DID GENOA AND VENICE KICK A FINANCIAL REVOLUTION IN THE QUATTROCENTO?

by

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Abstract.

Did the city-states of Genoa and Venice kick a financial revolution all the way back in the *Quattrocento*, much sooner than the financial revolutions of the Netherlands, England and America? To answer this question we analyze the classic revolutions in terms of three key criteria: credibility of debtor's promises, the role of national banks in facilitating the development of financial markets, and the extent and depth of financial and monetary innovations. We then compare the record of Genoa and Venice with the benchmark from the three classic financial revolutions. The upshot is that the two maritime city-states had developed many of the features that were to be found later on in the Netherlands, England and the United States. The importance of Genoa and Venice as financial innovators has been eclipsed by the fact that these two city-states did not survive politically. Instead, the innovations were absorbed in the long chain of financial evolution and, in the process, lost the identity of their creators.

Key words: financial revolution, credibility, debt, public bank, Genoa, Venice.

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I. INTRODUCTION

By "financial revolution" most economic historians tend to refer to the series of events surrounding the Glorious Revolution of 1688 in England, from the creation of a national debt to the establishment of the Bank of England (Dickson 1967). In that revolution, not only was Catholic James II replaced with his Protestant daughter Mary Stuart and her Dutch husband William of Orange, but Dutch practices and financiers moved to London. For Peter G.M. Dickson (9), the financial revolution was so significant to enable "England to spend on war out of all proportion to its tax revenue, and thus to throw into the struggle with France and its allies the decisive margin of ships and men without which the resources previously committed might have been committed in vain." The ability of England to tap financial markets for its borrowings was a decisive factor in the defeat of France. Approximately hundred years later, the young United States went through a financial revolution of its own (Sylla 1998). Under the leadership of the capable and strong-willed Alexander Hamilton, the Congress launched a series of financial reforms which transformed the United States from a risky emerging market to a magnet for foreign capital. These would include two features of the British financial revolution: a funded national debt, or tax revenues pledged to pay interest on the debt, and the creation of The First Bank of the United States modeled after the Bank of England.

Both England and the United States had profited from earlier Dutch experiences. For James Tracy (1985) and Larry Neal (1990), a financial revolution had already occurred in the United Provinces approximately 150 years before the English revolution and 250 years before the Federalist revolution in America. Herman van der Wee (1963)

claims that Antwerp had its own financial revolution at the end of the 16th century. Carlo Maria Cipolla (1952) notes a general decline in interest rates across the main European commercial centers by the mid 1500s and calls it a revolution as well. Perhaps not to abuse the term, other writers have refrained from identifying a specific place and a specific time period as a revolution. For example, Geoffrey Parker (1974) titles his article "The Emergence of Modern Finance in Europe, 1500-1730" and Henry Roseveare (1991, 2-3) writes that "…sooner or later many of our cherished 'revolutions' …suffer this re-definition and are shown to have antecedents or discontinuities which spoil their symmetry and dissolve their cohesion."

The main point of our paper is that several features of the mentioned financial revolutions were already present in republican city-states like Genoa and Venice as early as the 1400s. To be sure, what happened in these two cities in the 1400s and 1500s was not a mirror image of what will happen in Britain and the United States two or three hundred years later. For one thing, Britain and the United States were nation states with a large domestic economies, whereas Genoa and Venice were large commercial centers with a small domestic economy. Second, small states are less likely to survive than large states for no other reason than the economies of scale in the provision of public goods. Thus, the dimensions of Genoa and Venice made them closer to the Dutch provinces than to a Westphalian nation-state.[1] The upshot is that the origin of the innovations made by Genoa and Venice has been lost because these two city-states were absorbed into larger political territories. In contrast, Britain and the United States, not only survived, but became leading economic and financial centers in the world. We are reminded of British

[1] Tracy (1985, 220) recognizes this aspect of dimension: "… the task of creating a wider field for the kind of public debt pioneered by the city-states was left to provincial parliaments whose territories were intermediate between the medieval city-states and the emerging nation states…"

and American innovations because we observe them today, whereas Genoese and Venetian innovations have been absorbed into the long chain of financial evolution.

The paper proceeds as follows. We start by going forward in time and review the innovations that took place in England, the United States, and the Netherlands (Section II). These three countries represent a sample of best financial practices and should not be considered to exhaust the universe of financial innovation of the period. We then go back in time and analyze the innovations undertook by Genoa and Venice in the 1400s and 1500s (Sections III). With our *modus operandi* of fast forwarding we want to first present the benchmark of financial innovation before comparing what England, the USA, and the Netherlands did later with what Genoa and Venice did earlier. We ignore Florence, a great financial center on its own, because its government did not have the legitimacy of the governments in either Genoa and Venice. Legitimacy is at the heart of the ability of government to commit to honor its debt. Conclusions are drawn in Section IV.

II. INNOVATIONS IN ENGLAND, THE US, AND THE NETHERLANDS

While the literature recognizes that city-states like Genoa, Venice and Florence were the precursors of the so-called financial revolution, the conclusion inevitably is that the full potential of this revolution was realized by England at the end of the 17th century (see, for example, Neal (1990, 14); Baskin and Miranti (1997, 90-91); Ferguson (2001, 15-16)). There is also no dispute that the Dutch had introduced several "product" innovations approximately a hundred years earlier than England and that the United States went

through a financial revolution of their own approximately hundred years later than England.

The literature on financial revolution is rich with lots of details and insights and we cannot possibly do justice to them in a single paper. Instead, we distill from those insights and identify three pillars of the revolution: the institutional mechanism through which the debtor commits not to renege on debt, the public bank, and innovations in financial instruments and markets. On the first pillar, the possibility of repudiation is a prominent feature of many economic models of debt. In some models, the loss of reputation from a default and the consequent inability to tap the capital markets may be a sufficient deterrent to repudiation (Eaton and Gersovitz 1981). But in other models the threat that creditors will never lend again after a default is not costly enough to deter debt repudiation, and the equilibrium solution is zero lending. Lending can occur if lenders can impose bigger penalties on debtors (Bulow and Rogoff, 1989) or if there is an institutional mechanism that underpins the commitment not to renege, as in North and Weingast (1989). This institutional mechanism sits at center stage in our paper.

A public or central bank, not only provides liquidity in the market for government securities, but enlarges the options available to government in satisfying the intertemporal budget constraint. During times of stress –e.g., wars—when government spending is temporarily high and the commitment mechanism not to renege on debt is perceived to be weak, access to central bank credit relieves the pressure from raising tax rates. While this option has a cost in terms of inflation, the alternative of raising tax rates would be costlier and slower in marshalling the required resources.

Financial innovations are the lymph of expanding markets and flourish in a competitive environment, as Neal (1990) so well illustrates. In terms of timing, some financial innovations may occur after the commitment mechanism has been set in place; and should be interpreted as a consequence rather than as ultimate causes of the new regime. Other innovations, instead, may be part of the set of fundamentals that spark the new regime. Whether consequences or causes of the financial revolution, product innovations are an observable indicator of the breath and depth of the new regime.

