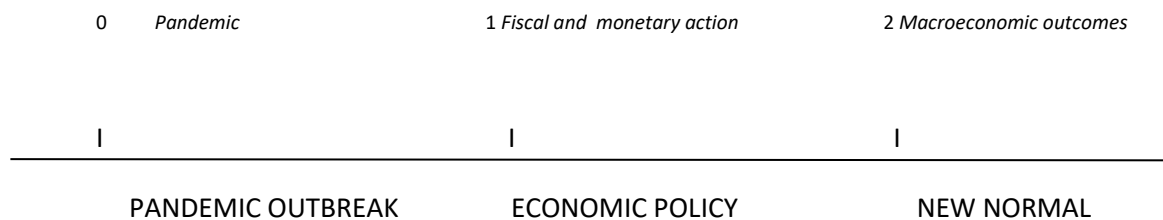
An unusual indicator is that in 1629 the musical life of Venice witnessed a special year, with foreign musicians visiting the city to meet its musicians - the most famous of whom at that time was Claudio Monteverdi – and a rich production of Venetian music. But then the plague reached Venice with devasting consequences: the music publishing trade was decimated:

whereas in 1629 fifty collections of music were printed, in 1630 production dropped to around thirty, and then no collections are registered in the Venetian presses in 1631 (Gonzaga Band, 2018).

However, for our purposes, we can consider the two sequential events as a unique negative macroeconomic shock - a calamitous or more simply a pandemic recession - that the incumbent government wishes to address. In fact this perspective has been used to describe how the two calamities were associated with the growing liabilities of the Giro bank (Soresina 1889, p.29).

To address the pandemic recession the government had to decide immediately whether to let citizens remain in trouble or help them in ways that are equivalent to injecting a lump-sum fiscal transfer to their balance sheets. The policy mix would affect labour supply, consumption, and growth. The sequence of events is as follows (Figure 1).

Figure 1: Pandemic Recession, Republic Fiscal Policy and Banco Helicopter Money

0 *Pandemic*	1 *Fiscal and monetary action*	2 *Macroeconomic outcomes*
I	I	I
PANDEMIC OUTBREAK	ECONOMIC POLICY	NEW NORMAL

Initially we use a standard assumption that the government is a benevolent player, i.e. the government cares about the Republic welfare, i.e. both personal interests and ideology of the policymakers in charge do not matter.

This assumption can be modified later, given that political drivers can be found also in Venetian history; for example during the previous 1576 pandemic the Venetian government reacted in a slow way exactly for political reasons, both denying the plague and downsizing the number and nature of deaths (Preto 1979, p.123, Palmer 1978, p.50-238-241-275). Somewhat similarly, during the 2020 pandemic episode populist and economically rightwing governments have reacted to the pandemic more slowly than their counterparts (Kavakli 2020).

If a pandemic occurs, there are extraordinary responses. At $t=0$, a pandemic breaks out and, consequently, the government designs and implements a containment policy. The starting point is the special nature of the pandemic-related recession. As a result of the pandemic, each national government faces an unpleasant dilemma between two public goals (Baldwin and Weder di Mauro 2020). First, there is a need to protect public health by implementing a containment policy with the aim of minimizing the expected loss of life (Atkeson 2020).

In the Republic of Venice the urban mortalities rates during the 1629-1631 were severe: in the affected cities the mortality rates went from 433 per thousand in Chioggia to 615 per thousand in Verona, while in Venice the mortality rate was 330 per thousand (Alfani and Di Tullio 2019, p.115); the 1629-1631 plague can be considered a Black Death-like event considering both overall mortality and its ability to spread in the countryside (Alfani and Di Tullio, p.114).

Such a containment policy saves lives, but, given the interactions between economic decisions and epidemics (Eichenbaum et al. 2020), any containment policy has economic costs (Ludvigson et al. 2020). These costs simultaneously affect the two fundamental macroeconomic pillars of a market economy: aggregate supply (Del Rio-Chanona et al. 2020, Koren and Peto 2020) and aggregate demand (Andersen et al. 2020, Del Rio-Chanona et al. 2020).

This was the case also in Venice at the time. In general the European governments designed and implemented stringent quarantine rules designed to check plague epidemics that paralysed economies (Pullan 1964,p .409). Venice implemented its first legislation to address a plague epidemic in 1423 (Palmer 1978, p.51) and a Health Office was established in 1490 (Palmer 1978, p.85). Over the years Venice developed a regulation on plague with three aims: to prevent its originating in Venice, to impede its importation and to check its spread should it break out in the city (Palmer 1978, p.123. During the 1575 plague episode the Republic imposed a general blockade on all neighbours suspected of the plague (Pullan 1964,p .409) . "Unemployment, which began among second-hand clothiers and all – from schoolmasters to mountebanks and tavern-keepers- whose living depended on assembling crowds, soon spread by these means to all sections of the people." (Pullan 1964,p .409, Palmer 1978, p.142).

11

The containment measures " were carried into effect on a colossal scale with full resources of the state" (Palmer 1978, p.142). A textile merchant pleaded for the quarantine to be lifted, given that "an incomparable greater number of people has died purely as a result of unemployment than of typhus or any other contagious disease" (Pullan 1964,p .409). It was argued that Verona was suffering more from the ban than from the disease itself (Palmer 1978, p.275). Bribery episodes were registered, being merchants anxious to get their goods into Venice (Palmer 1978, p.231 and p.235). Also the regular activity of the Mint suffered during the plague episodes (Stahl 2001).

Citizens suffered economic and financial losses that hit their balance sheets, as well as their ability to remain safe and sound borrowers (De Vito and Gomez 2020, Elenev et al. 2020). In other words, with Venice being a monetary economy, and not a barter economy, any negative effect of the pandemic recession could summarized as a loss in the citizen balance sheet.

The government can seek to address a pandemic recession by implementing an extraordinary fiscal policy, that can be implemented deploying different tools (Beck 2020, Bénassy-Quéré et al. 2020, Brunnermeier et al. 2020, Drechsel and Kalemli-Ozcan 2020, Gros 2020a, Kahn and Wagner 2020, Segura and Villacorta 2020). In normal times social expenditures was very low: for example, available data for 1602 and 1633 – i.e. before and after the pandemic – show that social expenditures were negligible, amounting respectively to 0.2% and 0.4% of total expenditures; in the same years the service of debt amounted respectively to 8.2% and 19.9% (Alfani and Di Tullio 2019, p.167). But during a pandemic the times were different.

In the case of the Republic of Venice, the government bought necessary goods from merchants (Ugolini 2020) to distribute them among the citizens, as it had been already done during the 1575 plague episode (Pullan 1964,p .409). When city districts were put in quarantine the inhabitants were provisioned by the State (Palmer 1978, p.143). Poor laws were promoted to reduce the risk of disease; "poor should be taken from their wretched housing (…) and that camps for the purpose should be maintain until the end of the epidemic." (Palmer 1978, p.144 and p.215).

A link between the government action and the victualing of the citizens can be found also in modern times: in 2020 the UK government implemented $38 billion worth of fiscal programme meant to address the pandemic recession, which included a 50 percent discount for diners in restaurants and pubs (New York Times 2020).

Some government policies to address a serious famine can be consistently included in an overall fiscal effort to help citizens: subsidies and fiscal help given to the affected communities, or distribution of free rations of grain (Alfani, 2018, p.162).

Moreover, it is likely that the Venetian government influenced employment and nominal wages in the sectors under its total or partial control. Regarding for example the Arsenal wages, the government, "in its anxiety to prevent so vital trades from decaying, was accustomed to pay its workers something, even if there was nothing for them to do" (Pullan 1964,p .420). During the 1575 pandemic a program of public works in order to give the unemployed people a livelihood was considered (Palmer 1978, p.275), as well as the need to feed them (Palmer 1978, p.275).

Whatever may be the fiscal method, such government action can be regarded as a mean for lessening citizen budget losses, where the worst scenario is when the citizens can lose all their assets. It is worth noting the worst scenario was more likely for the lowest levels of the population, which represented the large part of the overall population: such citizens were most usually in debt (Alfani and Di Tullio 2019, p.62), at greatest risk of crossing the boundary between subsistence and poverty, especially during famines and plagues (Alfani and Di Tullio 2019, p.63).

How big should the government fiscal policy be? The possible outcomes in terms of fiscal policy can take the form of two opposite options. At one extreme, the government is absent; in this no-transfer scenario, citizens suffered losses. At the other extreme, the fiscal expansion helps the suffering citizens. In the second case the government injects resources in the economy.

