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TLAC-ELIGIBLE DEBT: WHO HOLDS IT? A VIEW FROM THE EURO AREA

by Carmela Aurora Attinà[†] and Pierluigi Bologna[‡]

Abstract

We identify two categories of potentially ‘bad investors’ in TLAC-eligible bonds for the purpose of bail-in, i.e. households and hedge funds. The exposure of households may create political economy problems for policy makers when they have to decide about bail-in, while holdings by hedge funds may increase the price volatility of these instruments in stress periods. We analyze the composition of the investor base of the TLAC bonds issued by euro area G-SIBs between 2013 and 2020 and make a first assessment of whether the observed developments could have lessened the above mentioned problems. We show that the composition of the holdings of the different sectors has changed significantly over time. The share directly held by households has declined, is low on aggregate, and should not necessarily be an obstacle to the resolution of a G-SIB. However, there is a negative correlation between households’ TLAC holdings and their financial education. The information gap around the holdings of hedge funds means a full assessment of their role is not feasible. The market tensions that followed the Covid-19 shock did not negatively affect investments in TLAC debt, except for those of households which fell markedly in the first half of 2020.

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1 Introduction

In November 2015 the Financial Stability Board (Financial Stability Board, 2015) issued the Total Loss-Absorbing Capacity (TLAC) Standard for Global Systemically Important Banks (G-SIBs), as part of the regulatory response to the global financial crisis. The TLAC standard aims at ensuring that a failing G-SIB has sufficient loss-absorbing and recapitalization capacity to carry out an orderly resolution while maintaining the continuity of critical functions and avoiding exposing public funds to a loss. This standard integrates the FSB's Key Attributes of Effective Resolution Regimes (Financial Stability Board, 2011b and Financial Stability Board, 2014) adopted to address the “too big to fail” problem and prevent systemically important financial institutions from being bailed out with taxpayers' money. To quote the FSB: “the objective of bail-in is to reduce the loss of value and the economic disruption associated with insolvency proceedings for financial institutions, yet ensure that the costs of resolution are borne by the financial institutions' shareholders and unsecured creditors” (Financial Stability Board, 2011a).

The decision to impose losses on bond investors may nonetheless have economic and financial stability implications that go beyond those directly due to the bail-in. Losses on bond investments, including on senior bonds, is a ‘usual’ event in the failure of non-bank corporations but until now it has been a rather exceptional occurrence in banking crises, at least in the period between the great depression and the global financial crisis. The use of bail-in is supported by economic theory as a market discipline and leverage limiting tool (Repullo, 2005; Farhi and Tirole, 2012). However, although the new resolution regimes explicitly foresee the use of bail-in, the latest episodes of banking crises have shown that this measure has not been easy to use in practice (Visco, 2016, Visco, 2018, and Restoy et al., 2020). One of the reasons is that in the pre-crisis world investors in bank bonds considered the risk of losses on their investment a zero probability event because, in the absence of viable market based solutions, State interventions have typically shielded creditors from losses following bank failures. This entrenched belief may complicate the transition to a new regime where bail-in becomes the standard, as many bank bond investors may still be unprepared to bear losses. If this is the case, bail-in can have undesirable externalities for financial stability and the economy. Furthermore, even if the non-zero probability of losses on bank bonds were internalized by investors, bail-in might still not be optimal from a financial stability perspective as investors' reaction to sudden reassessments of bank risk could foster market instability. However, not all investors react in the same way. The different natures and characteristics of investors can imply heterogeneous behavior in the face of an information shock. Hence, the aggregate investors'

reaction - and also the risk that it could have destabilizing consequences - will critically depend on the composition of the investors in TLAC bonds. The investor base in TLAC bonds is therefore a crucial element that needs to be taken into account when deciding about banks' resolvability. A rule-based system that ties regulators' hands can instead result in bank runs and contagion (Eisert and Eufinger, 2019 and Walther and White, 2020). Recent empirical research supports this argument showing that systemic risk increases more after negative system-wide shocks and decreases more after positive shocks in countries with more comprehensive resolution frameworks, suggesting that the latter amplify rather than mitigate shocks during crisis times (Beck et al., 2020).

These considerations highlight the importance that the investors in TLAC bonds can have for policy makers when deciding about bail-in.

This paper analyzes the investors in the TLAC-eligible bonds issued by euro area G-SIBs from 2013 to 2020. The aim is to: i) identify the role played in the market by the different types of investors, and ii) shed light on how the developments in the composition of the investor base over the years - and in particular after the introduction of the new resolution regimes - have affected some of the problems faced by policy makers.

