

Appendix A: Notes on sample selection and identification process of historical bank crises interventions.

Irrespective of the fact whether a banking crisis was already catalogued in an existing chronology, we also analyze historical primary document collections: for instance the *British Calendar of State Papers*, and the extensive early modern *Making of the Modern World* series, which we searched for all titles relating to the banking industry, and more narrowly to banking crises since the year 1500.¹ Items including the 1869 *Bombay Bank Inquiry*, W.R. Bisschop's (1910) *Rise of the London Money Market, 1640-1826*, and Adam Kirkaldy's (ed. 1921) *British finance during and after the war, 1914-21* have all yielded new intervention events to us through this channel.

In addition, we systematically searched the historical archives of business periodicals such as, for instance, the *The Commercial and Financial Chronicle*, *Hunt's Merchants Magazine*, the well-known *London Banker's Magazine* (and its U.S. equivalent of the same name), *The Economist* and the *Financial Times*, as well as foreign-language dailies or weeklies known for an extensive foreign-correspondent network, such as the *Neue Zürcher Zeitung* – such industry-specific sources often provided crucial nuance on particular intervention measures; next, we systematically evaluated the published central-bank histories for policy-intervention evidence, including those for smaller or peripheral institutions such as Robert Bigo's (1927) history of the *Caisse d'Escompte 1776-1793*, the Cuban *Banco Espanol de la Isla de Cuba* (Montaud 2004), the Ottoman *Banque Imperiale Ottomane* (Autheman 1996), or the Finnish *Suomen Pankki* (Kuusterae and Tarkka 2011), as well as country-level banking history compendiums published during the 19th and 20th centuries, such as James Gilbert's (1836) *History of Banking in Ireland*, Heinrich von Poschinger's (1878) history of Prussian banking, Ernst Arndt's (1928) *Banking and currency development in South Africa (1652-1927)*, or Herbert Luethy's (1959) *Genevan banking history*. A representative case for the emerging market level may be Charles Brown's (1966) study on the (post-war) *Nigerian banking system*. From the bibliographies in such works, we obtain another large number of events and references.

¹ See Trivellato (2019, 228f.) for a brief discussion of the database and its relevance for early modern economic sources.

A third major group of sources are business history and institutional studies on the individual bank level, including, for instance, Edwin Perkins' (1976) investigation of the *House of Brown*, or Marten Buist's (1974) detailed study of the *Hope & Co.* enterprise – in addition to compendia such as the detailed *Handbook on the History of European Banks* edited by Manfred Pohl (ed. 1994).

For the more distant past, we increasingly utilize primary-source collections, printed primary banking-specific registries (with a certain bias on Italian and German merchant bankers and court financiers), and biographical accounts of prominent bankers in the early-modern period to identify interventions – examples being the accounts of the prominent London merchant banker (and Lord Mayor) Thomas Lodge (Sisson ed., 1933), Mario Chiaudano's (1935) contribution on the “Rothschild of the 13th century”, Orlando Bonsignori, Claude Badalo-Dulong's (1951) biography on Bartholome Hervart, or Goetz von Poelnitz studies (1958-1986) on *Anton Fugger*. Such accounts often shed light on ad hoc privately-organized emergency actions, which otherwise escape official accounts prior to the full establishment of modern monetary institutions.

For these earlier times, we also partially fall back on source collections – for instance the *British Calendar of State Papers*, Alfonso Silvestri's (1953) *Sull'attivit a bancaria napoletana durante il periodo aragonese* which documents the activities of Neapolitan banking houses in the second half of the 15th century, Elia Lattes' (1869) Venetian banking source collection, or Francesco Ferrara's (ed. 1871) “Documenti per servire alla Storia de' Banchi Veneziani”, which documented official Venetian communication and decrees with regards to major banks in the city Republic, including the famous *Soranzo* and *Garzoni* Banks. Occasional references to banking crises and political responses can even be found in early-modern royal inventories, such as Charles VIII of France's official letters (Pelicier ed. 1898-1905). Another useful resource are comprehensive historical works primarily aimed at political history, especially when they are based on extensive archival research, such as Robert Davidsohn's (1896-1927) sweeping 2,800 page history of Florence (*Geschichte von Florenz*), which contains valuable details on financial dynamics and policy responses.

We utilize such printed primary and secondary sources wherever possible, and apart from English sources, we are confident to have covered a critical share of the German literature available including and prior to the 20th century. Yet, for the pre-1700 period in particular, it is

likely that even when applying our minimum thresholds, an unknown number of interventions will still elude us for a lack of surviving or accessible sources. Against this backdrop, we make no claims of full historical comprehensiveness, even within the confines of our minimum threshold criteria.

