Moral Hazard and Lending of Last Resort

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This version: March 29, 2021

Abstract:

Nowadays, the idea that lending of last resort is necessarily conducive to moral hazard appears to be generally accepted. This chapter questions this conclusion by tracking the evolution of monetary theory and practice in the very long term. While most economists have seen as inevitable the association between lending of last resort and moral hazard, others (esp. Walther Bagehot) have claimed that the two may be separable if “constructive ambiguity” surrounds the conditions at which emergency liquidity may be accessed by banks. A brief overview of the practices adopted by monetary authorities over the centuries appears to confirm that the separability between lending of last resort and moral hazard may be attainable, but only through a correct design of banking regulation and liquidity-injecting operations.

On the very eve of the United Kingdom's departure from the European Union in February 2020, a YouGov poll found that the majority of Scottish voters had now shifted in favour of independence, yet by far the most popular reason advocated in favour of remaining in the UK was that "if Scotland faced financial problems, the UK would have the resources to help".[1] To all likelihood, behind this preoccupation stood the memory of the dramatic 2008 bailouts by the UK government of Scotland's two banking behemoths, Royal Bank of Scotland (RBS) and Halifax Bank of Scotland (HBOS); and in fact, on the eve of the 2014 referendum, RBS had explicitly threatened to leave an independent Scotland.[2] Banks' threat to move their headquarters from an independence-seeking region in order to secure the assistance of public authorities is not specific to Scotland – Québec[3] and Catalonia[4] also experienced the same fate. Yet, a priori, should not the chance of no longer having to potentially implement very costly interventions to support ailing banks be a reason in favour of independence rather than against it? This paradox shows to what extent the principle of unconditional support to unsound financial institutions has become deeply-rooted in public opinion in our times. But is this strict association between liquidity assistance and financial misbehaviour really inevitable? How did we get there? And is not there any alternative available? In order to shed light on these questions, this chapter will reconstruct the genesis of the debate on the relationship between lending of last resort and moral hazard, and will track the historical evolution of the monetary practices aimed to assist the banking sector in times of emergency.

The modern literature has often tended to conflate the two forms of ex-post intervention to ensure financial stability – viz. *lending of last resort* (assistance to illiquid but solvent intermediaries) and *bailouts* (assistance to illiquid and insolvent intermediaries) – in view of the fact that illiquidity and insolvency may not be separable phenomena (see e.g. Goodhart 1999). Despite the actual inseparability of illiquidity and insolvency, however, lending of last resort and bailouts arguably remain different kinds of policies – lending of last resort being a rule-based intervention, while bailouts being a discretionary one. The question of the relationship between bailouts and moral hazard is, per se, hardly an interesting one, as the literature has universally acknowledged bailouts to be highly conducive to moral hazard. That is why this chapter will only focus on the subtler and more controversial question of the moral

[1] https://yougov.co.uk/topics/politics/articles-reports/2020/01/30/scottish-independence-yes-leads-remainers-increasi
[2] https://www.theguardian.com/business/2014/sep/11/rbs-will-leave-scotland-yes-vote
[3] https://www.ft.com/content/7ba064e4-3a61-11e4-bd08-00144feabdc0
[4] https://www.ft.com/content/daada4cc-a9b4-11e7-93c5-648314d2c72c

hazard implications of lending of last resort, which is (unlike bailouts) universally recognized as a welfare-maximizing policy *per se* (Ugolini 2017, 107-118). After all, bailouts require the deep pockets of taxpayers and therefore are a matter for fiscal authorities; in this chapter, the focus will be kept on monetary rather than fiscal authorities.

In the remainder, I will proceed as follows. First, I will reconstruct the original arguments of the debate on the relationship between lending of last resort and moral hazard, as they were set in the 1860s by the famous Bagehot-Hankey controversy. Second, I will show how the debate evolved in recent decades, following the adoption of the conceptual framework originally developed by insurance theory. Third, I will discuss the limits of the current state of the debate, esp. in what concerns the question of the alleged inseparability between lending of last resort and moral hazard. Fourth, I will present a very synthetic historical outline of the evolution of the practices aimed at minimizing the moral hazard potentially associated with liquidity provision by monetary authorities. The chapter will end with some general conclusions.