The commitment mechanism

The ascent to power of the British Parliament, especially its fiscal power, was the key political aspect of the Glorious Revolution. The rule of law superseded the divine rights of the monarch, property rights became more secure and government gained credibility in its commitment not to renege on debt. Monarchs, over the centuries, had been prone to default on their obligations. For example, the British Crown had proclaimed a partial default in 1671 and again in 1685;[2] the French kings were "credited" with twelve partial or full defaults from 1559 to 1797, while the Spanish monarchs had thirteen from 1557 to 1696 (Ferguson 2001, 141-42). For Douglass North and Barry Weingast (824), "the new institutional underpinnings of public finance provided a clear and dramatic credible commitment that the government would honor its promises and maintain the existing pattern of rights." The institutional change was the engine driving the train of financial transformation and permitted English national debt to surge as a proportion of Gross

[2] The most famous default was that of Edward III in the 1340s that contributed to the bankruptcies of the Florentine Bardi and Peruzzi banks (Hunt 1990).

National Product and be financed at declining interest rates (North and Weingast, Tables 3 and 4).

The U.S. Congress, unlike the British Parliament, did not share power with a king and could legitimately raise taxes for servicing the Federal debt. This was done in 1789-90 by pledging customs duties and excise taxes to pay interest on debt in hard money -- the U.S. dollar was linked to gold and silver-- (Sylla 1998, 86). In Habsburg Netherlands, Charles V, seeking an alternative to borrowings from bankers like the Fuggers, was partly responsible for the launch of a Dutch debt. The Emperor spurred the provincial governments to pledge taxes to service the debt issued to finance the Habsburg state.

As early as 1482, Holland had pledged specific income of the province to service the "renten of the common land" (Tracy 1985, 57). This debt was backed by the full faith and credit of government and gave investors confidence in government honoring its promises. The North-Weingast commitment mechanism was just as present in the United Provinces of Habsburg Netherlands as it was in England of the Glorious Revolution: legitimate governments that can tax credibly can commit to pay their debts.

National banks

The establishment of a national bank was a common feature of both the English and the American financial revolution. These banks had the twin objective of handling the national debt and carrying a monetary reform. Neither one was a central bank in the proper sense of the term. The Bank of England, established in 1694 by the Tunnage Act, was a political institution, created by the Whigs who were representing the rising power of the merchant classes but was opposed by the Tories (Churchill 1956, 23). This Act

authorized a capital subscription of 1.2 million pounds to finance a loan to government of an equal amount at an 8 per cent rate of interest. The Bank was restrained from lending to the Crown unless explicitly authorized by Parliament (North and Weingast, 821). This authorization acted as an effective constraint imposed by creditors on debtor and thus lowered default risk. By concentrating debt into a single institution, the Bank was in a position to coordinate with ease all creditors in case of default. This lower costs of creditors' coordination implied a larger punishment on the defaulting debtor, and hence a lower credit risk for government (Wells and Wills 2000, 422).

The Act also authorized the Bank to issue notes, which were not legal tender, for an amount equal to the subscribed capital. In 1697, the Bank began "engrafting" government debt onto the bank's capital, a practice that today would be called a debt-for-equity swap (Neal 1990, 51). This transformation of debt bearing a fixed rate of interest into equity was the key financial engineering of the time; more on this below.

Engrafting was not unique to the Bank of England; it had been done with the Million Bank, the East India Company and most of all with the South Sea Company (Neal 1990, 51). The latter, in 1720, attempted but failed to take over the entire English public debt.[3] This takeover had been inspired by John Law's takeover of French debt in 1719 through his Mississippi Company (Murphy 1997, ch. 14). The eclipse of the South Sea Company strengthened the Bank of England. Not only the South Sea Company

[3] The South Sea Company came into existence in 1711 with a very large (over 9 million pounds) purchase of short-term government debt and the assignment of monopoly rights to trade in South America (Dickson, Table 5). The trade rights were of uncertain value given "Spain's notorious determination to exclude foreigners from it" (Dickson, 66). The South Sea Company competed with the Bank of England for the right to convert approximately 31 million pounds of government debt and won with a bid of 7.5 million pounds, a price that included also the cost of bribing several members of Parliament (Dickson, 110-12). In 1720, the House of Commons passed a law whereby all of the national debt –except that held by the Bank of England and the East India Company—would be sold to the South Sea Company; in other words, a complete takeover of English public borrowing, For details on the conversion of the national debt, see Appendices A and B in Dickson.

was absorbed by the Bank of England in 1723 through engraftment, but the South Sea Annuities –the financial innovation of the Company—inspired the Bank to launch its first irredeemable perpetual Three Per Cents Annuities in 1726 (Neal 1990, 112-17). Further boost to the power of the Bank came in 1707, when the Parliament gave the Bank the monopoly on joint-stock banking in England and made its notes legal tender;[4] and in1715, when the Bank began managing the national debt, thus re-enforcing its role as the fiscal agent of the state.

The First Bank of the United States (BUS) was created in 1791 and was patterned after the Bank of England, except that notes issued by BUS, unlike those of the Bank of England, were subject to a 100 per cent specie requirement (Cowen 2000, 12).[5] Like the Bank of England, BUS was a political creature: the brainchild of Alexander Hamilton and the Federalists who wanted "to build a national government that would command the respect of Americans and foreign nations, and to use that government to foster energetic national economic development" (Sylla 1998, 87).[6] More specifically, for Hamilton the creation of a national debt –which would have assumed state debts— would have been a "powerful cement of our Union" (Cowen, 10); and BUS would have played a critical role in the creation and development of this debt.

BUS lent to the Federal government, paid interests on U.S. government securities held in Europe (mainly in Amsterdam and London), held government deposits, and transferred these deposits and its own notes throughout the country (Cowen, 139-40).

[4] Other banks were limited to the inferior structure of a partnership not exceeding six members.
[5] BUS had a capital of $10 million and could issue notes up to an equivalent amount.
[6] The nationalist James Madison and the agrarian Thomas Jefferson were strongly opposed to Hamilton's bank which threatened to shift the balance of power in favor of the Federal government, large-scale capitalism, and finance; this opposition was at the core of the BUS demise in 1811 when its charter was not renewed.

Quickly, BUS became the critical player in the U.S. money market. From the very beginning Hamilton envisioned that BUS notes would be an alternative (to specie) medium of exchange. The management of the bank was conscious of this role and worried about the possibility of bank notes being cashed in for specie (Cowen, 58).[7] In sum, according to Sylla (1998, 88-89), Hamilton's plan of a funded national debt and BUS transformed the United States from an emerging market into an international capital market. U.S. government securities and BUS shares were actively traded in Amsterdam and London and prompted large inflows of capital.[8]

The Wisselbank of Amsterdam was established in 1609 as a public deposit bank and economic historians are in virtual agreement that it was patterned after the Venetian *Banco della Piazza di Rialto* of 1587. The Wisselbank was given a monopoly on money changing, bills of exchange valued in excess of 600 guilders, and bullion transactions. Merchants brought all foreign coins to the bank and received credit in deposit accounts denominated in bank guilders. The Wisselbank was at the center of the Dutch payment mechanism. In absence of bank fees, money settlements through the *giro* system–that is, by debiting and crediting deposit accounts with the bank—were cheaper and faster than settlements using coins. Larry Neal (2000, 121) describes how the relative price between deposits and specie reacted to bank fees, abundance of specie, and shocks to the economy. Other things the same, deposits traded at a premium when the bank charged fees in accepting coins for crediting a bank account. On the other hand, when Holland was at risk of being invaded, specie was at a premium relative to deposits. The higher the

[7] In 1792, BUS fell into temptation of over-issue but quickly reversed the course that is blamed for a credit squeeze and a decline in the price of government securities (Crowen, 90-1).
[8] Ironically, President Thomas Jefferson concluded the sale of the Louisiana Territory by exchanging U.S. government debt for land, a tribute to the ingenuity of his opponent, Alexander Hamilton (Sylla 1998, 89).

premium on deposits the lower the incentive to settle payments with deposits; and conversely the lower the premium on deposits the larger the incentive to bring specie into the bank and settle with deposit transfers.