But how can the fiscal policy be financed? The government can raise taxation, issue debt, that can be purchased by citizens, or issue money. The new debt, in turn, becomes an asset in private portfolios.

From the second half of the sixteenth century until the 1620s the Republic of Venice increased taxation: data show a moderate increase in per capita taxation from the 1550s to 1620s – from 6.5% to 16.1% , depending on the adopted metrics - and then the per capita burden grew much more markedly in the aftermath of the 1603 plague (Alfani and Di Tullio 2019, p.33).

Regarding public debt issuing, the earliest evidence for public debt dates back to 1164 for Venice, where the debt of the state were called *Monti* (Funds). In Venice both voluntary lenders and forced lenders were present (Fratianni and Spinelli 2006, p.264). Compulsory lending was usually based on the assessments of one's wealth (Pezzolo 2003, p. 64, Fratianni and Spinelli 2006, p. 262, Pezzolo 2007, p.2). We can consider such compulsory lending as a device for taxation, also considering the practice of delaying the interest payments for many years (Fratianni and Spinelli 2006, p. 263). Such compulsion was progressively replaced with a more market-friendly approach to debt management (Fratianni and Spinelli 2006, p. 263), using the yield payments for collecting private coins (Fratianni and Spinelli 2006, p. 263) on a voluntary basis (Pezzolo 2007, p.2). As we already noted, the Republic issued both floating and funded (long-term) debt,[3] where in normal times the role of floating debt was rather limited (Pezzolo 2003, p.61).

Coming back to 1630, during the pandemic recession the government financed the fiscal transfer using both taxes and monetization. On the one hand the government established a lump-sum wealth-tax to address the increasing public expenditures due to the containment

---

[3] The turning point for Venetian monetary and fiscal policy was the War of Chioggia (1378-81), the harsh conflict that solved the long-dated rivalry between the Republics of Venice and Genoa for the control of Mediterranean trade routes, ending with Genoa's definitive defeat (also see Appendix A). Up to that time debt issuance had been relatively limited (Mueller, 1977, p.221). In 1382 the government started to borrow from anyone who had money (Mueller, 1977, p.222), but normally the largest holders of government securities came from the élite governing the Republic (Pezzolo 2007, p.15, Alfani and Di Tullio 2019, p.5 and p.172) , but without using intermediaries between lenders and the government, as was the case for example in Florence (Pezzolo 2007, p.6). In this respect, "in cities run by oligarchies the debt relied on a sort of impersonal market, where as a rule all creditors enjoyed the same rights and suffered the same damages" (Pezzolo 2007, p.7). As far as foreigners were concerned, generally they became debt owners, but with limitations (Pezzolo 2007, p.9). In Venice the share of foreigner owners grew during the seventeenth century: in 1641 one seventh of the consolidated debt was owned by foreigners (Alfani and Di Tullio 2019, p.172).

policy needs (Preto 1979, p. 144, Pezzolo 2003, p.69). At the same time the plague made the tax collection more difficult and caused a relevant per capita increase of the fiscal pressure (Pezzolo 1994, p.322-323, Alfani and Di Tullio 2019, p.29).

On the other hand the Republic financed its fiscal action using transfers issued by the Giro bank (Ugolini 2020). The citizens needed material and financial support: on this issue, during the pandemic the government allowed Jews to lend on collateral also out of the ghetto (Preto 1979, p.144).

The Giro balance sheet was worth 2,071,168 ducats in April 1630 (Soresina 1889, p.23), and kept rising to a peak of over 2,666,926 million ducats in June 1630 (Soresina 1889, p.29, Roberds and Velde 2014, p.24). The Giro bank balance sheet increase, including the 1629 famine, rose in concert with the bubonic plague (Soresina 1889, p.29).

At the same time the balance sheet of the Rialto bank reached its peak of 1.7 million ducats in 1618, i.e. one year before the establishment of the Giro bank; then its level declined to 0.2 million ducats in 1625 (Sissoko 2002, p.8) and in 1630 the amount of deposits of the Rialto bank dropped to 56,185 ducats (Sissoko 2002, p.8, Pezzolo 2018, p.155). In a sense ,the growth of the Giro bank crowded out the activity of the Rialto bank (Ugolini 2017, p. 44) that in fact ended its activity in 1638.

Moreover up to 1625 the premium between bank transfers and coin was positive and substantial (Roberds and Velde 2014, p.24; see Appendix A). Then from 1625 the premium began to fall, slowly at first and then precipitously in 1630 (Roberds and Velde 2014, p.24) becoming negative (Soresina 1889, p.29); the *agio* was 20% in 1624, then it dropped to 19.5% in 1629 and fell in negative territory – 10% - in 1630 (Pezzolo 2018, p. 156).

The over-expansion of the money supply triggered a monetary depreciation (Soresina 1889, p.29, Roberds and Velde 2014, p.24), forcing the government to reform its monetary policy setting. On July 1630 a monetary board (*Inquisitori del Banco Giro*) (Giro bank Inspectors) was established, having three aristocrats as members (Soresina 1889 p.23, Roberds and Velde 2014, p.24). The aim of the monetary action was the reduction of the Giro bank liabilities - i.e. the scriptural money supply – whose parallel effect had been the reduction of the commodity money assets in the hands of the Republic.

Recently monetary policy theory highlighted the relevance of the transfers policies between central banks and governments (Sims 2003, Reis 2015, Orphanides 2016, Benigno and Nisticò 2020b). In the same perspective we focus our attention on the balance sheets of the Mint and of the Giro Bank.

First of all, the accounts of a number of separate administrations and public concessionaries – they were worth 716,652 ducats – were removed from the Giro Bank and transferred to the Mint (Soresina 1889 p.25-26, Roberds and Velde, p.24). Private depositors were moreover invited to convert their Giro bank liabilities into "Mint deposits", paying 7% interest (Soresina 1889, p.26; Roberds and Velde 2014, p.25). As the so-called "Mint deposits" were not current account deposits but inscribed bonds (Pezzolo 2003), all this amounted to the conversion of unremunerated sight liabilities into interest-bearing long-term bonds. Furthermore, Mint revenues from sales of life annuities at 14% were applied to the Giro bank (Soresina 1889, p.26; Roberds and Velde 2014, p.25) to strengthen its financial position. These combined operations netted the Giro balance sheet, thus reducing the money supply, but at the price of an increase in the funded public debt. Because the Giro bank was a State bank with no paid up capital, the operation actually amounted to a bailout of the central bank by the government. Secondly, to avoid trading speculation between the different kinds of money, the convertibility promise became available only to non- temporary account holders (no less than three days) (Soresina 1889, p.25, Roberds and Velde, 2014, p.24). As revealed by the collapse of the "agio", during the pandemic a "flight to quality" phenomenon had occurred – the citizens preferred coins instead of bank money – and this can be confirmed observing that in 1630 also the deposit of the Rialto bank dramatically dropped, as we noted above.

Thirdly, 100,000 ducats' worth of small change in copper was minted and distributed to members of the silk and wool trade who needed it, to repay the Giro debt (Soresina 1889, p.25, Roberds and Velde 2014, p.24).

Finally, anyone was allowed to pay taxes not only with bank transfers, but also with coins (Soresina 1889, p.25, Roberds and Velde 2014, p.24). In parallel the obligations for payment settlements in Giro transfers were reduced (Soresina 1889, p.26). Both decisions seem consistent with the aim to reduce the demand for Giro transfers, which in turn could help the deleveraging of the Giro bank.

These government decisions were clearly motivated by monetary policy reasons, rather than by fiscal concerns. In fact it has been stressed (Pezzolo 2003, p.64) that the high indebtedness of the Giro bank cannot be seen as dramatic, considering that at that time the Republic budget recorded incomes around 3,5 million ducats.

The new monetary policy strategy brought down Giro balances to 1.4 million ducats at the end of 1630 (Soresina 1889, p.29, Roberds and Velde 2014, p.25), but it was not sufficient to restore the convertibility on demand of Giro bank liabilities (Dunbar 1892, p.327 and p.330). Moreover the government was not able to stabilize the Giro balance sheet below 900,000 ducats until 1638 (Roberds and Velde 2014, p.25).