I. The Origins of the Debate: Bagehot vs Hankey

The main arguments of the debate on the relationship between lending of last resort and moral hazard were notoriously first established in mid-Victorian Britain, with the famous Bagehot-Hankey controversy (Fetter 1965; Goodhart 1988; Bignon et al 2012; Awrey 2020).[5] The controversy took place in the context of the violent financial crisis of 1866. In May 1866 Overend, Gurney & Co Ltd, London's biggest bill broking company (the 19th-century equivalent to a modern-day money market fund), found itself in deep insolvency and sought support from the Bank of England. The Bank refused to bail out the company, thus leaving it fail. News of Overend's failure sparked a huge panic and a rush to liquidity on the London money market. The Bank's standing facility was inundated with demands for credit. As monetary creation was strictly limited by Peel's Act of 1844, in order to be able to meet all demands, the Old Lady of Threadneedle Street had to ask the government for a temporary suspension of the Act – as it had already been forced to do in the two preceding crises of 1847 and 1857. The government immediately agreed: once granted with the faculty to create

[5] To be precise, similar arguments had already been advanced by earlier writers (esp. Henry Thornton), but the Bagehot-Hankey controversy definitively set the terms of the debate (Moore 1999).

unlimited amounts of money, the Bank promptly met all eligible demands for credit, but at very high interest rates (Flandreau and Ugolini 2014).

It was during those days of big financial turmoil that *The Economist* magazine, whose leading editor was Walter Bagehot,[6] started to publish a series of articles criticizing the Bank's attitude during the crisis. The articles did not question the refusal to engineer a bailout for Overend Gurney (which, to the contrary, they warmly approved), nor did they deny that the Bank was rightly behaving as a lender of last resort – as it had already been doing in 1857 (Bignon et al 2012). What the magazine did criticize was rather the Bank's communication strategy. As a matter of fact, Threadneedle Street was trying to maintain an extreme form of "constructive ambiguity":[7] while ready to act as a lender of last resort, it was not willing to let money market participants take its support for granted. In Walter Bagehot's view, this very uncertainty about the fact that liquidity might be obtained (at a positive yet finite price) needlessly exacerbated the severity of panics: that is why he maintained that the Bank should have firmly pre-committed to the implementation of lending of last resort (at a very high, but less than infinite interest rate) in any possible state of the world.

The Economist's campaign was not well received in central banking circles. Although the Bank of England did not react officially, some months later one eminent member of its board, Thomson Hankey,[8] took the initiative of replying to it in the preface to a new edition of his treatise on banking. Hankey put his opposition to Bagehot in very bold terms:

> "*The Economist* newspaper has put forth what in my opinion is the most mischievous doctrine ever broached in the monetary or banking world in this country; viz, that it is the proper function of the Bank of England to keep

[6] Walter Bagehot (1826-1877) was one of the most influential writers in mid-Victorian Britain. The son of a managing director of Stuckey's Bank (one of the most important country banks in England), he first started a banking career with his father. After becoming the son-in-law of *The Economist*'s founder and owner, James Wilson (1805-1860), Bagehot took up the role of editor-in-chief of the magazine in 1861. Besides his journalistic activity, Bagehot authored some essays on evolutionary politics and social change (including his famous treatise on *The English Constitution*, first published in 1867), which allow considering him as one of the founders of Social Darwinism. Bagehot's most renowned contribution to economics, *Lombard Street* (first published in 1873), can be seen as the application of his evolutionary thought to the financial realm (Ugolini 2017, 5-7).

[7] "'Constructive ambiguity', it is argued, can allow a central bank to step in when systemic crisis threatens, while maintaining pressure on banks to act prudently since they cannot be certain of being rescued. The doctrine of constructive ambiguity is a way of dealing with the *time-inconsistency* problem. The time-inconsistency problem arises because it is in the interests of the authorities to deny, *ex ante*, willingness to provide a safety net, but to step in if a crisis nevertheless develops" (Crockett 1996, p. 549). Also see Freixas et al (2000).

[8] Thomson [Jr] Hankey (1805-1893) was a London-based merchant and politician. A partner in his father's house Thomson Hankey & Co (which was involved in the West Indies and slave trade), he was first elected to the board of directors of the Bank of England in 1835, and in 1851-2 he served as governor. From 1853 to 1868, and again from 1874 to 1880, he was the Liberal MP for the city of Peterborough. As a member of the House of Commons as well as of the Political Economy Club, he delivered a number of speeches on financial topics; some of these were later reworked into written essays, as it was the case for his *Principles of Banking* (first conceived as a speech in 1858, then published in four successive editions between 1860 and 1887).

money available at all times to supply the demands of bankers who have rendered their own assets unavailable. Until such a doctrine is repudiated by the banking interest, the difficulty of pursuing any sound principle of banking in London will be always very great. […] I can only express my regret that the Bank, from a desire to do everything in its power to afford general assistance in times of banking or commercial distress, should ever have acted in a way to encourage such an opinion. The more the conduct of the affairs of the Bank is made to assimilate to the conduct of every other well-managed bank in the United Kingdom, the better for the Bank, and the better for the community at large. […]