Despite the efficiency of the payment mechanism and the abundance of financial instruments, Neal concludes that the Dutch failed to achieve the success of the English financial revolution. The reason is that the provincial structure of the United Provinces was an obstacle to the creation of "a truly national debt backed by a national taxing authority" (Neal 2000, 123).[9]

Financial instruments and financial markets

Northern French cities in the early part of the 13th century were the first to launch lifetime annuities (*rentes viagères)* as part of their urban debts (Tracy 2003, 14). The practice spread to the Flanders and the Brabant before being adopted by Holland in the following century (Tracy 1985, 14). Annuity contracts involved one party who sold the capital, a second party receiving the annuity, and a third party, the nominee, the actuarial target on which periodic payments were based (Poitras 1996, 7). The annuity could last the nominee's lifetime (*lijfrenten*), or over several lives, or in perpetuity (*losrenten*). Annuities were traded at the Antwerp Bourse in the first half of the 16th century. Church restrictions contributed to making yields on perpetual annuities lower than yields on lifetime annuities (Tracy 1985, 92-3).[10] Annuities were valued in terms of "years

[9] Tracy (1985, 222) seems to agree with this assessment when he states that "only in England was there, at this time, a parliament that could pledge the full faith and credit of an entire kingdom (in contrast, the States General of the Netherlands borrowed money on a much less ambitious scale than did the single province of Holland)."

[10] Tracy (92) reports that in Leiden in 1520 losrenten or perpetual annuities were sold at a yield of 1/16, lijfrenten for two lives at a yield of 1/10, and lijrenten for one life at a yield of 1/8.

purchase" times the yearly annuity payment; thus, years purchase were the equivalent of modern-day price-to-earnings ratio. The age of the nominee played no role on the pricing of the annuity until 1670, when a couple of Dutch municipalities adopted so-called tontine loans, in which interest payments reflected the age of nominees (Dickson, 41).[11]

Transaction costs in buying and selling lifetime annuities were high because of the legal requirement to prove that the nominee was alive and the difficulty to assess the probability that the nominee would survive a given number of years. Dickson (76-77) details the complications involved in managing annuity payments (and lottery loans) by the English Exchequer at the end of the 17th century. According to Larry Neal (1990), much of the English financial revolution is owed to the standardization, marketability and liquidity imbedded in the new financial instruments issued by the Bank of England, the East India Company and the South Sea Company. These characteristics led to a thickening of markets and a decline in transaction costs. Perpetual but potentially redeemable debt was first issued in 1723 in the form of the 3 per cent South Sea Annuities and later with the 3 per cent Consols as part of the strategy of the British government to lengthen the maturity of the national debt and lower its servicing cost (Dickson, 241-2); for yields on both the Annuities and the Consols from 1727 to 1800, see Sidney Homer and Richard Sylla (1991, Chart 5).

Credibility of the funded debt, an emerging banking system, and liquid financial markets attracted foreigners to purchase U.S. government securities (Sylla 1998, 98). The

[11] *Tontines* were named after Lorenzo Tonti, a Neapolitan banker who became an adviser to Cardinal Mazarin in 1652. Tonti devised a scheme whereby individuals would subscribe into a fund to receive periodic payments. When a member of the pool died, the others members shared the payments. Gains increased as the numbers of survivors shrank. *Tontines* were popular in France, Britain and the United States. They were made illegal when it was discovered that members killed one another to gain larger shares of the fund. The appeal of the idea still remains, witness the creation in February of 2005 of the Lorenzo Tonti hedge fund of Axis Capital Management, consisting of a portfolio of life insurance policies owned by elderly Americans; see Rebecca Knight (2005).

3 per cent, 6 per cent, and deferred 6 per cent of the 1790—redeemable at the pleasure of the U.S. government-- were popular with European investors and regularly traded in Amsterdam and London in the early part of the 19th century (Sylla et al. 2004). The American banking system brought its own innovation in the form of the call loan, a loan by New York banks to out-of-town banks. The loan was secured by securities and became soon an integral feature of modern money markets.

In sum, we have reviewed the essential ingredients of three financial revolutions—the Dutch, the British, and the American—in terms of reputation of the issuer of the debt, the presence of national banks and the characteristics of financial instruments and financial markets. These will be our benchmark for the following discussion of two Italian city-states, Genoa and Venice, in the 1400s and 1500s and their financial innovations.

III. FISCAL AND FINANCIAL INNOVATIONS IN GENOA AND VENICE

Medieval Genoa and Venice were at the frontier of economic development and capitalism. Commerce and international trade were the key to their success. Both cities competed and fought for dominance of overseas routes. Geographic specialization occurred after Genoa and Venice fought their third and last war in 1378-81. After that the Venetians dominated the routes to the East, leaving to the Genoese room for growth in trade with the West. Both centers traded with the North of Europe. Characterizations of the relative importance of Genoa and Venice vary in the literature, but Venice is often described as having the stronger political and economic models of the two city-states. As to the economic model, Fernand Braudel (1992, 118-9) takes a different view on this:

> "I certainly do not believe that the rise of Venice is accounted for by the outstanding excellence of her capitalism…For no historian could deny that Genoa was first in the field, with a uniquely modern approach to capitalism…and may indeed have been somewhat vulnerable by virtue of this forward position. Perhaps it was one of Venice's advantages to be more conventional, less audacious. And her geographical situation undoubtedly favoured her…And as long as the East was the chief source of wealth, Venice with the facilities of her route through the islands to the Levant would have the advantage."

Others share Braudel's assessment; for example, Robert Sabatino Lopez (1964, 455-58) gives an account of how Genoa was more successful than Venice in adapting to the rise of the Western markets.

Both city-states were finance centers. As with international commerce, traditional accounts give an advantage to Venice. But a more careful analysis of actual records yields a different assessment, with Genoa being the more innovative of the two in financial instruments and markets. For example, Lopez (462-3) states that "shortly before 1600, Genoa virtually became the financial capital of the Catholic world, even as Amsterdam was becoming the financial capital of the Protestant countries." Ramón Carande (2000, 533) dates the dominant role of Genoese bankers at the Spanish court in 1553. Braudel (157) summarizes that the period 1557-1627 is the age of Genoese finance, when "…the merchant-bankers of Genoa, through their handling of capital and credit, [called] the tune of European payments and transactions." For Felipe Ruiz Martín (1991), the age of the Genoese, at least insofar as Spanish finances are concerned, extends until the end of the 17th century. Yet, the biggest Genoese financial innovation dates back to 1407 with the creation of the *Casa di San Giorgio* (henceforth San Giorgio), which was primarily a creditors' association and secondarily a bank for part of the time.