Summing up, and treating the amount of 800,000 ducats as the issuing target in normal times, the monetary policy implemented during the pandemic recession years produced an over-expansion of scriptural money coupled with losses in issuer capital – the central bank had to be bailed out by the government. Moreover, although the government avoided any debasement policy, convertibility on demand of scriptural money into coin had to be suspended. Price instability and currency devaluation were the final macroeconomic outcomes. The price dynamics needs to been analysed in depth, given that in general pandemics can lead to rich inflation dynamics with strong inflationary as well as deflationary forces (Brunnermeier et al. 2020).

Therefore, it is unlikely that the actual fiscal monetization was optimal

5. The Bank of Venice Helicopter Money: Politics can Matter

If the government is a standard benevolent policymaker, its choices will be consistent with the social-planner decisions described in Appendix B. But if politicians are in charge and at the same time citizens are heterogenous, different monetary policies have associated redistributive effects and at the same time such policies can have political effects if the political consensus is directly related to citizens' economic preferences (Masciandaro and Passarelli 2019).

In general, the net transfers implied by efficient policies can be positive for some and negative for others. Moreover, if a policy task has distributional effects, politicians would like to control those effects (Alesina and Tabellini 2007); the redistributive effects are relevant as long as the politicians care about the citizens' preferences. And redistributive effects matter the more inequality is a relevant issue; as we already noted, inequality in the Republic of Venice was a relevant issue.

In the Republic of Venice during the early modern period wealth ownership was extremely polarized (Alfani and Di Tullio 2019, p.105-106), with both the top and the bottom of the wealth distribution distancing themselves from one another, as well as from the middling groups (Alfani and Di Tullio 2019, p. 112).

In Venice the politicians in charge probably cared about citizens' wishes due to redistributive issues. When calamities occurred public institutions reflected the expectations of the local population (Alfani 2018, p.162). The population, especially that in the cities, was watchful of the activities of the governments, and was ready to riot and tumult if they became convinced that the government was not doing all it could, and should have done, to ensure the availability of food, guaranteeing the "right to bread" (Alfani 2018, p.162).

Moreover, the government had much to fear, also in terms of personal safety, from riots motivated by distributional reasons – the "injustice" (Alfani 2018, p.162) – so the incentives to act for the politicians were really strong (Alfani 2018, p.162). In other words, most early modern popular riots seem to have been caused by "political" claims (Alfani and Di Tullio 2019, p.13). The citizens' preferences mattered, notwithstanding full citizenship did not guarantee full "political" rights as those were reserved to the patriciate (Alfani and Di Tullio 2019, p.61).

 The extraordinary expansionary monetary policy that was implemented in Venice during 1629-31 can be considered optimal from the perspective of poor citizens. In this respect, the government decision can be considered consistent with   the aim to please the majority of citizens during a pandemic recession, enhancing consensus and avoiding riots.

Summing up, our interpretation of the monetary stance in Venice during the 1629-1631 period is as follow: the government, in order to avoid riots and disturbances, implemented a massive fiscal policy that has been financed through money issuing; the money supply excess triggered monetary instability, and the government was forced to partially sterilize the money

creation, suffering losses (the central bank had to be bailed out, and losses covered by future tax revenues).

The final outcome was an extraordinary monetary expansion coupled with losses for the money issuer, which is exactly the modern definition of net-worth helicopter money. In a sense, a redistributive monetary policy was implemented. However, the policy was financed by earmarking future tax revenues to the payment of debt interests. Because taxes were strongly regressive in Venice, this means that short-term redistribution in favour of the poor was compensated by a long-term redistribution in favour of the wealthy. And in fact, this policy did not cause permanent changes in the conditions of poor citizens, given that analyses of income distribution show that the 1629-31 pandemic did not trigger a phase of sustained inequality decline on the same scale as the Black Death (Alfani and Di Tullio 2019, p.116).

6. Conclusions

Which are the drivers and the effects of an extraordinary fiscal monetization motivated by the need to address a pandemic recession? The aim of this paper has been to analyse the monetary policy that the Most Serene Republic of Venice implemented in the years of calamities, using the modern concept of helicopter money, precisely an extraordinary money issuing coupled with capital losses for the issuer.

The 1629 famine and the 1630-1631 plague was a negative macroeconomic shock, that the incumbent government addressed using fiscal monetization. Consolidating the balance sheets of the Mint and of the Giro Bank, and having heterogenous citizens – inequality matters - we showed that the Republic actually implemented helicopter money driven by political economy reasons, in order to avoid popular riots. This analysis can be further enriched in several fruitful directions:

a) Monetary stability risks and citizen heterogeneity: in this paper monetary instability is assumed to be an homogeneous social cost, that is borne equally by all individuals as an outcome of the fiscal monetization. But citizens can be heterogeneous in their ability to address such risks through hedging, with some individuals facing – or feeling that they face – higher

costs due to monetary instability (i.e. *inflation-adverse* citizens). Allowing for this kind of heterogeneity would lead to a straightforward prediction: the smaller the mass of such inflation risk-adverse citizens, the stronger the political pressure to engage in fiscal monetization.

b) b) Income, taxation and citizen heterogeneity: labour income and taxation has been assumed to be the same for all individuals. In the presence of income and/or taxation heterogeneity, the distributional effects are likely to increase. For example, given the decisions regarding the fiscal policy as well as its monetization, if richer citizens are likely to have higher tax burden, all else equal, they would prefer smaller fiscal policies. The income and/or taxation heterogeneity can be relevant in strengthening or weakening political pressure in favour or against the fiscal monetization.

c) Public debt and interest rates: here government debt is only issued to address the pandemic-related recession and the interest-rate level remained consistent with the long-term risk-free interest rate. The insertion of initial debt into the framework would increase its complexity but not have any substantial consequences for the overall rationale, maintaining the lump-sum feature of the fiscal monetization option. Furthermore, interest rate endogeneity depending on the stock of debt is likely to exacerbate the policy trade-offs and, consequently, the relevance of the political distortions.

6. References

Abel A.B., 1987, Optimal Monetary Growth, *Journal of Monetary Economics*, 19(3), 437-450.

Alesina A. and Tabellini G., 2007, Bureaucrats or Politicians? Part I: A Single Policy Task, *American Economic Review*, 97(1), 169-179.

Alfani G., 2013, Famine, in: *Calamities and the Economy in Renaissance Italy. The Grand Tour of the Horsemen of the Apocalypse*, Palgrave Macmillan, UK.

Alfani G., 2018, Famines in Late Medieval and Early Modern Italy: A Test for an Advanced Economy, in D. Collet and M. Schuh (eds), *Famines During the "Little Ice Age" (1300-1800)*, Springer.

Alfani G. and Di Tullio M., 2019, *The Lion's Share. Inequality and the Rise of the Fiscal State in Preindustrial Europe*, Cambridge University Press, Cambridge.

Alfani G., Di Tullio M. And Fochesato M., 2020, *The Determinants of Wealth Inequality in the Republic of Venice*, CAGE Working Paper Series, June, n.483.

Andersen A.L., Hansen E.T., Johannesen N. and Sheridan A., 2020, Consumer Responses to the COVID-19 Crisis: Evidence from Bank Account Transaction Data, *Covid Economics*, 1(7), 88-114.

Anonimo, 1847, *Le Finanze della Repubblica Veneta e il Banco-Giro*, Venezia, Tipografia Antonelli.

Baldwin R. and Di Mauro W., 2020, *Mitigating the COVID Economic Crisis: Act Fast and Do Whatever It Takes*, Vox eBook, CEPR Press, London.

Beck T., 2020, Finance in Times of COVID-19: What Next?, in Baldwin R. and Di Mauro W., 2020, *Mitigating the COVID Economic Crisis: Act Fast and Do Whatever It Takes*, Vox eBook, CEPR Press, London.

Bénassy-Quéré A., Boot A., Fatàs A., Fratzscher M., Fuest C., Giavazzi F., Marimon R., Martin P., Pisani-Ferry J., Reichlin L., Shoenmaker D., Teles P., Weder di Mauro B., 2020b, *Covid-19: A Proposal for a Covid Credit Line*, in Bénassy-Quéré A. and Di Mauro W., (eds), *Europe in the Time of COVID-19*, Chapter 18, Vox eBook, CEPR Press, London.

Benigno P. and Nisticò S., 2020a, *The Economics of Helicopter Money*, CEPR Discussion Paper Series, n.14555.

Benigno P., Nisticò S., 2020b, Non-Neutrality of Open Market Operations, *American Economic Journal: Macroeconomics*, 12(3), 175-226.