I have alluded to the prevailing opinion that, by some management or other (though what that management should be no one has yet defined), the Bank of England might have the power, which *The Economist* thinks desirable, of coming to the rescue whenever any financial difficulty may arise; and especially that good bills of exchange – that is, bills of an undoubted character – *ought at all times to be discountable at the Bank of England*. One of the grounds alleged as a reason why this should be the case has been the public character of the institution of the Bank. Supposing that this reason had any sound basis, it does not appear to have occurred to those who advocate the right of holders of bills of exchange to claim ready money from the Bank in exchange for future engagements, that there are many other parties in England who are engaged in carrying on works of great public importance who might equally put in their claim to be as much considered as holders of bills of exchange. […] What is really asked for by the advocates of the right of the holders of bills of exchange to have their bills at all times discounted at the Bank of England is, that one class in the country shall be benefited at the expense of the rest of the community" (Hankey 1867, 25-26 and 29-30).

Hankey situated his reasoning at a normative level. First, he argued that providing banks with the certainty that they would receive liquidity assistance during crises would have incentivized them to take excessively leveraged positions. Second, he stated that doing so amounted to granting a privilege to some actors at the expense of the rest of the economy, thus generating distributional effects from the real sector to the financial sector.

In his best-selling book *Lombard Street* (first published in 1873), Walter Bagehot took aim at firing back at Hankey, thus vehiculating the controversy to the history of economic thought. Bagehot's reply to Hankey was articulated into four points:

"I am scarcely a judge, but I do not think Mr. Hankey replies to *The Economist* very conclusively.

First. He should have observed that the question is not as to what 'ought to be', but as to what is. *The Economist* did not say that the system of a single bank reserve was a good system, but that it was the system which existed, and which must be worked, as you could not change it.

Secondly. Mr. Hankey should have shown 'some other store of unused cash' except the reserve in the Banking Department of the Bank of England out of which advances in time of panic could be made. These advances are necessary, and must be made by someone. The 'reserves' of London bankers are not such store; they are used cash, not unused; they are part of the Bank deposits, and lent as such.

Thirdly. Mr. Hankey should have observed that we know by the published figures that the joint stock banks of London do not keep one-third, or anything like one-third, of their liabilities in 'cash'. […]

Fourthly. Mr. Hankey should have observed that, as has been explained, in most panics, the principal use of a 'banking reserve' is not to advance to bankers; the largest amount is almost always advanced to the mercantile public and to bill-brokers" (Bagehot 1873, 171-172).

In front of Hankey's normative reasoning, Bagehot explicitly chose to put forward only strictly positive arguments. On the one hand, he did not deny that in non-crisis times banks would be tempted to over-leverage. He merely stated that banks would do so regardless of the central bank's official stance, betting on the inevitability of liquidity assistance during crises:[9] in his view, the Bank of England's refusal to officially acknowledge its role as lender of last resort only had a negative impact in crisis times, while it did not have any impact in non-crisis times. On the other hand, Bagehot did not deny that lending of last resort would generate distributional effects. He merely pointed out that given the nature of the monetary instrument used by the Bank to implement its monetary operations (i.e. the bill of exchange),[10] the economy at large (and not only the financial sector) did benefit from liquidity injections.

Although Bagehot is universally considered to have won the controversy (Fetter 1965), it is worth noting that in his direct reply to Hankey, he did not really address his opponent's theoretical arguments about moral hazard: to the contrary, he indirectly admitted that they were well-founded, but concluded that the central bank had no choice anyway. Although (as we shall see)[11] Bagehot did provide other relevant insights elsewhere in *Lombard Street*, his failure to cope directly with Hankey's arguments from a normative viewpoint would allow later economists to talk squarely about a "Bagehot problem" (Hirsch 1977). In turn, it is worth noting that in his rebuttal of Bagehot, Hankey only focused on one dimension of moral hazard – i.e., excessive leverage. In fact, Hankey's objections to Bagehot could have been easily addressed through the introduction of reserve requirements, which did not exist in England at the time

[9] Bagehot based this on the idea that the central bank and its borrowers are interdependent, as the central bank's power strictly depended on borrowers' willingness to hold the money it created: "But if the Bank had not made these advances, could it have kept its reserve? Certainly it could not. It could not have retained its own deposits. A large part of these are the deposits of bankers, and they would not consent to help the Bank of England in a policy of isolation. They would not agree to suspend payments themselves, and permit the Bank of England to survive, and get all their business. They would withdraw their deposits from the Bank; they would not assist it to stand erect amid their ruin" (Bagehot 1873, 191). Note that this is a rather different argument than the contemporary "put option" argument (see Section II). Moreover, Bagehot's argument appears to be fully valid in a world where central bank money is *not* the only form of domestic legal money (which was the case under the classical gold standard, where gold coins were indeed legal money), but much less so in modern-day fiat money regimes.