There are two classes of documents in particular where further research is likely to add particular nuance and/or breadth to our current database:

1. despite our forays into Italian-, French-, and Spanish-language sources, we have not yet searched a wide body of less prominent literature in these languages – especially when it comes to pre-1945 publication dates, and especially when they fall outside of the rather prominent periodicals and publication houses. When it comes to the emerging-market space, a meaningful share of international banking activity was led and operated by European houses; in many countries – such as the Ottoman Empire – even the central bank was de facto European-owned. Similarly, significant banking events would likely have left some traces in the case of South American, Indian, Ottoman, South African, and other colonial geographies. Nevertheless, we would speculate that a systematic investigation of Chinese and Japanese historical sources could yield a number of relevant historical additions to the database.²
2. Archival documents. While we have utilized printed primary documents, we can only speculate how much a full and detailed investigation of archival files could improve our database coverage. We think it likely that a systematic search in the fiscal, monetary, and corporate funds across the geographies covered would add additional relevant granularity, especially when it comes to pre-1800 events. The *Archives Nationales* may well illuminate the revulsions of Parisian (quasi) banks during the Revolutionary Period, or during the particularly volatile mid-17th century; German archives could undoubtedly shed further light on the wave of (merchant-)banking failures during the second half of the 16th

²² For instance, the absence of a comprehensive English language history of the Bank of Japan is surely responsible for various omissions thus far in the international literature on its de facto LLR interventions.

century after the Franco-Spanish double default of 1557, and the exceptional financial turbulence during and after the Thirty Years War;³

Still, larger and international banking concerns are usually well documented even during the 15th and 16th centuries, given enduring efforts at the construction specialized studies in our own time, and the fact that contemporary authorities widely recorded and debated such major economic events. In fact, when studying the early-modern debates, one is tempted to conclude that Northern Italian and Flemish politicians during the 14th century already grappled with quite familiar regulatory and moral questions in the face of prominent banking and exchange crashes.

For the interventions in our database that are not associated with an specific crisis, many have a clear preventive quality, and often authorities in such cases act upon small-scale indications of looming bank runs, such as heightened currency demand that is still being met by the banking sector at the time of the policy action, or discreet communication by bank insiders, who make authorities aware of a potentially serious financial event at their own institution or the wider market.

A typical example is the swift policy action by U.S. actors in December 1905, after banking industry insiders and authorities are made aware of the looming collapse of three of Chicago's most prominent depository institutions: prior to the public announcement of the suspension of the three banks, the Clearing House Committee has completed an 18-hour session and decided to fully guarantee the deposits at the affected institutions. Both the news of suspension and news of the policy action reach the market at the same time. The Comptroller of the Currency and other market participants here widely share the sentiment that the intervention "has relieved a most critical situation, which, if it had not been taken promptly in hand, might have led to the most serious consequences, not only in Chicago, but elsewhere".⁴ Such occasions illustrate why existing databases not least tend to overlook *successful* policy interventions.

Sample selection: as indicated, a long-run historical approach that seeks to go beyond established "crises chronologies" faces sample selection issues. Which biases exist in terms of

³ For a source guide on the French side, see Felix (1994, 31-33, 39, 49ff.); on the German side, we would not least expect some insights from the Fugger-Archives in Dillenburg, and from municipal archives in the early modern merchants hubs such as Augsburg, Cologne, and Nuremberg.

⁴ Financial Times, December 19, 1905, 5.

event size, beyond the spatial and temporal biases indicated above? Our data on “intervention sizes” can shed further light on the underlying properties of the “candidate” crises sample in particular.

Figure 9 displays the 278 datapoints for liquidity interventions for which the exact “liquidity size” can be calculated between the years 1450 and 2019 (because both the absolute liquidity provision volume, and the current GDP data are available).

Shown in addition is a “size/GDP range” that takes as its basis the liquidity “intervention sizes” provided in Laeven and Valencia’s (2020) banking crises sample: the average liquidity size/GDP for their post-1970s sample is calculated at 19.1% of GDP, and includes a wide range of both EM and DM geographies.⁵ The upper and lower thresholds of the liquidity size sample in Figure 2 now refer to the 5th and 10th percentiles of this post-1970s sample, and apply a (slight) “regime adjustment” for earlier episodes (a simplistic reduction by 20% of the size/GDP threshold in 1971, 1914, 1870, and 1800, so that the 10th percentile in 1800 and earlier stands at 0.46% of GDP).