Bernanke B.S. 2016, *What Tools Does the Fed have left? Part.3: Helicopter Money*, Brooking Institutions.

Bertagni A., 1889, Carestia e Febbre Maligna in Tempi di Peste, Consulti e Provvedimenti a Udine negli anni 1629-1630, Antonio Measso, *Archivio Storico Italiano*, 3(169), 123-125.

Bianchi F., Faccini R. and Melosi L., 2020*, Monetary and Fiscal Policies in Times of Large Debt: Unity is Strength*, NBER Working Paper Series, n. 27112.

Bindseil U., 2019, *Central Banking before 1800: A Rehabilitation*, Oxford, Oxford University Press.

Bordo M.D., and Levin A.T., 2017, *Central Bank Digital Currency and the Future of Monetary Policy*, NBER Working Paper Series, n. 23711.

Brunnermeier M.K and Niepelt D., 2019, On the equivalence of private and public money, *Journal of Monetary Economics*, 106, 27-41.

Brunnermeier M.K, Merkel S., Payne J. and Sannikov Y., 2020, *COVID-19: Inflation and Deflation Pressures*, CESifo Area Conferences, mimeo.

Buiter W.H., 2007, *Seignorage*, NBER Working Paper Series, n. 12919.

Buiter W.H., 2014, *The Simple Analytics of Helicopter Money: Why it Works – Always,* Kiel Institute for the World Economy, Economics Discussion Paper, n.24.

Capie F., Goodhart C., Fisher S. and Schnadt N., 1994, *The Future of Central Banking*, Cambridge, Cambridge University Press.

Carter T.J. and Mendes R., 2020, *The Power of Helicopter Money Revised: A New Keynesian Perspective,* Bank of Canada, Staff Discussion Paper Series, n. 1.

Cessi R., 1937, *Problemi Monetari Veneziani*, Casa Editrice Dott. Antonio Milani (CEDAM), Padova, 225-258.

Chari V.V. and Kehoe P.J, 1999, Optimal Fiscal and Monetary Policy, in *Handbook of Macroeconomics*, Vol.1, Chapter 26, 1671-1745, Elsevier.

Cukierman A., 2020, *Covid-19, Helicopter Money and the Fiscal Monetary Nexus*, CEPR Discussion Paper Series, n.14734.

Da Ponte L.A., 1801, *Osservazioni sopra di Depositi della Veneta Zecca*, Verona.

Day W.R., 2003, Zecca: The Mint of Venice in the Middle Ages: a Review, *Speculum*, University of Chicago, 78(2), 602-605.

De Cecco, Monetary Theory and Roman History, *Journal of Economic History*, 45(4), 809-822.

Del Rio- Chanona R.M., Mealy P., Pichler A., Lafond F. and Farmer J.D., 2020, Supply and Demand Shocks in the COVID-19 Pandemic: An Industry and Occupation Perspective, *Covid Economics*, 1(6), 65-103.

De Vito A. and Gomez J.P., 2020, *COVID-19: Preventing a Corporate Cash Crunch among Listed Firms*, Vox, CEPR, March 29.

Di Giorgio G. and Traficante G., 2018, Fiscal Shocks and Helicopter Money in Open Economy, *Economic Modelling*, 74, 77-87.

Dunbar C.F., 1892, The Bank of Venice, *Quarterly Journal of Economics*, 6(3), 308-335.

Dunbar C.F., 1893, The Bank of Venice: Addendum, *Quarterly Journal of Economics*, 7(2), 210-216.

Drechsel T. and Kalemli - Ozcan S., 2020, Are Standard Macro Policies Enough to Deal with the Economic Fallout from a Global Pandemic? , *Economics for Inclusive Prosperity*, mimeo.

Eichenbaum M., Rebelo S.T. and Trabandt M., 2020, *The Macroeconomics of Epidemics*, NBER Working Paper Series, n. 226882.

Eichengreen B., 2015, *Hall of Mirrors: The Great Depression, the Great Recession, and the Uses – and Misuses – of History*, Oxford University Press, New York.

Elenev V., Landvoigt T., Van Nieuweburgh S., 2020, *Can the Covid Bailouts Save the Economy?*, CEPR Discussion Papers, n.14714.

Ell S., 1989, Three Days in October of 1630: Detailed Examination of Mortality During an Early Modern Plague Epidemic in Venice, *Reviews of Infectious Diseases*, 2(1), 128-139.

Ferro M., 1778, *Dizionario del Diritto Comune e Veneto*, v.1-2, Venezia.

Fratianni M. and Spinelli F., 2006, Italian City-States and Financial Evolution, *European Review of Economic History*, 10, 257-278.

Friedman M., 1969, The Optimum Quantity of Money, in M. Friedman, *The Optimum Quantity of Money and Other Essays,* Chapter One, Adline Publishing Company, Chicago.

Friedman M. and Schwartz A.J., 1963, *A Monetary History of the United States, 1867-1960*, Princeton, NJ, Princeton University Press.

Galì J., 2020, The Effects of a Money-Financed Fiscal Stimulus, *Journal of Monetary Economics*, forthcoming.

Goodhart C.A.E., 1985, *The Evolution of Central Banks*, London, London School of Economics.

Goodhart C.A.E., 1998, The Two Concepts of Money: Implications for the Analysis of Optimal Currency Areas, *European Journal of Political Economy*, 14, 407-432.

Gonzaga Band, 2018, *Venice 1629*, Resonus Limited, UK.

Gordon G., 2017, The History and Economics of Safe Assets, *Annual Review of Economics*, 9, 547-586.

Gros D., 2020, *EU Solidarity in Exceptional Times: Corona Transfers Instead of Corona Bonds,* in Bénassy-Quéré A. and Di Mauro W., (eds), *Europe in the Time of COVID-19*, Chapter 18, Vox eBook, CEPR Press, London.

Holmstrom B. and Tirole J., 1998, Private and Public Supply of Liquidity, *Journal of Political Economy*, 106(1), 1-40.

Kahn C.M. and Wagner W., 2020, *Liquidity Provision during a Pandemic*, CEPR Discussion Paper, n. 14101.

Kapoor S. and Buiter W., 2020, To Fight the COVID Pandemic, Policymakers Must Move Fast and Break Taboos, in Bénassy-Quéré A. and Di Mauro W., (eds), *Europe in the Time of COVID-19*, Chapter 37, Vox eBook, CEPR Press, London.

Kavakly K.C., 2020, *Did Populist Leaders Respond to the COVID-19 Pandemic More Slowly? Evidence from a Global Sample*, Bocconi University, Covid Crisis Lab, June, mimeo.

Kindleberger C.., 1991, The Economic Crisis of 1619 and 1623, *Journal of Economic History*, 51(1), 149-175.

Kiyotaki N. and Wright, 1993, On Money as Medium of Exchange, *Journal of Political Economy*, 97(4), 927-954.

Koren M. and Peto R., 2020, Business Disruptions from Social Distancing, *Covid Economics*, 1(2), 13-31.

Krishnamurthy A. and Vissing-Jorgensen A., 2012, The Aggregate Demand for Treasury Debt, *Journal of Political Economy*, 120(2), 233-267.

Lattes E. (1869), *La Libertà delle Banche a Venezia dal Secolo XIII al XVII*, Valentiner & Mues, Milan.

Lattes A., 1880, *Il Fallimento nel Diritto Comune e nella Legislazione Bancaria della Repubblica di Venezia*, Tipografia M. Visentini, Venezia.

Lazzari G., Colavizza G., Bortoluzzi F., Drago D., Erboso A., Zugno F., Kaplan F. And Salathè M., 2020, *Death in Venice: A Digital Reconstruction of a Large Plauge Outbreak During 1630-31*, mimeo.

Loyo E., 2002, Imaginary Money against Sticky Relative Prices, *European Economic Review*, 46(6), 1073-1092.

Ludvigson S., Ma S. and Ng S., 2020, *Covid19 and the Macroeconomic Effects of Costly Disasters*, NBER Working Paper Series, n. 26987.

Luzzatto G., 1934, Les Banques Publiques de Venise (Siècles XVI-XVIII), in *Studi di Storia Economica Veneziana,* Casa Editrice Dott. Antonio Milani (CEDAM), Padova, 225-258.

Mandich G., 1957, Formule Monetarie Veneziane del Periodo 1619-1650, Il Risparmio, 5(4), 634-682.