[10] On the nature of sterling bills of exchange in the 19th century, see Accominotti et al (2021).

[11] See Section III.

(Ugolini 2017, 131-143).[12] As a result, the Bagehot-Hankey controversy was somewhat of a dialogue of the deaf: in modern parlance, we might say that while Bagehot was arguing for the need of a better "forward guidance" to manage bankers' expectations, Hankey was arguing for the need for macroprudential regulation to limit banks' risk-taking. While from a practical viewpoint both claimants eventually proved somewhat right (as both unconditional lending of last resort and macroprudential regulation came to be jointly adopted by all central banks in the course of the 20th century), from a theoretical viewpoint none managed to specifically address the opponent's argument, thus falling short of satisfactorily settling the controversy.

II. Central Banking as Insurance: Vindicating Hankey?

For more than one century after the Bagehot-Hankey controversy, the literature hardly experienced any significant improvement. The early-20th-century reference work on lending of last resort, Ralph Hawtrey's *The Art of Central Banking* (Hawtrey 1932), provided contradictory answers on how monetary authorities might have mitigated moral hazard (Moore 1999, 454-455). According to Moore (1999), by the end of the 20th century the literature had basically proposed to central bankers four alternative practical solutions to address the problem. The first and more popular one was a mere restatement of Bagehot's (1873) guidelines: eliminating uncertainty about universal liquidity assistance by a single public institution, but limiting it to a previously-established list of eligible securities. The second one, proposed by Kindleberger (1978), was the opposite to Bagehot's: creating uncertainty about liquidity assistance, to be provided in an uncoordinated fashion by a number of different public institutions. The third one, most prominently defended by Goodhart (1988), consisted of coupling liquidity assistance with other microprudential and macroprudential tools – most notably, capital and reserve requirements. And the fourth one, sketched by Hirsch (1977), consisted of coupling liquidity assistance with strong social sanctions to misbehaviour. All solutions revolved around the elements already put forward in the Bagehot-Hankey controversy, without however developing a strongly compelling rationale.

The literature took a new turn only when, in the last quarter of the 20th century, it gradually started to integrate insights from insurance theory. This process took place in a number of successive steps. First, the conceptual framework developed in order to study insurance

[12] See Section IV.

schemes was applied to the analysis of deposit insurance. Insurance theory had long started to tackle the question of moral hazard (Rowell and Connelly 2012), and deposit insurance was just another plain application of the general framework: introducing deposit insurance created incentives for insured agents to misbehave. The second step was due to Merton (1977), who showed that providing a guarantee as the one supplied by deposit insurance was economically equivalent to selling a put option. The third and crucial step was accomplished by Solow (1982), who argued that there was no economic difference between lending of last resort and deposit insurance: the central bank's commitment to provide liquidity assistance to banks under any state of the world actually amounted, in his view, to the provision of an insurance clause. The fourth step then naturally consisted of interpreting lending of last resort as the supply of a put option – and therefore, as a contingent liability for the central bank (Blejer and Schumacher 2000).[13] The fifth and last step eventually consisted of concluding that the provision of such a put option precipitated the central bank into a regime of "financial dominance". In the aftermath of the "Great Inflation" of the 1970s, Sargent and Wallace (1981) had famously argued that the commitment to support the public debt put the central bank into a regime of "fiscal dominance", depriving it of the possibility to set the monetary stance appropriately; in the aftermath of the "Great Financial Crisis" of 2008, Brunnermeier and Sannikov (2012) noted that commitment to support the banking system had the very same kind of effect.[14] As much as a regime of "fiscal dominance" provides no incentives for fiscal discipline, a regime of "financial dominance" provides no incentive for financial discipline: as a result, lending of last resort is inevitably conducive to moral hazard and to a "redistributive monetary policy" – a result that can only be mitigated through the application of macroprudential tools (Brunnermeier and Sannikov 2012).

Therefore, the application of the conceptual framework developed for insurance to the domain of central banking has led to more theoretically-founded, very pessimistic conclusions: lending of last resort inevitably generates moral hazard and distributional effects from the real sector to the financial sector, and this can only be solved indirectly through the introduction of macroprudential tools. Ironically, these conclusions closely resemble those to which Thomson Hankey had come one century and a half earlier. Does this mean that recent theorical developments fully vindicate the positions defended by Hankey in his controversy with

[13] For an application of this conceptual framework to Bagehot's times, see Calomiris (2011). This interpretation is discussed by Flandreau and Ugolini (2014).