Last but not least, both Genoa and Venice shared republican political institutions and the rule of law, which gave them legitimacy and credibility to issue large amounts of long-term and marketable debt . Medicean Florence, on the other hand, relied on a small group of well-connected officials of the Monte who borrowed from wealthy individuals and lent to government with a considerable mark-up. For Pezzolo (2003, 74), "under the Medici regime, therefore, borrowing became a powerful device to construct and consolidate the patronage system." This is one reason that Florence is excluded from our discussion.

The government in Venice was strong, whereas in Genoa it was "fractious and unstable," as Niccolò Machiavelli puts it in his History of Florence (1965, 494-95). This assessment is often repeated elsewhere. One explanation for this difference is that in Genoa there was a protracted power struggle between the rising merchant class, the *Popolo*, and the feudal aristocracy, the Nobles. As a barometer of Genoese political fractionalism, from 1338 to 1528 Genoa had 14 *Popolo* revolts, 11 Noble revolts, 7 joint revolts, 6 revolts led by the Fregoso family, and one civil war (Epstein 1996, Appendix). Periods of fierce competition among clans or family aggregations –called *alberghi*— in Genoa were followed by periods of cooperation. Cooperation fostered economic prosperity, but prosperity fostered inter-clan competition (Greif 1995, 736). In 15th century Genoa, power was shared by approximately 30 *alberghi* of different sizes and lineages. Political stability arrived in Genoa in 1528 under the aristocratic republic of Andrea Doria who was able to strike an agreement on power sharing among the *alberghi*. Venice's strong republicanism was rooted in a "uniquely homogeneous and unified ruling class" (Jones 1997, 646). Clan clustering was not a feature of Venice. Venetian ruling

élite discouraged fractionalism through a careful process of family representation in politics and checks and balances (Greif, 736 and 738-9).

In sum, Genoa and Venice, although both republican, developed different degrees of "stateness:" The state was more compact and more willing to interfere with the economy in Venice than in Genoa. As a result, we would expect that fiscal and financial innovations in the two city-states would adapt to these differences in political institutions, in accordance with predictions made by institutional theory (North 1981).

Commitment mechanisms

The earliest evidence of long-term urban debt dates back to 1149 for Genoa and 1164 for Venice. In both cases lenders gave the state a fixed amount of funds against a stream of uncertain but predictable future cash flows supported by a tax or income-generating property (Tracy 2003, 20-1). The debts of the State were called *compere* in Genoa and *Monti* in Venice (and Florence). The term *compera* (literally a purchase) was first used in Genoa in the middle of the 12th century to refer to a tax-farming contract (Sieveking 1906a, 50). Later, *compera* meant a loan to government against the right to a tax revenue flow from a specific tax or duty. These loans were compulsory at first but became voluntary in time (Sieveking 1906a, 54; Sieveking 1906b, 40). In contrast, in Venice (and Florence) lending to government was compulsory and based on assessments of one's wealth. The governing élite in Venice was not keen in relinquishing control of tax revenues to private creditors (Luzzato 1929, xii).

Venetian debt was structured between a floating debt and a long-term funded debt (Pezzolo, 62). The Grain Office, the Salt Office and banks were the sources of short-term credit to the Republic. The Grain Office, created in the early part of the 13th century, was

like a bank, accepting deposits, as early as 1316, from individuals and institutions and lending to government, business for importing grain and sustaining strategic sectors –a sort of Venetian industrial policy—and individuals (Mueller 1997, 402-6). The Grain Office operated in the red and was subsidized by the government. Private banks were the other large source of short-term loans to government, and by the 15th century replaced the Grain Office in handling Venetian floating debt (Mueller, 426). Banks lent to the state regularly, without charging an interest rate but receiving non-pecuniary side payments in return (Mueller, 444-8). In addition to disbursing specie, banks issued bank money and thus monetized part of the public debt (Mueller, 427). The symbiotic relationship between the state and Venetian private banks is another piece of evidence of a strong state that considers banks and the services they provide as part of the collective good.

Long-term debt in Venice was funded through assigned tax revenues. The act of a legitimate government setting aside specific tax revenues to service the public debt is a credible commitment, one where elected officials do not merely promise to follow "a precedent of 'responsible behavior'" but are "… constrained to obey a set of rules that do not permit leeway for violating commitments" (North and Weingast, 804). The earliest such commitment dates back to 1262 when the Grand Council, the governing body of Venice, gave the *Ufficiali degli Prestiti* (Loan Officers) the charge to collect tax revenues assigned for the repayment of public debt. The same officers "were required to swear a solemn oath that…they would use the revenues under their control to pay interest on loans." (Tracy 2003, 21). The credibility mechanism was reinforced by the fact that the largest holders of government securities came from the same élite governing Venice (Mueller, ch. 12).

Debt consolidation in Venice took place with the establishment of the *Monti*. The oldest was the Monte Vecchio, dating back to the middle of the 13th century. Loans were compulsory and their sizes were based on ability to pay. A Loan Office kept the books, collected taxes and paid interest twice a year. As early as 1262 the Venetian public debt became a perpetuity (Mueller, 459). Suspensions or delays in interest payments occurred in 1379-81, 1463-79 and in 1480. Prices of government securities declined through most of the 1400s (Mueller, 462). To rejuvenate interest in public debt, the *Monte Vecchio* was superseded by *Monte Nuovo* in 1482, by *Monte Nuovissimo* in 1509, and finally by *Monte Sussidio* in 1526. But the root of the problem was in forcing citizens to lend to government. In 1528, the Mint in Venice began to pay market rate of interest on specie deposits, the so-called *depositi in Zecca*. The government issued also life annuities, as was done in Holland. Venice had finally replaced the compulsory loan system with a market-friendly approach to debt management (Pezzolo, 67-8). By 1600, the city had repaid all its debt (Pezzolo, Table III) and thus enhanced its reputation and creditworthiness in the market place.