Masciandaro D. and Passarelli F., 2019, Populism, Political Pressure and Central Bank (In)dependence, *Open Economies Review,* 31(3), 691-705.

Masciandaro D., 2020, Covid-19 Helicopter Money: Economics and Politics, *Covid Economics*, 23-45.

Monnet E. and Velde F.R., 2020, *Money, Banking and Old-School Historical Economics*, CEPR Discussion Paper Series, n.15348.

Mueller R.C., 1977, *The Procuratori di San Marco and the Venetian Credit Market*, New York, Arno Press.

Mueller R. C., 1997, *The Venetian Money Market: Banks, Panic and the Public Debt, 1200-1500*, Johns Hopkins University Press, Baltimore.

New York Times, 2020, *Britain Says It Will Spend $38 Billion to Save Job*, July, 9th.

Orphanides A., 2016, *Fiscal Implications of Central Bank Balance Sheet Policies*, IMFS Working Paper Series, n.105, Goethe University Frankfurt, Frankfurt.

Palmer R.J., 1978, *The Control of Plague in Venice and Northern Italy*, University of Kent, mimeograph.

Pezzolo L., 1994, Sistema di Potere e Politica Finanziaria nella Repubblica di Venezia (secoli XV-XVII), in G. Chittolini, A. Molho and P. Schiera (eds.), *Origini dello Stato. Processi di Formazione Statale in Italia fra Medioevo ed Età Moderna*, Bologna, Il Mulino, 303-327.

Pezzolo L., 2003, *The Venetian Government Debt 1350-1650*, Studies in European Urban History (1100-1800), Vol.3, 61-74.

Pezzolo L., 2007, *Government Debts and Credit Markets in Renaissance Italy*, Ca' Foscari University of Venice, Working Paper Series, n.5

Pezzolo L., 2018, *Public Banks and State Finance in Florence and Venice*, in L. Costabile and L. Neal (eds), Financial Innovation and Resilience, Chapter 7, Springer, 147-164.

Preto P., 1979, Le Grandi Pesti dell'Età Moderna: 1575-77 e 1603-31, *Venezia e la Peste*, Marsilio Editori, S. Croce, Venezia, 123-148.

Pullan B., 1964, Wage-Earners and the Venetian Economy, 1550-1630, *Economic History Review*, 16(3), 407-426.

Punzo C. and Rossi L., 2019, *Is a Money-Financed Stimulus Desirable?*, Mimeo.

Reis, R., 2015, Comment on: "When Does a Central Bank's Balance Sheet Require Fiscal Support?", by M. Del Negro and C. A. Sims, *Journal of Monetary Economics*, 73 (C), 20–25

Reis R., 2020, *The Fiscal Footprint of Macroprudential Policy*, Deutshe Bundesbank, Discussion Paper Series, n.31.

Roberds W. and Velde F.R., 2014, *Early Public Banks*, Federal Reserve Bank of Chicago, Working Paper Series, n.3.

Rochet, J.C., 2008, *Why Are There So Many Banking Crises?*, Princeton University Press, Princeton, New Jersey.

Sandi V., 1756, Magistrato sopra il Banco Giro, in: *Storia Civile Veneziana*, v.2, p.3, Venezia.

Sargent T.J., 1982, *The Ends of Four Big Inflations*, in R.E. Hall (ed.), *Inflation*, Chicago, Chicago University Press.

Sargent T.J and Wallace, N., 1981, Some Unpleasant Monetarist Arithmetic, *Quarterly Review*, Federal Reserve Bank of Minneapolis, Fall, 1-17.

Sargent T. And Velde F.R., 1997a, *The Big Problem of Small Change*, Federal Reserve Bank of Chicago, Working Paper Series, October, n.8.

Sargent T. And Velde F.R., 1997b, *The Evolution of Small Change*, Federal Reserve Bank of Chicago, December, mimeo.

Sargent T.J. and Velde F.R., 2002, *The Big Problem of Small Change*, Princeton, NJ, Princeton University Press.

Segura A. and Villacorta A., 2020, Policies to Support Firms in a Lockdown: A Pecking Order, *Covid Economics*, 25, 90-121.

Sims C.A., 2003, *Fiscal Aspects of Central Bank Independence*, http://sims.princeton.edu/ytfp/Munich/CBInd.pdf.

Sissoko C., 2002, *The Political Economy of Private Paper Money: Institutional Development in Europe up to 1800*, ssrn.com, mimeo.

Sissoko C., 2007, *The Disappearance of Deposit Banks: An Explanation*, ssrn.com, mimeo.

Soresina A., 1889, *Il Banco Giro di Venezia*, Fratelli Visentini, Venezia.

Stahl A.M., 2000, *Zecca: The Mint of Venice in the Middle Ages*, Baltimore and London, John Hopkins University Press.

Stahl A.M.,2001, *The Venetian Mint in the Age of the Black Death*, Material Culture and Cultural Materialism, Brepols Publishers.

Temin P., 2013, *The Roman Market Economy*, Chapters Two and Eight, Princeton University Press, Princeton and Oxford.

Tucci, U., 1973, Convertibilità e copertura metallica della Moneta del Banco Giro Veneziano, *Studi Veneziani*, 15, 349-448.

Tucci, U., 1991, Il Banco Pubblico a Venezia, in AA.VV., *Banchi Pubblici, Banchi Privati e Monti di Pietà nell'Europa Preindustriale*, Società Ligure di Storia Patria, Genoa, 309-325.

Ugolini S., 2017, *The Evolution of Central Banking: Theory and History*, London, Palgrave Macmillan.

Ugolini S., 2018, The Historical Evolution of Central Banking, in S. Battilossi, Y. Cassis and K. Yago, *Handbook of the History of Money and Currency*, Springer Nature, 978-981.

Ugolini S., 2020, *The Normality of Extraordinary Monetary Reactions to Huge Real Shocks*, Vox, CEPR, April 4.

Velasco A., Chang R. and Cèspedes L.F., 2020, *The Macroeconomics of a Pandemic: A Minimalist Model,* CEPR Discussion Paper Series, n. 14777.

Wallace N., 1980, The Overlapping Generations Model of Fiat Money, in J.H. Kareken and N. Wallace, *Models of Monetary Economics*, Minneapolis, Federal Reserve Bank of Minneapolis, 49-82.

Weiner G.M., 1970, The Demographic Effects of the Venetian Plagues of 1575-77 and 1630-31, *Genus*, 26(1/2), 41-57.

Yashiv E., 2020, *Breaking the Taboo: The Political Economy of COVID-Motivated Helicopter Drops*, in Bénassy-Quéré A. and Di Mauro W., (eds), *Europe in the Time of COVID-19*, Chapter 36, Vox eBook, CEPR Press, London.

Appendix A: Money and Central Banking in Venice

The Republic of Venice issued both commodity money (coins) and, starting from 1587, scriptural money (bank deposits).

Regarding the commodity money, the mint of Venice was active since 814, issuing coins that progressively came to dominate Mediterranean trade from the thirteenth century (Stahl 2000, Day 2003). Coinage was essential for trade reasons; but at the same time the mint activity produced relevant revenues for the Republic (Stahl 2001, p.42). Eventually in preindustrial times the economics of minting (Sargent and Velde 1997a and 1997b, Redish and Weber 2011) was essential to address the never-ending   trade-off between monetary stability and seignorage.

The crisis of the War of Chioggia (1378-81) can be considered a turning point, given that this fiscal emergency led the Venetian government to implement a debasement policy, altering the standard of its coins (Stahl 2000). The early fifteenth century saw reforms to both gold and silver mints (Stahl 2000, Day 2003). The debasement strategy was a policy that governments frequently implemented in response to negative macroeconomic shocks (Kindleberger 1991).

Regarding scriptural money, on April 1587 (Roberds and Velde 2014 p.19) the Most Serene Republic of Venice definitively established its first public bank, after a process started on December 1584 (Soresina, 1889, p.7): the Banco di Rialto (Bindseil 2019, pp.207-10). Until then the government provided public money by issuing gold, silver and copper coins through its minting activity (Roberds and Velde 2014 p.19).

The Rialto bank was created by the government to correct a market failure: the private sector *per se* was unable to supply an efficient payment service (Roberds and Velde 2014 p.15), given that the Venetian payment system has been characterized by a series of bank failures (Ugolini 2018, p.5). In 1584 It has been calculated that only seven private banks out of one hundred and three were able to avoid bankruptcy procedures (Lattes 1880, p.40, Dunbar 1892, p.312); in such procedures banks were not considered at all as special firms (Lattes 1880, ,p.47), i.e. activities needing special bankruptcy procedures. Yet a banking supervision body was established from 1524, having three aristocrats as members (Anonimo 1847, p. 364).