[14] To be precise, the concept of "financial dominance" had already circulated before in academic and central banking circles (Diessner and Lisi 2020, 318-320).

Bagehot? As a matter of fact, things are slightly more complicated than they may appear at first sight.

III. The Varying Liquidity Indemnity: Vindicating Bagehot?

The gradual process of transposal of insurance theory to central banking has implied some distortions of the mobilized conceptual framework, thus generating confusion. While deposit insurance can legitimately be seen as a form of insurance, application of the same conceptual framework to lending of last resort requires at least some adaptations. In fact, there appears to be at least one main difference between "classical" insurance contracts and the alleged "liquidity insurance" policy provided by the central bank: while insured agents know in advance the sum they will be entitled to receive in case an insurance claim is filed, borrowers from the central bank can never be sure about how much cash they will receive in exchange for their collateral, as the lender is not committed in advance to guarantee any specific lending conditions. By modifying either discount rates or haircuts, central banks can actually modify quite substantially the amount of liquidity actually provided upon presentation of each given unit of collateral – something an insurer will not be entitled to do. This means that, if put option there is, it is quite a special one, as its "strike" (i.e., the price at which collateral can be exchanged on demand against cash) is undisclosed.[15] This detail is particularly important, because it reintroduces an element of uncertainty that has the potential to downsize moral hazard: banks will be certain to receive liquidity assistance in case of panic, but they will be uncertain about the exact amount of liquidity they will be able to receive against their collateral.

It is noteworthy that despite criticizing the Bank of England's extreme form of "constructive ambiguity", Walter Bagehot had not denied the need for some level of uncertainty: indeed, he had been adamant on the fact that last-resort lending should take place at "high rates", in order to "prevent the greatest number of applications by persons who do not require it" (Bagehot 1873, 197).[16] And Thomson Hankey had himself mobilized the very same argument, writing that the central bank had "to fix such a high rate of interest as would prevent applications from those whose demands were not pressing" (Hankey 1867, 27). Therefore,

[15] See e.g. Bank for International Settlements (2014, 6). This is acknowledged by Calomiris (2011, 126, ft 18), who recognizes that describing lending of last resort as the provision of a put option is "a bit of an overstatement": if the central bank can change the interest rate at which it lends on the collateral, then the price of the option becomes "a moving target".

[16] On this point, also see Freixas et al (2000, 74-6) and Bignon et al (2012, 603-5).

Bagehot and Hankey had agreed on the fact that liquidity assistance by the central bank should be reserved to those whose demand for cash had a very low price-elasticity. But in Bagehot's view (and in stark contrast to Hankey's), this was a sufficient condition for discouraging free-riding on central bank liquidity, and thus excessive risk-taking by commercial banks: "The 'unsound' people are a feeble minority, and they are afraid even to look frightened for fear their unsoundness may be detected. The great majority, the majority to be protected, are the 'sound' people, the people who have good security to offer" (Bagehot 1873, 198). Thus, trying to extract some normative message from Bagehot's positive thinking, we might say that he was arguing as follows: lending of last resort and moral hazard were potentially separable dimensions, but that in order for this to be the case, the terms at which the "put option" was made available to borrowers had to be disadvantageous and unforeseeable.

This very important point has been extensively overlooked by most of the literature, which has tended to look at the three Bagehotian rules ("lend freely", "on good collateral", "at high rates") as three separable entities rather than as a whole (Bignon et al 2012). In particular, the third rule has generally been interpreted as valid for a country adopting a fixed exchange regime (as Britain used to be in Bagehot's times, when it adhered to the classical gold standard), but no longer relevant in the context of a floating exchange regime in which the central bank can freely create unlimited amounts of money (see e.g. Martin 2009). As a result, in recent episodes of crisis lending, central bankers happened to do the very opposite of what Bagehot had prescribed concerning interest rates (Hogan et al 2015).

Central bankers' willingness to keep interest rates at a level that is compatible with macroeconomic needs during a slump can well be understood. However, interest rates are not the only instrument allowing to modify the "exchange rate" at which collateral can be swapped for cash at the central bank: this can also be impacted by modifications in haircuts (margins). Of course, an interest payment and a margin deposit are two different things, which are supposed to have different functions: interest rates are intended to remunerate the lender's capital (and thus to provide incentives to borrowers), while haircuts are intended to protect the lender's capital from potential losses on collateral value (in case the borrower does default). On the one hand, interests are permanently lost to the borrower; while on the other hand, margins are fully recovered by the borrower as soon as the loan is repaid. Yet, in the short term (i.e., for as long as the loan does not mature), the application of a high interest rate and the application of a high margin do produce exactly the same effect on borrowers: viz., they both diminish the amount of cash that can be immediately obtained upon presentation of each unit of collateral. Haircuts also present the advantage of being easily differentiable for different classes of collateral, thus allowing for the maintenance of laxer borrowing conditions on less risky collateral (esp. government bonds).