The analysis leverages on the European Central Bank (ECB) Securities Holdings Statistics database, a unique source of information on the investor base of TLAC debt in terms of sector, country, and type of security (European Central Bank, 2015, and European Central Bank, 2016). It builds on the work of Pigrum et al., 2016, that provides a first high-level snapshot of the holders of euro area banks 'uncovered bonds' at the end of 2015, by extending the analysis in several directions. Among others, it focuses on G-SIBs, the most systemically important institutions and the more active players in the bond market; it considers a longer period which covers the introduction of the actively issued new category of senior non-preferred bonds; it reviews the dynamics of the issuances and the holdings over time, including the outbreak of the Covid-19 pandemic; it proposes an identification of the most critical investors in TLAC bonds, and provides a first assessment of their role from the perspective of the policy makers that may need to enact a bail-in.

The rest of the paper proceeds as follows. Section 2 briefly recalls the main elements of the TLAC standard introduced by the FSB and implemented in the EU. Section 3 discusses the importance of the composition of the investors in TLAC debt from the perspective of banks' resolvability. Section 4 describes the data. Section 5 presents the evolution of the TLAC investors' base. Section 6 analyses the available evidence in light of the criteria identified in Section 3. Section 7 concludes.

2 The TLAC standard

The TLAC standard was introduced in 2015 (Financial Stability Board, 2015) and has been phased in for G-SIBs at the G-20 level since 1st January 2019. It will be fully phased in by 1st January 2022. There are two types of TLAC requirement:

- External TLAC requirement. It is applied to G-SIBs as resolution entities.¹ The phase-in requirement is 16 per cent of risk-weighted assets (RWA) or 6 per cent of the leverage ratio exposure (LRE). The final requirement is 18 per cent of RWA or 6.75 per cent of the LRE, to be met by 1st January 2022.
- Internal TLAC requirement. It is applied to the material sub-groups of the resolution entity (i.e. to material subsidiaries of G-SIBs). The requirement refers to the liabilities issued by the material sub-group to the resolution entity and is set – by the host authority in consultation with the home authority – at between 75 and 90 per cent of the External TLAC requirement that would apply if the material sub-group were a resolution entity.

The FSB's Review of the Technical Implementation of the Total Loss-Absorbing Capacity (TLAC) Standard (Financial Stability Board, 2019) estimated that by January 2019 all G-SIBs met the TLAC requirement, after issuances of eligible instruments which ranged between US\$ 360 billion and US\$ 433 billion per year during the previous three years.

In the European Union, the Bank Recovery and Resolution Directive (BRRD1) and the Single Resolution Mechanism Regulation (SRMR) introduced an institution-specific minimum requirement for own funds and eligible liabilities (MREL requirement) applicable to all EU banks.² The second Bank Recovery and Resolution Directive (BRRD2)³ and the second Single Resolution Mechanism Regulation (SRMR2)⁴ have then transposed the TLAC standard into the EU legislation and have harmonized the TLAC and the MREL requirements, to avoid having two parallel regimes for EU G-SIBs (Martínez Guerra, 2019).

The TLAC and MREL standards pursue essentially the same objective of ensuring that banks have adequate loss-absorbing and recapitalization

¹Resolution entity: the entity to which resolution measures are applied based on a G-SIB's resolution plan agreed by its home and host authorities.

²Technical standards for MREL were developed by the European Banking Authority (EBA) and formally adopted by the European Commission in May 2016. Mesnard, 2016 provides a summary of the main features of MREL and its differences from TLAC before BRRD2.

³Directive (EU) 2019/879.

⁴Regulation (EU) 2019/877.

capacity in the event of resolution. The main differences between the two requirements are that: i) the TLAC requirement is applied to G-SIBs only, whereas the MREL requirement is applied to all EU banks; ii) the TLAC minimum requirement is the same for all entities, whereas the MREL is set entity by entity, based on the formulas and valuations contemplated in BRRD2; and iii) the TLAC requirement must be met mostly by subordinated instruments (equity, subordinated debt and senior non-preferred debt, with minimal exceptions), whereas MREL can be met in part by other instruments.