In Venice both investment credit and consumer credit were available (Mueller 1977, p.294), given that traditionally the bankers permitted on the side a depositor to overdraw her account (Mueller 1977, p.159) and on top making the sum immediately available for payments via transfers, whose effects were the same as that of modern cheques (Mueller 1977, p.159, 227).

Overdrafts were recognized as legitimate by the state (Mueller 1977, p.214), and deposit transferability was available; for example a loan between two citizens could be based on a bank deposit, given that bankers accepted deposits, letting their depositors settle credit-debt relationships by transferring deposits between each other (Roberds and Velde 2014, p.15). The association between asset holding and credit availability can be further confirmed from the fact that in normal times the premium between a bank transfer and the coin was positive (Roberds and Velde 2014, p.24) , i.e. the *ducato di banco* (bank ducat) had a superior value than a *ducato d'argento (*silver ducat*)* (Anonimo 1847, p.365 used the two denominations).

In theory, the Banco di Rialto was supposed to represent a case of quasi-narrow banking, given that it was obliged by law to accept only deposits in coins, and the cash was always to remain available at the request of depositors (Anonimo 1847, p.564; Dunbar 1892, p.321), defining tendentially a policy of 100% reserves (Sissoko 2002, p.7 and p.10); transfers had to be made simultaneously between creditors and debtors (Dunbar 1892, p.321, Roberds and Velde 2014 p.20). In practice, however, because the coins into which the Banco's liabilities were formally convertible had been withdrawn from circulation in 1588, bank liabilities were de facto inconvertible into the new circulating coins (Roberds and Velde 2014, pp.21-2; Ugolini 2017, pp.225-6). Coins were the main item in the asset side of the Rialto bank, notwithstanding – to a certain extent - also private commercial debt was allowed (Ugolini 2017, p.44). Moreover the Rialto bank eventually centralized the clearing mechanism for payments in Venice (Dunbar 1892, p.323, Fratianni and Spinelli 2006, p.271).

In 1593 Banco liabilities became legal tender (Anonimo 1847, p.366, Roberds and Velde 2014, p.21) and its deposits in 1603 represented 80% of the overall volume of exchange settlements in Venice (Sissoko 2002, p.8, Roberds and Velde 2014, p.21). During these years

the two legal tenders – coins and Rialto transfers – were imperfect substitutes, with a premium ("agio") for payments in transfers relative to those in coins (Dunbar 1892, p.318, Fratianni and Spinelli 2006, p.271, Ugolini 2018, p.7), as well as between large and small coins (Sargent and Velde, 1977b, p.23). The conversion rate between the different types of money was determined on the market, and its setting was even more complicated by the fact that Venice adopted a bimetallic monetary standard (Cessi 1937).

The existence of a positive premium between public banking money (scriptural money) and coins (commodity money) was almost a constant in the Venetian experience; only sometimes were they brought at par (Roberds and Velde 2014, p.17). From an economic point of view, as we will see later, the premium drivers are likely to be on the one hand the credit availability attached with the public bank money (Dunbar 1892, p.330), and on the other hand the quality of the available commodity money (Dunbar 1892, p.331). The premium can be considered a relative price between scriptural money and commodity money, and it was associated with the relative quantity/quality of the two monies.

Regarding the Banco's governance, the bank manager was a public concessionaire (Ugolini 2017 p.36), who was called "Depositario" (escrow agent) (Anonimo 1847, p.364), or "Governatore" [4] (governor) (Soresina, 1889, p.8), chosen and paid by the government, given a list of submitted proposals (Roberds and Velde 2014 p.20). The government was the guarantor of the deposits (Pezzolo 2018, p.153); yet the governor was required to post a bond as guarantee and he was considered responsible for the full satisfaction of any bank obligation at the end of his mandate – upon request, in cash - (Ugolini 2017, p. 42), under pains of confiscation and banishment (Roberds and Velde 2014 p.20). Moreover, all bank officers were required to post a guarantee (Anonimo 1847, p.364) .

The venality of offices was in part a device for public funding: the purchaser of the office paid a given amount (the principal) – or made a temporary loan posting a guarantee – while the government paid him a salary (the interest) (Pezzolo 2007, p. 8). The Bank was to be

---

[4] Some authors used the name "*Depositario*" to define the governor of the Rialto bank (Sandi 1756, Ferro 1778, Anonimo 1847) while others (Soresina 1889, p.5, Luzzatto 1954, p.231) used "*Governatore*", claiming that "Depositario" has been used for the first time later, when the Giro bank was established.

formally liquidated every three years (Dunbar 1892, p.321), in order to reduce the possibility of losses larger than the governor's personal assets, while the private bankers were required to liquidate every six years (Roberds and Velde 2014, p.21). Moreover, the costs of the bank establishment were to be met by public resources – i.e. import taxes (Dunbar 1892, p.312).

Summing up, the Banco di Rialto was a quasi- narrow bank, acting also as a clearing house, and governed through a public concession managed by a hybrid player, being the governor in charge, a mix between a public manager and a private banker.

In May 1619 the government created a new public bank (Soresina 1889, p.9; Bindseil 2019, pp.215-7) – the Banco del Giro – with floating (short-term) public debt and coins in the asset side (Roberds and Velde 2014, p.24) and the Giro transfers in the liability side, which represented convertible money up to 1630. In general the Republic issued both floating and funded (long-term) debt, where in normal times the role of floating debt was rather limited (Pezzolo 2003, p.61). In general the state's creditors were likely to become floating debt holders, using the transfer mechanism. This mechanism had been first introduced in the 13th century when the Grain Office and Salt Office had started providing transfers for their creditors, and also the Fodder Office used it from 1608 to 1614 (Pezzolo 2003, p.63, Roberds and Velde 2014, p.24, Ugolini 2018, p.6).

Regarding the respective business roles of the two public banks, while the Rialto bank was a deposit bank, the Giro bank was a device to make the public debt easily transferable, turning it into a means of payment (Roberds and Velde 2014, p.22), and "paying deposits at the call of the depositor, like the existing Banco di Rialto" (Dunbar 1892, p.325), with the possibility of deposit overdrawing (Dunbar 1892, p.325), i.e. to make loans. The account holders were floating debt holders; the Giro bank was allowed to accept deposits of private individuals only from 1643 (Sissoko 2002, p.11).

In this respect the Giro bank can be defined an issue bank (Sissoko 2002, p. 11, Fratianni and Spinelli 2006, p.272), with its liabilities and its main asset floating public debt. The core of this mechanism lay in the relationships between the Giro Bank and the State Mint, via the role of floating debt holders, that we will describe below. Briefly the Giro bank establishment in 1619 can be considered the final step in a process aimed at increasing the transferability of

floating debt transfers, transforming them into means of payment (Sissoko 2002, p.9, Fratianni and Spinelli 2006, p.272).

The functioning of the Giro bank was both innovative and simple (Ugolini 2017, p.43): the government opened accounts to merchants having credits to the Republic, that could be converted in coins upon authorization (Soresina 1889 p.12 and p.16); the credit of one accountholder could always be freely transferred on demand to another accountholder (Soresina 1889 p.16), and the corresponding amount would continue to circulate until the final repayment to the last bearer cancelled it out (Ugolini 2017, p. 43). The Giro bank liabilities were legal tender for any payment greater than one hundred ducats, while its clearing activity was possible also for payments lower than one hundred ducats (Soresina 1889 p.12). Moreover from July 1627 the account holders could pay import taxes using Giro bank transfers (Soresina 1889 p.20).

The convertibility promise on Giro bank deposits was based on the fact that in the State Mint an amount of bullion served as a fund to back the operations of the Giro, although the backing was not 100%. In fact on June 1619 the Senate authorized on the one hand the creation of 150,000 ducats' worth of coin reserves earmarked at the Mint for the Banco, and on the other hand a 500,000 ducats' worth of bank balances to pay its creditors ((Soresina 1889 p.12-13, Roberds and Velde 2014, p.23) - i.e. the holders of the Banco transfers. Moreover, one share of the future output of the Mint was earmarked to repay Giro bank money in coin (and thus, to "destroy" scriptural money): the decree of foundation of the Banco actually ordered monthly transfers of 10,000 ducats from the Mint to the Giro for repayments (Roberds and Velde 2014, p.24) up to the limit of 50,000 ducats (Soresina 1889 p.15).