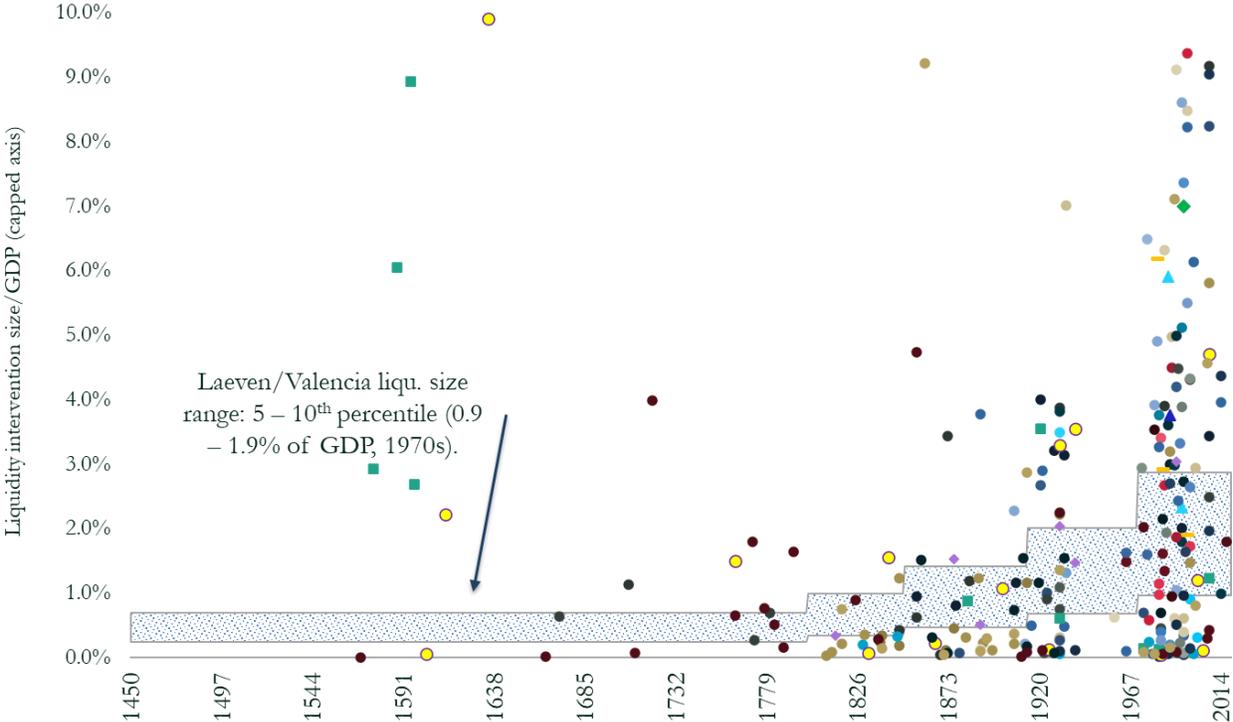
We observe that during all historical periods, parts of the intervention sample fall inside and outside such a –fully arbitrary – threshold: even our most recent, post-Bretton Woods sample covered by “canonical” chronologies exhibit a wide range of liquidity sizes, and to our knowledge there are no existing suggestions in the literature what sensible cutoff ought to distinguish “systemic” from “non-systemic”, or “borderline” from “non-systemic” crises.

We simply note for the moment that our sample – including the early modern period in particular – encompasses “large” and “small” liquidity interventions which are not displaying any systematic bias when compared to the post-1970s intervention sample. It does not appear that our historical selection methods yield only “sizable” interventions: on the contrary, we appear to be capturing a range of intervention sizes not altogether too different from those of modern subperiods. However, here we simply propose that if future researchers wanted to apply any threshold to capture a “sizable” sub-sample, a 5th percentile cut-off as shown in Appendix

⁵ Laeven and Valencia (ibid.) denote such “sizes” as “liquidity costs”, but conceptually follow the same procedure as we do, given that the authors record peak liquidity provision over the pre-crisis base year, in gross terms. Refer to the discussion of nuances in the respective methodologies in the main body of the text above. Note that Laeven and Valencia present a wide range of liquidity intervention sizes spanning 0.1% to 156.5% of the change of central bank claims to domestic deposit volumes (a measure we transfer to a current GDP denominator, as elaborated above). No “threshold” is applied by the authors here.

Figure 9 could represent a sensible choice. A similar exercise on the basis of “fiscal intervention sizes” and “guarantee sizes” yields comparable results and implications.

Appendix A Figure 9: Sample selection – applying intervention size thresholds, liquidity sample, 1450-2019.⁶



Liquidity size sample	Datapoints included
No threshold	278
Laeven/Valencia – 5 th percentile (rolling)	189
Laeven/Valencia – 10 th percentile (rolling)	157

Figure displays the “lending” intervention size datapoints reported in table 4 above as a share of NGDP, and overlays this data with the range of lending intervention sizes reported in Laeven and Valencia (2020), displayed here as the 5th and 10th percentile threshold observed in their data for the post-1970 era. This threshold is then extended to the pre-1970 era, with downward adjustments to the threshold at key historical inflection points: 1800, 1870, 1914, and 1971.