In Genoa, like in Venice, government debt went through a series of consolidations – one as early as 1274- before being purchased by the new institution of San Giorgio in 1407. The consolidation of 1407 put under one roof *compere* yielding anywhere from 8 to 10 per cent into a single San Giorgio asset bearing a 7 per cent interest rate. Investors who had funded San Giorgio would now hold not specific *compere* but Genoese public debt (Fratianni 2004, 8). This is exactly the technique of engraftment we discussed earlier in connection with the Bank of England and the South Sea Company. San Giorgio's investors faced risks typical of a shareholder, but two in particular. The first

risk emanated from the uncertain flow of alienated tax revenues underlying the *compere* contracts. As the economy grew and contracted, so did tax revenues. The second risk came from the close relationship that existed between the Republic and San Giorgio. While San Giorgio was formally and fiercely independent of government, in practice the fortunes of one were tied to those of the other. In addition to giving a fixed yearly amount, San Giorgio helped the Republic through extraordinary contributions, debt forgiveness, and even by running the city's overseas territories and colonies.[12]

The commitment mechanism in Genoa was different than in Venice. In Genoa, current government spending had to match current borrowing, primarily from San Giorgio. In Venice, the state set tax rates and forced borrowing to match government spending, including interest payment on debt. The state in Venice was the protagonist of the commitment device; in Genoa, the state had relinquished this role to San Giorgio. While it is true that San Giorgio represented the interests of the Republic's creditors, it was also concerned about the economic and political viability of the state. San Giorgio's management monitored closely the affairs of the Republic and was able to differentiate financial difficulties due to opportunistic behavior from difficulties caused by exogenous shocks. San Giorgio was forgiving about the latter but not about the former. Wars, famine, pestilence were good reasons for excusable delays in interest and debt payments or outright debt forgiveness. Machiavelli (494-95), an early admirer of San Giorgio, coined the felicitous phrase of San Giorgio being a 'state within a state', but a benevolent and well-administered state within the fractious and unstable state that was the Republic. By being lenient under moments of stress, the creditor was ensuring the

[12] For a list of the different methods San Giorgio used to help the Republic financially, see Giacchero (1979, 131). The same author gives examples of extraordinary contributions and debt forgiveness on pages 54, 131-36, 435, and 477.

economic viability of the debtor. It was compassionate behavior, but it was also a smart strategy (Fratianni, 15).

In sum, the commitment mechanism in Genoa passed through the creditors' association of San Giorgio. By imposing effective constraints on the debtor and by being forgiving in times of financial stress, San Giorgio had greatly diminished default risk. San Giorgio's *luogatari* (shareholders) felt re-assured by this mechanism and could consequently demand a lower rate on equity. Pronouncements alone, regardless of their solemnity, were not adequate in re-assuring creditors. This is also the implication of sovereign debt where reputation alone is not sufficient to sustain a positive amount of lending; the creditor must be able to impose a large enough penalty on the debtor.[13] The contingent use of a penalty translates into a constraint on debtor. An example of debtor's constraint was the imposition, in1539, not to raise taxes without the consent of San Giorgio's management (Fratianni, 12-13). This constraint was qualitatively similar to the prohibition that the Bank of England could not lend to the Crown without the explicit approval of the British Parliament.

San Giorgio's *luoghi* were owned widely by Genoese and foreigners. According to Heers, (1961, 147-162), by the 15th century the secondary market for *luoghi* had become active, liquid, and sophisticated. Not only *luoghi* were bought and sold, but they were used for collateral by bankers, borrowers and tax collectors (Sieveking 1906b, 37-38). Each *luogo* was entitled to a variable dividend, called *paga*. However, dividends were often paid with a significant time delay with respect to the their declaration.

[13] For example, in the model of Jeremy Bulow and Kenneth Rogoff (1989) reputation can be sustained if the discounted value of future expected interest and principal payments on debt can never exceed the discounted value of future expected output flows. That condition is violated if a negative shock, at any point in time, reverses the direction of the inequality and induces the debtor to use the savings from a partial default as collateral for a series of cash-in-advance contracts.

Declared *paghe*, as we will see later, were also actively traded and were sold for specie at a discount. Statistical information on yearly market prices (p), declared dividends (d), and discounted dividends (d^a) was published by Carlo Cuneo (1842, 307-311). The three series have different starting and ending points, with the d series covering the longest period (1409-1800). Carlo Cipolla (1952, Appendix) expanded the Cuneo series recovering data for p and d^a all the way back to 1522. All series are expressed in lire, soldi, and denari (1 lira = 20 soldi = 240 denari) up to 1739 and in scudi after this date. The p series is a yearly average; for more details see Fratianni (2004).

Figure 1, line RL, shows current yields on San Giorgio's *luoghi*, computed as $(d^a/p)*100$ for the period 1522-1739. Yields start at about 5 per cent and quickly decline to an approximate average of 4 per cent all the way to 1573. After that year, they decline again until 1603 and then settle at about 1.5 per cent.[14] Data limitations prevent us from comparing Genoese yields with those received by holders of Venetian debt. Mueller (Table 11.3) gives current yields on the *Monte Vecchio* for some years all the way to 1578. Yields on Venetian debt differed between forced lenders and voluntary lenders (e.g., foreigners); and these differences are noted by Mueller. But yields were also affected by the noted practice of delaying interest payments. In 1432, the delay was 4.5 years and then increased progressively. After 1454, for securities purchased on the Venetian open market, *paghe* were paid after many years (Mueller, 473). Since values of discounted *paghe* are available for Genoa and not for Venice, the current yield for Venice, d/p, has a large upward bias relative to the yields in Genoa, d^a/p. Even ignoring this bias, Genoese yields, on average, were very close to Venetian yields for the period

[14] The average value of the yields from 1522 to 1573 is 3.88 per cent, from 1574 to 1603 2.59 per cent, and from 1604 to 1739 1.45 per cent.

1535-76 (see Table 1).[15] Homer and Sylla (120-1, Table 9) compare interest rates in 16th century Genoa and Venice but that comparison mixes money market rates in Genoa with perpetuity yields in Venice.

[Insert Figure 1 and Table 1here]

Our best assessment is that yields on San Giorgio *luoghi* were among the lowest if not the lowest of the period under consideration. Table 1 shows that San Giorgio current yields were lower than interest rates on government loans in high-reputation Holland in the 16th and 17th centuries. This pattern of interest rates is consistent with our account that San Giorgio was perceived to be solid and of low credit risk. The evidence reported by John Day (1987, Table 8.1) that the difference between interest rates based on par-value debt in Genoa and Venice and Florence fell after the creation of San Giorgio further reinforces this assessment.

Public banks

Both Genoa and Venice have a long and rich history in banking. While banking in Genoa can be traced all the way back to 1150 (Sieveking 1906b, 49), the first public bank emerges in 1408 with the creation of *Banco di San Giorgio*, a unit of the *Casa*. The *Banco*'s primary mission was to facilitate the management of the *luoghi* (Sieveking 1906b, 46). The *Banco* was in competition with other banks (Sieveking 1906b, 49). Banking transactions to the public were closed in 1445 and were resumed again in 1530; during this time interval, banking activities were restricted to the state, shareholders, tax

[15] Our series on Genoese debt starts in 1522 and overlaps the data in Mueller's Table 11.3 for the period 1535-76. Mueller gives four yields for the period 1535-48 and again four yields for the period 1549-76. The average of the four yields for the first period is 2.5 per cent and for the second is 4 per cent. The average for the 14 Genoese yield observations from 1535 to 1448 is 3.82 per cent and for the 27 observations from 1549 to 1576 is 3.76 per cent.

collectors and suppliers. (Felloni 1990b, pp. 77-82). The *Banco* was permanently closed in 1805. Banking in Venice starts a few years after banking in Genoa (to be precise in 1164). The first Venetian public bank was the *Banco della Piazza di Rialto,* or *Banco di Rialto* for short, established in 1587. A second public bank, *Banco Giro*, was created in 1619. *Banco Giro* gradually displaced the *Banco di Rialto*, which ceased operations in 1637 (Tucci 1981, 250).