On January 1620 the overall balance and the monthly transfers became respectively 700,000 ducats and 20,000 ducats; the monthly transfers eventually became 80,000 ducats on August 1625 (Soresina 1889 p.17, Roberds and Velde 2014, p.24). The Giro balance was further increased on May 1621 – by 100,000 ducats – and on June 1621 – by 40,000 ducats.

Then, "as long as the monthly flow was sufficient to accommodate depositors' requests, the bank's liabilities remained convertible (….). This would remain the modus operandi until 1666: the State (….) adjusted the monthly flows of cash from the Mint to service the redemption requests" (Roberds and Velde 2014, p.24).

The Giro bank seems to have had some flexibility in the choice of coins in which to repay (Roberds and Velde 2014, p.24). Progressively convertibility difficulties arose, with delaying payments going hand in hand with further creation of liabilities (Dunbar 1892, p.327). As we will see, authorizations to convert liabilities into coins were suspended in 1630 (Dunbar 1893, p.211) during the pandemic, eventually transforming the Giro bank into the first example of a purely fiduciary state-issued legal-tender money (Ugolini, 2018, p.7), acting as a clearinghouse for the community (Sissoko 2002, p.10).

The Giro Bank was based on a public - although temporary - commitment: the floating debt has to be extinguished and the accounts closed within three years; however the deadline was extended from year to year (Ugolini 2017, p. 42). The Banco transfers remained convertible in coins upon authorization until 1666, when full convertibility on demand was established (Roberds and Velde 2014, p. 26; Ugolini 2017, pp. 225-7). Finally, the Republic defined an issuing target for normal times: in fact the government came to the conclusion that the Giro balance sheet should not exceed 800,000 ducats (Roberds and Velde 2014, p. 24). Contemporary monetary theory, indeed, included early statements on the need of quantity limitations in money issuing (Sargent and Velde 1977b, p. 51). The Giro balance sheet reached a level of 813,751 ducats level in 1624 (Soresina 1889 p.19, Roberds and Velde 2014, p.24). However in the same balance sheet coins were just worth 80 ducats, indicating that convertibility requests were likely to be limited (Soresina 1889 p.19) or, alternatively, unlikely to be authorized.

In respect to governance, as in the case of the Rialto bank, the officers in the new public bank were concessionaires (Soresina 1889 p.13, Dunbar 1892, p.325, Roberds and Velde 2014, p. 23); the main officer was called the Depositario, (Soresina 1889 p.8, Dunbar 1892, p.324 and 335), with a three months mandate (Soresina 1889 p.9).

All in all: from 1619 a duopolistic public banking system was born in Venice, where the liabilities of the two banks were treated as equivalent (Dunbar 1892, p.324, Ugolini 2017, p. 44), including the seizure exemption privilege (Soresina 1889 p.8), meaning that in no case the judicial courts had the power to seize their deposits.

Moreover, in the period of coexistence the two public banks were interconnected in some coin exchange operations (Soresina 1889 p.9); while the reciprocal clearing of their liabilities was forbidden, given the need to maintain separation between the two banks (Soresina 1889 p.13). The duopolistic setting ended in 1637, when the Banco di Rialto was shut down (Soresina 1889 p.8, Dunbar 1892, p.324, Roberds and Velde 2014, p. 25, Fratianni and Spinelli 2006 p.271, Ugolini 2017 p.44), with the Banco del Giro remaining the only public Bank in Venice.

Appendix B: Pandemic Recession, Helicopter Money and Central Banking

Let us start from normal times. For the sake of simplicity, the population size is one: total and per-capita amounts are the same for all the variables in the model. The citizens are risk neutral, and they draw utility from consumption and disutility from labour. They use their net labour income, as well as their monetary and financial assets, to buy consumption goods. We use a general economic setting where heterogeneity in the composition of citizen assets is coupled with homogeneity in labour income (Masciandaro and Passarelli 2019, Masciandaro 2020).

Starting with labour income, let individual utility from labour be:

$$l(1-\tau) - U(l) .\tag{1}$$

Labour productivity is normalized to one. Then $l(1-\tau)$ is the after-tax (net) labour income. $U(l)$ is a standard increasing and convex effort function. After knowing τ, each citizen chooses how much to work in order to maximize her welfare. The optimality condition yields each individual's labour-supply function:

$$L(\tau) = U_l^{-1}(1-\tau) .\tag{1'}$$

Labour supply $L(\tau)$ is decreasing in the tax rate, $L_T < 0$, which is the same for all citizens. We acknowledge that this assumption simplifies a tax system that was rather muddled and complicated (Alfani and Di Tullio 2019, p.24). At the same time, the main source of revenues for the Republic was taxes - which were both "direct" and "indirect" (Alfani and Di Tullio 2019, p.27). More importantly the Venetian taxation system had a marked "regressive" nature (Alfani and Di Tullio 2019, p.147), which is exactly the assumption that we are going to use, using a lump-sum tax. In any case, this assumption can be modified without any loss of generality.

Given such productivity, and a population size of one, the labour supply equals total income: $y = L(\tau)$. Therefore, in normal times, output growth in equilibrium depends on tax policy, and l^* is the optimal labour supply, which depends on the selected tax policy, such that $l^* \equiv L(\tau)$.

Moreover, each citizen, given their labour income (l*) , as well as their initial wealth (w) - real assets - can have financial (banking and monetary) assets with a total value of π and an overall return of λ ; therefore   (1+λ)π will be the total amount of financial liabilities. The financial yield λ >0 is determined according to a financial no-arbitrage condition with respect to a perfect, long-term,   international risk-free interest rate, which we normalize to zero for simplicity. All in all, citizens draw utility from consumption, c, and the budget constraint of a citizen who owns an average portfolio is then:

$$c = l^* + w + (1 + \lambda)\pi \qquad\qquad (2)$$

Now let us assume that in this economy a pandemic recession occurs.

Citizens suffered losses that hit their financial balance sheets: any negative effect of the pandemic recession could be summarized as a unexpected loss in the citizen balance sheet. In fact, in absence of public support, if we assume that a containment policy   (lockdown) is associated with less income and less possibility to sell real assets, such as policy   implies during the pandemic period a one- shot reduction of financial assets to finance consumption; the unexpected reduction is a proportion γ, of the citizen's financial balance sheet $\pi(1 + \lambda)$.

How big should the government fiscal policy be? The possible outcomes in terms of fiscal policy can take the form of two opposite options. At one extreme, the government is absent; in this no-transfer scenario, citizens suffered financial losses. At the other extreme, the fiscal expansion helps the suffering citizens. In the second case the government injects resources in the economy, and the metric of this fiscal action is a proportion, β , of the citizen's financial losses γ$\pi(1 + \lambda)$.

The fiscal bailout is naturally parameterized on the losses the citizens suffered. Moreover we can assume that the government implements its fiscal action using direct financial transfers to citizens. It is worth noting that, being the financial assets the only source of heterogeneity among citizens, such metric allows us to highlight in the clearest and simplest way the redistributive effects of the fiscal backstop. Thus, β is the policy variable that parameterizes the economic size of the fiscal policy, where $\beta > 0$.

The government finances its policy by making a simultaneous decision regarding taxation, the issuance of new funded debt and fiscal monetization, which is the issuing of floating debt in the hands of the Giro bank. The government defines the optimal fiscal policy, $\beta*$. If the fiscal policy $\beta\pi(1+\lambda)$, is implemented, then the government supports the citizens' welfare. It finances this policy by issuing new debt at time 1. At the same time, it charges a linear income tax, τ, for servicing the debt at time 2. Without default risk, the overall government budget constraint is:

$$\beta\gamma(1+\lambda)\pi(1+i(1-\delta)) = \tau y \qquad (3)$$

where τ is the tax rate, y is the income of the citizens before taxes, i is the interest paid on the government bond and δ is the fiscal monetization where $\delta \in [0,1]$. As noted above, at the beginning of the 17th century the state of public finance in Venice was good; the government offered 4% bonds just for investment opportunities (Sissoko 2002, p.8), while the long-term return from trade was estimated to be 6.4% per annum (Sissoko 2007, p.6). In 1632 the holders of the Venetian funded debt received a return of 5% (Pezzolo 2003, p.65).