In *Lombard Street*, Walter Bagehot was silent about haircut policy. To all likelihood, this was due to the fact that in the mid-19th century, the liquidity-injecting operation *par excellence* consisted not of loans on securities, but of discounts of bills of exchange.[17] Discounts did not imply haircuts because bills of exchange "disappeared" ("self-liquidated') at maturity: unless in case of default, they were not returned to the borrower at maturity, and their market price always converged with their face value (Jobst and Ugolini 2016). In a world where central banks only inject liquidity through discounts, interests and margins are therefore functionally undistinguishable from each other. But in a world where central banks inject liquidity through loans on securities, increasing margins allows benefiting from the advantages of high rates put forward by Bagehot (fixing an unfavourable "exchange rate" between collateral and cash), without however suffering from its disadvantages (imposing prohibitive borrowing costs in dire macroeconomic contexts).

This means that, through the adoption of a conservative haircut policy, the Bagehotian rationale for high rates may be reconciled with the macroeconomic rationale for low rates in crises, thus allowing for a dissociation between lending of last resort and moral hazard. As the actual haircut policy put in place by central bank during recent crises remains to date completely undisclosed, we still do not know to what extent central bankers were indeed faithful to Bagehot's spirit and set sizable haircuts for their liquidity-injecting operations. Available indirect evidence, however, points to the opposite conclusion (Gorton et al 2020).

To sum up, the conceptual framework interpreting lending of last resort as a form of insurance is only appropriate if the conditions at which banks are allowed to swap collateral with cash at the central bank are advantageous and foreseeable. In view of his insistence on the fact that interest rates should be "high" (and therefore, volatile) during crises, Walter Bagehot might be interpreted as having argued that such conditions should not be advantageous and foreseeable: if the "strike" of the "put option" cannot be systematically anticipated by banks, lending of last resort will be separable from moral hazard. The central bank has the possibility of modifying the "exchange rate" between collateral and cash by changing either the discount rate (as Bagehot advocated) or, in alternative, the haircuts imposed on collateral. In recent

[17] Although mid-19th-century commentators only focused on discounts, in truth "advances" (loans on securities) were already a major type of liquidity-injecting operation in those times. Even archival evidence is particularly scanty, however, for what concerns the haircuts the Bank of England used to apply on advances (Bignon et al 2012).

crises, however, central bankers appear to have violated the spirit of Bagehot's prescriptions, supplying liquidity at low rates and with small haircuts on collateral. It was precisely this leniency that created the conditions for the existence of an actual "put option" – sometimes described in the literature as the "Greenspan put"[18] or "Fed put" (Miller et al 2002). In such circumstances, lending of last resort and moral hazard will no longer be separable, and the central bank will find itself into a regime of "financial dominance" (Brunnermeier and Sannikov 2012).

IV. The Tamer's Tools: A Brief Historical Overview

In the previous sections, we have seen that since the mid-19th century, the theoretical literature has been split concerning the question of the separability between lending of last resort and moral hazard. On the one hand, Hankey (1867) argued that borrowers' certainty that they will always receive liquidity assistance from the central bank does inevitably encourage them to behave imprudently; adopting the conceptual framework developed by insurance theory, late-20th-century economists denounced the central bank's provision of a "put option" to the financial sector, generating a regime of "financial dominance" (Hirsch 1977; Solow 1982; Blejer and Schumacher 2000; Brunnermeier and Sannikov 2012). On the other hand, Bagehot (1873) suggested that lending of last resort and moral hazard could be separated if "constructive ambiguity" concerned not the provision of liquidity in crisis times, but the conditions at which liquidity is provided: these were supposed to be tough and unforeseeable for borrowers *ex ante*. However, we also noted that monetary practice in recent decades has consisted precisely of what Hankey and his followers had feared – i.e., an unconditional provision of cash at favourable and foreseeable conditions, thus incentivizing banks to free-ride on central bankers' liquidity assistance.