Banco di San Giorgio carried four types of transactions: deposits, specie transactions, loans, and handling of *paghe,* the interest payments on *luoghi* (Assini 1995). Deposit accounts were used by customers to settle payments. The giro system reduced the use of scarce specie and raised the velocity of narrowly defined money. For example, Client A, who owed funds to Client B, would transfer a sum of money by charging his account and crediting Client B's account. If Client A and Client B had accounts in the same bank, settlement would be intra-bank. If B had an account with a different bank, settlement would take place through one of the many correspondent banks of the *Banco di San Giorgio* (Sieveking 1906b, 57). The *Banco* and other Genoese bankers, furthermore, dominated the Besançon and Piacenza fairs where the bulk of the international settlement took place (van der Wee 1977, 321). Cash transactions involved the deposit and withdrawal of specie. Being a public bank, *Banco di San Giorgio* had to guarantee that the depositor could receive specie on demand. Despite this constraint, the *Banco* extended loans to the Republic, tax farmers, and its own clients by allowing deposit accounts to run negative balances (Assini, 270). Account overdrafts were exchanged among clients as part of an extended credit network. Interest on San Giorgio *luoghi* were credited in the accounts of *luogatari* four times a year (February, May, August, and

November) but before they could be cashed (Assini, 277). Initially, the payment delay was nine months but later it grew. The books registered the date of maturity of the *paghe*; *luogatari* who had claims on a future cash flow would use the *paghe* to extinguish a debit. For example, an owner of *paghe* could use them to settle a debt maturing into the future or to pay taxes. When the maturity of the *paghe* was longer than the maturity of the debt, the *paghe* had to be discounted. *Paghe* were actively exchanged at their own money of account, *lire di paghe*. Jacques Heers (1961, 159-72) has an extensive discussion of the *paghe* market and of the use of *lire di paghe* as bank money. This was Genoa's money market and was a great innovation.

As mentioned, *Banco di San Giorgio* suspended operations with its "external" clientele in 1445 and resumed them again in 1530; this for two reasons. The first was the increasing pressure the Republic was exerting on the *Banco* to obtain short-term loans. According to archival data compiled by Giuseppe Felloni (1990a, Table 2), loans to government grew at a compound annual rate of almost 20 per cent from 1409 to 1432.[16] The second was the government imposition that the *Banco* make cash payouts at the legal rate of 42 *soldi* for one florin when the market price was higher.[17] This gave incentives to deposit *soldini* in the bank and withdraw florins. To adhere to the legal exchange rate, the

[16] Loans outstanding in 1409 were 5,000 lire and rose to a peak of 386,804 by 1432. After that date, they declined.

[17] Money scarcity prevailed in much of 14th and 15th century Europe (Day, ch. 1). This scarcity was driven by a decline in gold and silver production and a chronic deficit in the European current account with respect to the Levant. Mining was plagued by diminishing returns, given a stagnant technology. On gold and silver production during the period, see Day (Figure 10.11) and Aerts (2004). Mint production in Genoa, valued in money of account, declined from 1370 to 1415 (Aerts, Fig. IV). In an attempt to cope with money tightness, the Genoese government lifted import duties on bullions and coins in 1400 and placed an embargo on the exports of gold coins in 1402 (Day, 27-8). At the same time, the price of the high-value florin coin was rising in relation to small-value coin *soldino*. Popular sentiment was that bankers were responsible for the premium on gold coins, and government felt compelled to resist the appreciation of the florin by enforcing its legal price in terms of *soldino*. Against this background, the *Banco di San Giorgio* emerged in 1408, with the charter to stabilize the currency, in particular the exchange rate between high and low-value coins (Felloni 1990a, 228).

Banco was forced to acquire florins at market prices and lose on each cash withdrawals. According to its income statement, the *Banco* made a profit in only 6 out of the 37 years it was in existence (Felloni 1990a, Table 3). Losses were the norm and were large. The undiscounted sum of the losses and profits over the entire period was -141,225 lire; the undiscounted sum of the losses due to the legal florin-to-soldi exchange rate was -140,930 lire. The enforcement of the legal exchange rate was bleeding the *Banco di San Giorgio*. In 1445, when faced with the ultimatum of either respecting the loss-making legal exchange rate or close operations, San Giorgio opted for the second (Felloni 1990a, 243). Banking transactions for *luogatari*, government and tax farmers continued as usual.

When the *Banco di San Giorgio* re-opened in 1530, it accepted for deposit all types of large coins valued in terms of the bank's unit of account, the *lira in mumerato*. Only later, the *Banco* opened specialized accounts for gold (1586), silver (1607), and Spanish reals (1625) coins (Felloni, 1990b, 77-79). As early as 1610, bank notes were introduced in circulation and became a substitute for coins.

The first proposal for a public bank in Venice dates back to 1356 (Mueller, 112).[18] The project had a lot of merit but did not go through and Venice had to wait until 1587 before seeing the lights of the *Banco di Rialto*. Technically, the *Banco di Rialto* was no different than the older *banchi di scritta* (script banks) in the Rialto that accepted *giro* accounts, an innovation prompted by currency scarcity and high costs of information regarding the vast range and often poor quality of coins. The critical difference was that the *Banco di Rialto* had a solvency guarantee from the state and the older *banchi* did

[18] According to the author of the plan, Giovanni Dolfin, a member of the Council of Forty, the public bank would co-exist with private banks, would deal exclusively with the payments and clearing mechanism, would be subject to a 100 percent reserve requirement, and would be financed with customers paying a fee for bank services.

not.[19] Like its successor, the Wisselbank of Amsterdam, the *Banco di Rialto* was a monopolist and centralized the clearing mechanism. Payments through the giro system were less costly than payments settled with specie; hence, a premium rose for payments *in banco* relative to those in specie, as it would happen later with the Wisselbank in Amsterdam (Kohn 1999, 23).

In 1619, the *Banco Giro* was launched to manage Venice's floating debt. This bank lent to government at short maturities and obtained, in exchange, that its deposit liabilities be treated as legal tender (Day, 153; Zannini 1998, 444). In other words, the *Banco Giro* was an issue bank, except that rather than issuing bank notes like the Bank of England, it issued bookkeeping entries. These soon rose to a premium with respect to currency. As Day (153) notes, "[t]he creation of the Banco del Giro resulted in the immediate monetization of 350,000 ducats of the floating debt (500,000 ducats in credits against a cash reserve of 150,000 ducats)." The *Banco Giro* out-muscled and out-competed the *Banco di Rialto* because of the close connection it had with government. As it is so often true in monetary history, the bank with privileged access to government and its finances becomes the central bank (Goodhart 1988, 4-5).

In summary, if the closest predecessor to the Wisselbank of Amsterdam is the *Banco di Rialto*, the closest predecessor to the Bank of England is the *Banco Giro*.

Financial and monetary innovations

Our discussion, so far, has emphasized the institutional mechanisms that permitted Genoa and Venice to issue large amounts of public debt at relatively low cost for the issuer.