⁶ Y-axis is capped at 10% in the figure for presentational purposes; maximum actual value: “LUX-2008” at 171.9%.

Further Notes on Data Construction

1. Often, an existing intervention measure within a given geography is repeated again after a certain interval, or its operational details are tweaked slightly, to address an ongoing concern in the banking of wider financial sector. We employ some discretion in cases where such cases of repeats or tweaks should sensibly be treated as a single historical intervention, with the data recorded at the time of the first initial decision to intervene.
 - Examples include the repeated deployment of emergency liquidity assistance (ELA) lines in a given country during the European debt crisis after 2012. Subsequent to the initial decision to grant ELA to the Greek banking sector, for instance, the ECB governing council decides to raise the maximum ceiling for ELA assistance in follow-up meetings (ECB 2015a; 2015b).⁷ In our database, in all such cases we record the first known deployment as the intervention date and do not separately record subsequent discretionary drawings.
 - A similar logic applies to stress tests. Whenever it is obvious that no or only minor tweaks have been undertaken after an initial decision to conduct stress tests, we only record the initial decision as the date for this stress-test intervention. For example, the first EU-wide stress test exercise was announced by regulators in May 2009 (CEBS 2009); multiple similar exercises with different degrees of refinement and technical evolutions have taken place ever since; we do not treat such processes as multiple, separate instances, and only record a single intervention dated as May 2009.
2. What do we define as a “bank”? This question is particularly relevant for the pre-1700 domain, when the lines are particularly blurry between individual merchants, industrial family conglomerates, and actual incorporated concerns focusing only on financial business; while we exclude any interventions in the non-financial and industrial sectors, we are using a relatively wide definition of a “bank”, including all individuals or incorporated businesses that at least partly deal in financial matters, even if such business

⁷ The first official ECB press release on Greek ELA assistance dates from February 4, 2015 (ECB 2015a), though it did not specify maximum levels granted at this point. Subsequent ECB or Bank of Greece announcements on raises of ELA ceilings date from July 16, 2015 (ECB 2015b), and September 17, 2015 (BoG 2015), for instance.

is just a peripheral concern, or just limited to merchant or trade finance; we here follow existing historical literature that has treated such merchant ventures as forming part of a direct evolutionary line preceding modern banking ventures (Lopez 1979).

3. We do not cover any de facto or de jure central bank establishments per se – unless they are associated with a crisis to which the decision to establish this central bank can reasonably be linked.
 - This means that, for example, the founding of the National Bank of Egypt in June 1898 as the country’s “embryonic central bank” (Baster 1935, 73) is not included in the database, since it is not associated with a crisis. we are not able to trace any associated liquidity or financial sector crisis event fulfilling our intervention criteria, we are **not including** the instance in our main database; the same goes for the founding of the Bank of Japan in 1883, and all other similar events not directly associated with banking sector or wider financial instability.
 - We do, on the other hand, include the founding of the Danish Rigsbank in January 1813, since it is directly associated with the state bankruptcy and severe liquidity problems in the country (Maercher 2010, 135f.).
4. We do, however, include major bank nationalizations, even if they are not associated with a specific crisis. Our logic here is that such nationalization events involve a significant change of sectoral ownership of the banking industry, and we see such conscious policy decisions therefore as equivalent in their effect to a major restructuring event in the banking sector. Secondly, even though there may not be specific evidence of financial sector strains, such events are historically usually linked to significant political stress events and/or a major de facto reassessment of the country risk profile by the international financial community. Examples are the Russian banking sector nationalization in the wake of the Bolshevik Revolution in 1917, the Indian banking sector nationalization during the 1950s and 1960s in the wake of decolonialization, or the Iranian nationalizations in 1979 in the wake of the Revolution.
 - Our bank nationalization interventions fall into either of two categories: “BBCI”, if we can confirm that existing private owners received obvious compensation for their existing ownership, and were de facto bought out from the state (such as in 1982 France and under the Mexican 1982 nationalization, see Maxfield 1992, 92);

or else, “RES” – if we cannot confirm that such a formal “buy-out” took place, but that it is not ruled out that existing private owners were simply expropriated (as in the Bolshevik case). We do not include central-bank nationalizations, which involve changes of ownership from traditional privately owned de facto central banks, to formally government-subordinated central banks – transitions which were particularly prevalent during the interwar and immediate post-war period (Kriz 1948).