This opens the question of the practical design of liquidity-injecting intervention. Does the current design stand in continuity with or in contrast to previous practice? In this section, we will very briefly outline the evolution of the approaches adopted in Europe, over the very long run, in order to "tame" moral hazard. Even though the principle of last resort lending was only formally established in Bagehot's times (Fetter 1965), the problem of the provision of liquidity

[18] The term "Greenspan put" refers to the extraordinary monetary intervention implemented by the Federal Reserve under the instigation of its then President, Alan Greenspan, to support the financial system following the stock market crash of October 1987.

support by monetary authorities and of their implications for financial stability is a hardy perennial, having manifested itself since Antiquity (Calomiris et al 2016). As the banking business started to become increasingly sophisticated in the late Middle Ages, the question of how to minimize liquidity shocks while also minimizing moral hazard naturally emerged.

Of course, the problem of moral hazard in banking is not limited to the question of lending of last resort. A banker acts as an "agent" on behalf of her "principals" (i.e., the depositors who have entrusted their money to her), and this delegation is a classical example of the principal-agent situation that is conducive to moral hazard (Stiglitz 1989). Early banking regulation was essentially focused on this kind of agency problem. The solution universally adopted to tackle the problem was the maintenance of unlimited liability: bankers' personal wealth would therefore systematically act as collateral to their bank's liabilities. To reinforce this principle, legislation often included harsh sanctions to delegation: a banker could be punished for leaving her books or her seals to her clerks, as she was always held as ultimately responsible for all operations accomplished by her bank. Moreover, high barriers-to-entry existed in the banking sector, so that only people with certified financial and reputational capital would be admitted to exercise the profession. Most of these provisions remained in force throughout Europe until the first half of the 19th century (Ugolini 2017, 119-121).

While such regulations to tackle agency problems in banking were uniformly adopted everywhere, some more sophisticated financial centres gradually started to implement additional rules, in an attempt at keeping under control the growing concern of banking instability. One of Europe's most prominent financial centres during the medieval and early-modern era, Venice was the first place to develop a complex banking legislation that covered all three "pillars" of nowadays' Basel Accords: 1) legal restrictions on banks' operations, 2) supervision, and 3) disclosure. The "first pillar" included reserve requirements, capital requirements, as well as activity restrictions (i.e., bans on some specific kinds of operations). The "second pillar" consisted of the creation of the first dedicated supervisory body in the world: the Provveditori sopra Banchi ("bank superintendents"), instituted in 1524. The "third pillar" featured the introduction of a principle of publicity of bank books, which were considered as public records and made accessible to everyone upon request (Ugolini 2017, 122-126).

The existence of a number of restrictions aimed at minimizing moral hazard *ex ante* explains why, in late medieval and early-modern Europe, the first episodes of liquidity support from authorities to banks took place at particularly favourable conditions. This is particularly evident in the case of Venice, where lending-of-last-resort operations were implemented at mild conditions even before the creation of a public bank. During the very violent financial crisis of 1499, when the whole Venetian banking system edged towards the brink of collapse, the Treasury transferred all of its coin reserves to banks against immediate cancellation of its liabilities with them, which allowed some of them surviving a run by depositors (Lattes 1869, 15-20). Following this episode, a more formalized mechanism for providing liquidity against deposit of collateral was created through the Mint. During the 1576 crisis, for instance, the Mint lent its coin reserves to banks upon security of public debt at 4% interest. If such conditions were somewhat tougher than in 1499, they were still very mild, as the charged interest rate was lower than the market rate. Yet, there is no evidence that such moves triggered a less prudent behaviour by bankers (Mueller 1997, 126-127).

In the 17th century, public banks were founded in a number of European cities – including Venice (1587), Amsterdam (1609), Hamburg (1619), and London (1694). These new, state-sponsored organizations gradually assumed the function of lenders to the private sector (Bindseil 2019, 108-135). The defining moment in which lending of last resort first started to be implemented on a large scale was the second half of the 18th century, when a wave of successive crises (1763, 1773, 1781) was handled via the intervention of the monetary authorities in support of private bankers. In London, liquidity assistance was extended directly by the Bank of England (Kosmetatos 2019), while in Amsterdam and Hamburg the respective public banks provided a liquidity backstop to a government-sponsored mutual guarantee fund (Uittenbogaard 2009, 127-137; Bindseil 2019, 144-154). Being a privately-owned joint-stock bank with substantial equity, the Bank of England actually disposed of capital buffers allowing to absorb potential losses; by contrast, the public banks of Amsterdam and Hamburg, working with no paid-up capital, could not afford any. Still, lending conditions proved relatively mild: in Bindseil's (2019, 147) words, "none of the supposed 'Bagehot rules' was followed: neither was credit only granted against what is accepted as good collateral in normal times, nor was the price of loans high". And yet, losses appear to have been limited in the end.