[19] For early banking in Venice, see Mueller (ch. 1). It should be pointed out that the first public bank was the *Taula de Canvi*, established in Barcelona in 1401. However, the *Taula* was not as purely a payments bank as the *Banco di Rialto* inasmuch as it lent heavily to the city.

These mechanisms developed in conjunction with innovations in financial and monetary instruments and in markets. In what follows we emphasize four innovations: the perpetual debt instrument, the marketability of debt instrument, the money market, and the interaction between credit and money markets.

In Venice, public debt was a perpetuity as early as 1262. With the debt consolidation of 1538, also Genoese debt became a perpetuity. We have seen that both Genoa and Venice could borrow at relatively low rates of interest. The governments of these two city-states in the 1400s and 1500s, like the government of England in the 1700s, understood well the gain in financial freedom from lengthening the maturity of debt; but this could not be done unless the issuer was reputable. Credibility in servicing the debt was of the essence. The Venetian commitment to service the debt in the 1400s and 1500s was similar to the English commitment of the late 1600s. The Genoese commitment was different by having transferred to the monopolist creditor the burden of reputation and ability to keep the debtor "honest." The Venetian approach was statist; the Genoese market friendly. Both survived for centuries. The Venetian was copied, the Genoese was not.

The second innovation resided with the very nature of San Giorgio. This institution engrafted –using English financial terminology of the 17th century-- public debt onto its capital; or, what today we would call a swap of debt for equity. The fact that this innovation inspired John Law's takeover of French debt in 1719 through his Mississippi Company might have tarnished the importance of the swap. There is wide agreement among economic historians that "Law's plan was neither fantastic nor fraudulent and that it might have succeeded if no over-issue had taken place" (de Roover

1974, 234). The sound economic principle underlying debt conversion was the gain associated in transforming high transaction cost and difficult-to trade debt instruments into transferable and liquid shares (Neal 1990, 96-7).

The third innovation was the Genoese money market, arising from interest payment delays on San Giorgio *luoghi*. Recent archival research by Professor Giuseppe Felloni has revealed that dividend payment delays varied greatly over time, rising from 50 months in 1518 to a maximum of 116 months in 1553, and then settling to 64 months from 1579 to the end of our sample period. Since we have data for declared dividends (d), discounted dividends (d^a), and dividend delay (t) –kindly supplied to us by Prof. Felloni-- we can compute the implied money market interest rate,

(1) $Rm = (d/d^a)^{1/t} - 1.$

Figure 1 displays the Rm series against the RL series (the current yield on *luoghi* discussed above). Figure 2 shows the difference between RL and Rm. The prevalence of a negative yield curve confirms the evidence that reputable debtors could lower the cost of debt by lengthening maturities.[20] Money market rates rose in the first half of the 16th century and fell in the second half up to 1620. Then they surged from1622 to 1632 and decline again afterwards. Furthermore, short rates were much more variable than long-term rates, reflecting perhaps their hyper-sensitivity to news.

The money market innovation appears to have had no direct spillover on the practice of discounting bills of exchange until the time when these were endorsed.[21] This may not be for lack of knowledge, given that the Genoese brought to life also the

[20] The sample average of the difference between RL and Rm is -52 basis points.
[21] According to de Roover (221), endorsement became diffused in the seventeenth century.

prototype bill of exchange.[22] It may well be that the Church ban on charging interest without bearing a risk was the main reason in preventing the spreading of discounting (de Roover, 210-11).

[Insert Figure 2 here]

The fourth and last innovation deals with the method Genoese merchant bankers used to link the so-called Besançon exchange fairs to the international means of payment. The Genoese set up these fairs, among which those in Besançon and later in Piacenza, in 1535, after having been forced out of the fairs in Lyons. The Besançon fairs became a large credit market, where letters of exchange were not only cleared but re-issued time and again (Day 148). Braudel (168) arrives at the conclusion that as a result of these fairs "…the capital of the Italian cities was all drained towards Genoa . And a multitude of small investors, Genoese and others, entrusted their savings to the bankers for modest returns." These funds were used by the Genoese merchant bankers to lend to the Spanish Crown. Starting with 1566, the Genoese obtained from the Crown long-term securities (*juros de resguardo*) as collateral for their loans; the contracts specified that these securities would be sold if the Crown did not repay the loans (Lovett 1980, 905). The Genoese received an interest rate equal to the difference between the interest rate on the loan and the interest rate on government securities; in essence, the bankers had worked out an interest rate swap. Furthermore, the Crown sold silver spot in Spain to the Genoese in exchange for future delivery of gold in Antwerp, where the gold was used to pay Spanish troops fighting in the Low Countries. The cost to the Genoese delivering gold up north, through letters of exchange, was a fraction of the cost of shipping silver--

[22] Raymond de Roover (203), the acknowledged expert on bills of exchange, arrives at this conclusion from a notarial instrument called *instrumentum ex causa cambia* found in Genoa's archives.

including the high risk of predation-- from Spain to Antwerp. The Genoese advantage was driven by "increasing returns to scale in international financial services" (Conklin 1998, 499). The Genoese sold silver to Italian merchants who, in turn, shipped it to the Far East to settle a trade deficit. In exchange, the Genoese received letters of exchange that allow them to buy gold for delivery in Antwerp. Thus, the merchant bankers of Genoa brought into equilibrium a web of long and short positions through the use of credit (Braudel, 168; Conklin, 499). This was global finance at its best.

IV. CONCLUSIONS

Our main question was whether the city-states of Genoa and Venice kicked a financial revolution all the way back in the *Quattrocento*, much sooner than the financial revolutions of the Dutch, English and Americans. To answer the question we went back and analyzed the classic revolutions in terms of three key criteria: credibility in the debtor's commitment to honor its promises, the role of national banks in facilitating the development of a national debt and financial markets, and the extent and depth of financial and monetary innovations. We then compared the record of Genoa and Venice with the benchmark from the three classic financial revolutions. The upshot is that the two maritime city-states had developed many of the features that were to be found later on in the Netherlands, England and the United States.

Take the commitment mechanism. Long-term debt in Venice was funded by a legitimate government setting aside specific tax revenues to service the public debt. In the early period loans to the state were compulsory and based on income; later they became voluntary. The Republic of Venice did not default on its debt, although it often delayed

paying interest. In Genoa, the commitment mechanism was different from Venice. Genoa, more politically divided than Venice, relinquished control over most of tax revenues to San Giorgio. San Giorgio represented the interests of the state's creditors, but at the same it was also concerned about the economic and political viability of the debtor; in essence, San Giorgio was a semi-public institution. Genoa did not default on its debt. Both Genoa and Venice—Genoa more than Venice—carried a low cost of debt. Investors believed in the state honoring its promises and were willing to accept a lower return on invested funds. This outcome roughly coincides with what would emerge later in Holland, England, and the United States.

Both Genoa and Venice had their own public banks. The *Banco di Rialto* was a pure payment bank and handled all clearings in Venice: it was the closest predecessor of the Wisselbank of Amsterdam. The *Banco Giro* was an issue bank and the fiscal agent of the Republic of Venice: it was the closest predecessor to the Bank of England and the First Bank of the United States. San Giorgio was also a predecessor of the Bank of England inasmuch as it invested engraftment, that is the debt-for-equity swap.