The interest rate on funded debt is determined according to a financial no-arbitrage condition with respect to a perfect, long-term, international risk-free interest rate, which we normalize to zero for simplicity. For any unit of debt issued in time 1, the government repays $1+i(1-\delta)$ in time 2. The cost of debt, $i(1-\delta)$, is negatively associated with the degree of fiscal monetization. When an higher monetization is implemented (i.e. high δ), a lower portion of funded debt will be sold to citizens. Without any loss of generality, the demand function for long term bonds by citizens is flat; if we were to assume a diminishing marginal utility for long term bond holders, the government trade- offs should be even more evident.

The design of the economy policy action will influence the citizens' welfare. Disposable income and assets finance consumption. Such assumption can be particularly relevant during a pandemic: lockdowns produce material deprivation and households can draw on both income and wealth to address the unexpected shock. When the fiscal policy, β, is implemented at time 1, the average value of a citizen's balance sheet will be affected. Its shape at time 2 will be the following:

$$\beta\gamma\lambda(1+\pi) + \beta\gamma(1+\lambda)(1-\delta)\pi(1+i) + [w - \beta\gamma(1+\lambda)(1-\delta)\pi] \qquad (6)$$

The first term is the value of the fiscal transfer, the second term is the value of the government bonds inclusive of interest payments, and the third term represents the difference between the initial wealth, w, and the value of the purchased bonds. Notably, the fiscal policy influences welfare through three channels: the direct value of the fiscal transfers and the indirect effect due to the interest payments on funded debt, which simultaneously discounts the monetization effect.

Last step: citizens draw utility from consumption, c, at time 2. The budget constraint of a citizen who owns an average portfolio is then:

$$c = l * (1 - T(\beta,\delta)) + w + \beta(1+\lambda)\pi(1 + i(1-\delta)) \equiv C(\beta,\delta)$$

(7)

where $l*$ is the optimal labour supply, which depends on the selected tax policy, such that $l* \equiv L(\tau)$.

Finally, does the policy mix produce long-standing effects? If the answer is positive, we need to consider welfare losses that may be caused by monetary and financial externalities, internalizing future negative spillovers due to the economic policy action that can affect the economy when the pandemic recession ends.

First of all, fiscal monetization is not a free lunch. In other words, it may create monetary externalities. In general the monetary externalities can depend on the association between central bank seignorage and monetary stability risks, where the more traditional channel is the relationship between seignorage and inflation tax, which represents the reduction in the real value of the monetary base due to a possible change in the consumer prices (Buiter 2007). In Venice the over-production of money created currency depreciation and uncertainty, harming trade and commerce; in 1627 the Republic felt the need to reinforce the monetary regulation, strengthening the Giro bank accountability (Soresina 1889, p.20-22).

Then we assume that the monetization is associated with increasing monetary stability risks, such that that the monetary expansion can threaten the monetary stability goal in the new normal times. To ensure that the maximization problem is concave, we assume that the costs of

monetary instability, $M = M(\beta, \delta)$, are quadratic in the degree of monetary accommodation δ:

$$\frac{\varphi}{2}\delta^2 \beta \gamma (1 + \lambda)\pi \equiv M(\beta, \delta) \tag{8}$$

We assume that the monetary externality is homogenous among citizens in order to show that it is sufficient to have heterogeneity just in asset composition among citizens to have a multiple equilibria setting.

Moreover, in the real world the less the government is involved in supporting the economy during the pandemic recession, the more likely are negative second-round effects in the well-functioning of the banking system in the new normal times. In Venice discussions on the feasibility of instituting a public bank – that started from the second half of the fourteenth century (Mueller 1997, p.111) – were motivated by the need to prevent problems - cash shortage and trade disruption (Sissoko 2007, p.9) for citizens and foreigners alike during the banking instability events.

To capture in the simplest way this channel, let the financial externality function be:

$$\frac{\varepsilon}{2}[(1 - \beta)\gamma(1 + \lambda)\pi]^2 \equiv F(\beta) \tag{9}$$

The externalities are increasing and convex in the amount of financial losses, and they are lower the higher are the cash transfers, β, that the government implements. Also the financial externalities are homogenous among citizens.

Therefore, the overall indirect utility function, $V(\beta, \delta)$, of the average citizen at time 2 is:

$$V(\beta, \delta) = C(\beta, \delta) - U(l*) - F(\beta) - M(\beta, \delta). \tag{10}$$

As the population size is one, $V(\beta, \delta)$ also represents the social-welfare function.

The last step is the identification of the optimal economic policy mix. Our starting assumption is that the Venice government acts as a long-sighted social planner. Therefore, the Venetian government takes the relationship between the tax policy, τ, and the labour supply

into account. It simultaneously sets the policy strategy regarding the fiscal transfer $\beta*$, and the monetary policy, $\delta*$, at time 1 in order to maximize the social-welfare function, $V(\beta, \delta)$.

If the government is a benevolent policymaker, its choices will be consistent with the social-planner decisions: fiscal and monetary policy can be optimally coordinated (among others, from Abel 1987 to Bianchi et al. 2020), including the degree of fiscal monetization (among others, Chari and Kehoe 1999, Punzo and Rossi 2019).

Then, using the above social-welfare function (10), the social optimal fiscal policy is:

$$\beta* = 1 - \frac{1}{\varepsilon(1+\lambda)\pi}\left[\frac{\eta}{1-\eta}(1+i(1-\delta*)) + \frac{\phi}{2}\delta*^2\right]$$
(11)

While the optimal monetization policy is:

$$\delta* = \frac{\eta}{1-\eta}\frac{i}{\phi}.$$
(12)

The optimal level, $\delta*$, of fiscal monetization has well-defined properties. It increases:
a) if the labour supply is relatively elastic, given that the corresponding tax-distortion risk is high;
b) if the cost of debt servicing is high and c) if the monetary instability risks are low.

We need to explore the citizen preferences regarding the policy mix implemented by the government to address the pandemic recession.

Given a citizen *j,* let $\lambda + \lambda^j$ be the amount of his or her leverage at time 0, and $\pi + \pi^j$ be the amount of assets in *j*'s portfolio. Depending on $\lambda\pi^j > 0$ or < 0, citizen *j* will be a subsidized citizen relative to the average. Let $L(\lambda^j)$ be the distribution of the subsidized citizens across the population. Being the leverage a proxy for the fiscal transfer, the leverage of the median citizen will tell us whether the subsidized citizens represent the majority or a minority of the population. If the subsidized citizens are the majority, the exempted citizens represent the minority.

Moreover, citizens can be heterogeneous also as funded debt holders. Let $(\beta + b^j)(1+\lambda)(1-\delta)\pi$ be the amount of bonds in j's portfolio at time 0. Depending on $b^j > 0$ or < 0, citizen j will be a wealthy citizen relative to the average. Let $G(b^j)$ be the distribution of wealthy citizens in the population. The average of $G(b^j)$ is zero. The financial wealth of the median citizen signals whether the wealthy voters represent the majority or a minority of the population. If the wealthy citizens are the majority, the poor citizens represent the minority.

Given the general individual utility function (10) and the above definitions of π^j, λ^j, b^j, the voter j's utility $V^j(\beta, \delta)$ is:

$$V^j(\beta, \delta) = V(\beta, \delta) + \beta \pi^j(1+\lambda) + b^j(1+\lambda)\pi i(1-\delta) \qquad (13)$$

where the last two terms on the right-hand side account for the two forms of heterogeneity of citizen j relative to the average. Each citizen's preferences can differ from those of the social planner because of these two terms. Zooming on the monetary policy preferences, given $V^j(\beta, \delta)$, the corresponding FOC and the social optimality condition V_δ, the optimal fiscal monetization for the citizen j is:

$$V_\delta^j = V_\delta - b^j(1+\lambda)\pi i \leq 0. \qquad (14)$$

Assuming equation (14) holds as an equality, solving it yields:

$$\delta^j = (\frac{\eta}{1-\eta} - \frac{b^j}{\beta})\frac{i}{\phi}. \qquad (15)$$

By comparing equation (15) with the optimal monetary policy (12), it is immediately evident that, given a fiscal policy $\beta \neq 0$, a political distortion can arise between the citizen preferred policy and the social optimal monetary policy:

$$\delta^j - \delta\ast = -\frac{b^j}{\beta}\frac{i}{\varphi} \qquad (16)$$

The political distortion will reflect the citizen heterogeneity. More precisely, other things being equal the number of citizens that like fiscal monetization will be higher the higher is the number of poor citizens.