It therefore seems that the appearance of lending of last resort operations in a context of unlimited liability and tight regulation was not particularly conducive to moral hazard. But in the course of the 19th century and following the rise of *laissez-faire* ideology, the banking system evolved rapidly, esp. in England. By the 1860s, limited-liability banking had become widespread and free-entry; capital and reserve requirements had disappeared; banking supervision had basically become inexistent; and only very thin transparency rules were in place (Turner 2014; Ugolini 2017, 131-134). This was the "brave new world" in which the Bagehot-Hankey controversy took place: such a context explains why both Hankey and Bagehot agreed on the fact that lending of last resort should occur at very high interest rates in order to limit risk-taking by unregulated banks. This new policy of high rates was now made possible by the abolition, in the mid-19th century, of another important piece of financial regulation: i.e., usury laws, which had previously prevented the deployment of such a strategy. In the half century preceding the outburst of the First World War, this new policy of free lending at very high rates appears to have worked reasonably well. It must be underlined, however, that if the Bank of England managed to minimize losses on last resort lending (Bignon et al 2012), this was also due to the development of sophisticated microprudential tools allowing the Bank to monitor the building of fragilities in the financial system (Flandreau and Ugolini 2014).

The 19th-century model of unregulated banking came to an end in the Interwar years. During these years, lending-of-last-resort facilities were taken for granted by the banking sector, while the pre-war discipline of lending at high rates was jeopardized by macroeconomic and political considerations, forcing central bankers to keep interest rates at low levels (Eichengreen and Flandreau 2012). This situation then became conducive to moral hazard, and susbstantial fragilities started to build in the financial system. In 1931, the herculean efforts to keep overleveraged banks afloat in a number of countries led to the collapse of the international monetary system (Ugolini 2017, 138-143). As a result, the 1930s ushered in the age of "financial repression", in which moral hazard was tamed through much more radical tools – sometimes coming to full nationalization of banking systems (Toniolo and White 2016). In this new age, interest rates completely ceased to be seen as an instrument aimed at fostering financial stability: they only became an instrument aimed at fostering macroeconomic stability, and their level started to be fixed in view of growth rates.

When a new era of financial liberalization started in the 1970s, therefore, the experience of the previous generations in managing the delicate relationship between lending of last resort and moral hazard had been lost for decades. In particular, the rationale that had led to the introduction of the high rate policy in the 19th century had been totally forgotten in the meantime. As it had been the case in the Interwar period, a combination of lax banking regulation and lax lending-of-last-resort conditions proved, again, to be conducive to moral hazard. The outcome of this explosive mix manifested itself with the spectacular crisis initiated in 2008. In stark contrast with the 1930s, however, the 2010s did not lead to a complete rebuttal of pre-crisis practices (Helleiner 2014). Lending of last resort continued to be made accessible at very favourable and foreseeable conditions (Hogan et al 2015; Gorton et al 2020), while public opinion apparently resigned itself to the alleged inseparability of lending of last resort and moral hazard.

V. Conclusions

In our days, the belief that lending of last resort and moral hazard are indissociable elements is a very widespread one, and public opinion appears to have surrendered to the idea that unconditional support to the financial sector is inevitable. In this chapter, I have tried to put this belief under scrutiny by retracing the historical evolution of theory and practice over the very long term. I have first shown that the Bagehot-Hankey controversy of the 1860s already contained, in a nutshell, all the main arguments subsequently developed about the separability (Bagehot) or inseparability (Hankey) of lending of last resort and moral hazard. I have then illustrated how the transposal of the conceptual framework of insurance theory to the monetary domain apparently vindicated Hankey's position. Hence, I have pointed to the approximations of such a transposal, underlining that the price of the alleged "put option" supplied to the banking system is (at least, in theory) undisclosed. In this respect, I have maintained that Bagehot's plea for "high rates" of discounts (i.e., for keeping the "exchange rate" between collateral and cash unfavourable and unpredictable to banks) is the very source of the separability between lending of last resort and moral hazard, and that the same result can also be attained by charging varying haircuts on collateral while leaving interest rates low. Having ascertained that current practice does not respect these requirements, I have asked whether past practice mirrored nowadays' choices. I have concluded that this was not the case, as monetary authorities found in the past a number of different devices to tame the moral hazard associated with liquidity assistance. The only other period in which banking regulation and conditions for accessing emergency liquidity were both lax was the Interwar – indeed, another period of mounting financial fragilities.

In sum, the main take-home message of this chapter is that the ability to dissociate lending of last resort from moral hazard strictly depends on the concrete design of liquidity-injecting operations and of the regulatory environment in which they take place – or, differently said, that the devil is (as always) in the detail. Such a design still considerably varies across countries to date (Ugolini 2017, 152-155; Awrey 2020), yet margins for improvement arguably exist in all of them.

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