The Venetians, but more the Genoese, were financial innovators. In addition to the mentioned debt-for-equity swap, they understood the importance of the link between reputation and the cost of debt. Both city-states had perpetual debt. The government debt market in Genoa propelled an active money market, in which merchants used declared but not matured interest on debt to settle due payments and to extend short-term credit. In light of the fact that both Genoa and Venice were extremely open economies, the dividing line between domestic and international innovations was very thin. Genoese merchant bankers had a global reach and understood how to operate in both the credit and

money markets, linking the two to exploit profitable arbitrage opportunities. This lesson was painfully learnt by Philip II who, having defaulted on its loans in 1575, had to beg the Genoese merchant bankers to return to court and resume the delivery of gold to Antwerp.

Clearly, there is a limit in how far we can carry the comparison of Genoa and Venice of the 1400s and 1500s with England or Holland of the late 1600s and the United States of the late 1700s. At the technical level, Genoa and Venice did not have stock exchanges and the intense trading that occurred in those markets. Genoese and Venetian financial instruments could not aspire to enjoy the degree of standardization, marketability and liquidity to be found in Amsterdam, London or New York in the later centuries. Another difference is the potential role of capital flows on economic development and growth. Genoa was a net capital exporter, in contrast to capital-importing Amsterdam, London and New York. Traditionally, economic development occurs with a current-account deficit and net capital inflows. Could there be a negative association between capital export and the persistence of good institutions? We leave this as a question for future research. But perhaps more importantly, Genoa and Venice did not survive as political entities and, consequently, had no opportunity to refine their innovations and ultimately export them, as the Dutch, English and Americans did. It is tempting to suggest that political survival declines, other things the same, as the size of the nation shrinks. What is surprising to most modern readers is that Genoa and Venice lasted that long. Their economic and financial greatness postponed the inevitable political demise. When that demise arrived, their innovations were absorbed in the long chain of

financial evolution and, in the process, lost the identity of the creators; except for studying them in history.

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Table 1: Interest Rates in Genoa, Venice and Holland
(per cent)

Period	Genoa	Venice	Holland
1382-85, yearly average	8.83	14.85	
1386-1407, yearly average	7.03		
1386-1420, yearly average			
forced loans		8.8	
voluntary loans		6.13	
1522-49, yearly average	3.95		
1535-48, yearly average	3.82	2.5	
1549-76, yearly average	3.76	4.0	
1549	3.87		6.25
1552	3.87		8.33
1560	3.66		6.25
1574	3.86		20.0
1576	2.79		8.33
1606	1.38		7.28
1610	1.45		6.25
1640	1.41		5.0
1655	1.49		4.0
1664	1.23		3.0
1665	1.23		4.0
1671	1.41		3.8
1673	1.37		4.0

Notes and sources. In Genoa, interest rates are current yields on San Giorgio based on discounted *paghe*; in Venice, interest rates are current yields on the *Monti* based on undiscounted *paghe* (Mueller 1997, Table 11.3); in Holland, interest rates refer to government loans (Hart 1999, Figure 9.3). The data on Genoese yields from 1386-1407 come Day (1963)

Figure 1: Short and Long-term yields on San Giorgio

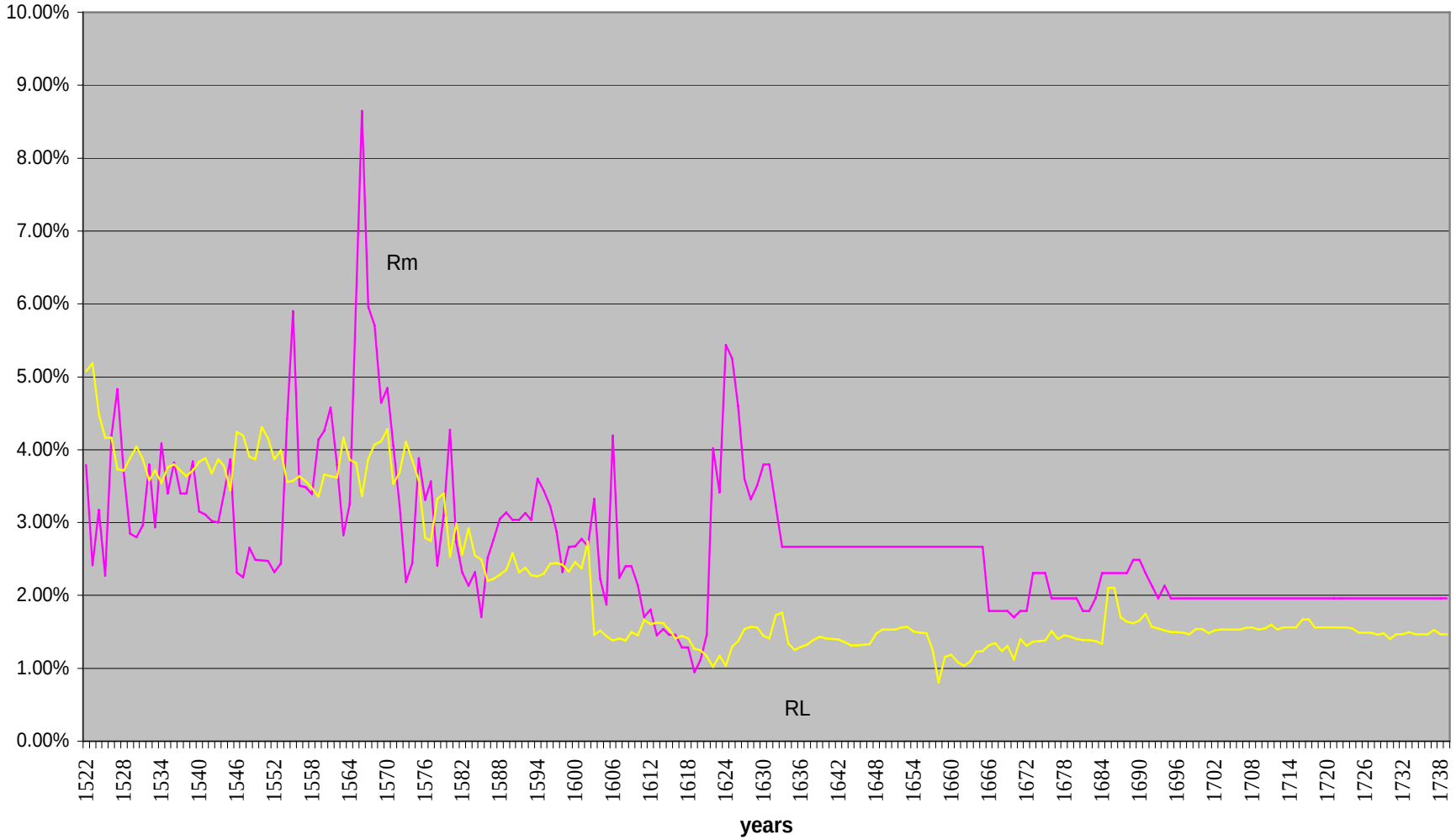


Figure 2: Difference between long and short rates for San Giorgio