2.1 Eligibility for the TLAC requirement

The FSB TLAC Term Sheet (Financial Stability Board, 2015) sets out the criteria that an instrument must meet in order to be eligible for the TLAC requirement. TLAC-eligible instruments must: be paid in; be unsecured; not be subject to set-off or netting rights that would undermine their loss-absorbing capacity in resolution; have a minimum remaining contractual maturity of at least one year or be perpetual; not be redeemable (i.e. not contain an exercisable put) by the holder prior to maturity; not be funded directly or indirectly by the resolution entity or a related party of the resolution entity.⁵ In practice, the TLAC requirement can be met with Tier1 and Tier 2 capital plus other debt conforming to the eligibility criteria. The Term Sheet excludes from TLAC eligibility several types of deposits and other liabilities.⁶

A TLAC-eligible instrument could be subordinated in three possible ways: i) contractual subordination, which makes an instrument junior to the excluded liabilities of the resolution entity; ii) statutory subordination, where the instrument is subordinated to the excluded liabilities by law (statutory creditor hierarchy); and iii) structural subordination, which is based on the institutional organization of a banking group (e.g. the debt is issued through a bank holding company which does not have any excluded liabilities that rank *pari passu* or junior to TLAC-eligible instruments on its balance sheet, which *de facto* makes its debt subordinated to the debt held at the operating company level).

⁵Except where the relevant home and host authorities in the Crisis Management Group agree that it is consistent with the resolution strategy to allow TLAC-eligible instruments or liabilities issued to a parent of a resolution entity to count towards external TLAC of the resolution entity.

⁶Insured deposits; sight deposits and deposits with original maturity of less than one year; liabilities arising from derivatives; debt instruments with derivative-linked features, such as structured notes; liabilities arising other than through a contract such as tax liabilities; liabilities which are preferred to senior unsecured creditors under the relevant insolvency law; or any liabilities that, under the laws governing the issuing entity, are excluded from bail-in or cannot be written down or converted into equity by the relevant resolution authority without giving rise to the material risk of successful legal challenge or valid compensation claims.

The TLAC standard requires that at least 33 per cent of the TLAC requirement be met with debt instruments, with equity allowed to account for a maximum of 67 per cent.

3 Are there ‘good’ and ‘bad’ investors in TLAC bonds?

The holding structure of TLAC bonds can be a crucial element for the credibility of the possible resolution of a G-SIB as argued in Section 1. In this section we sketch under which circumstances the investor base of TLAC could become an obstacle for resolution.

Two types of investors can potentially be critical and could ultimately compel authorities to find alternative solutions to bail-in: households and leveraged investors.

As for households, the level of TLAC investments relative to their wealth is a key aspect that is likely to matter because of the possible externalities that a bail-in may have. The choice of how much to invest in TLAC debt depends on households’ risk appetite, but could also be affected by their awareness of the riskiness of the TLAC securities. In fact, disregarding the possibility of incurring losses on TLAC investments would bias upward the decision about the level of risk-taking by a risk-averse investor. Under such circumstances, banks’ mis-selling practices would aggravate the bias as banks would sell inappropriately high amounts of risky TLAC debt to unaware households.

If households end up having too many TLAC bonds relative to their wealth, they could become financially constrained in the event of losses on these securities. In addition, a loss for households that are unaware of the riskiness of the TLAC securities they have invested in could also have negative implications for their confidence in the banking system. If these conditions were to materialize, political economy considerations against the resolution of a G-SIB may prevail in order to avoid the negative externalities for economic growth, that would occur as a result of lower household consumption, and for financial stability, which could be driven by the spread of mistrust in banks. As a result, TLAC would not work as expected.

The risks related to having households as investors in TLAC can be mitigated by ensuring that banks’ selling practices are appropriate and by enhancing financial education. A sound level of financial literacy would result in responsible investment decisions and adequate portfolio diversification, which could lead to TLAC holdings being a small proportion of households’ wealth. In this case the economic and financial stability concerns related to

a lack of awareness would be lessened as occasional losses would not have material effects on aggregate households' consumption and/or their trust in the banking system.

The other investors which could be relevant for resolvability are leveraged investors, such as banks and leveraged investment funds, i.e. hedge funds.

If banks invest in TLAC securities, the main concern is that of an artificial inflation of their loss absorption capacity. If G-SIBs were holding each other's TLAC debt, the resolution of a G-SIB would cause immediate losses for other G-SIBs, threatening the stability of the whole system. This risk is lessened by the regulatory requirement for G-SIBs to deduct the holdings of other G-SIBs' TLAC securities from their own capital (Basel Committee on Banking Supervision, 2016). This requirement curtails G-SIBs' incentives to hold each other's TLAC debt, and hence limits the risk of contagion in the case of the resolution of a G-SIB.

For hedge funds the situation is different. Their leveraged and active investment strategies are such that a sudden risk reassessment – caused by unexpected losses on their TLAC bonds portfolio or even by a threat of losses – could drive abrupt portfolio adjustments and deleveraging. If fire sales were to occur, the resolution of a G-SIB could have severe pro-cyclical effects on asset price dynamics, and spur further losses in the system through contagion. The possibility of such an outcome is not desirable for policy makers, and would make a bail-in ultimately unviable. Here again TLAC would not work as expected. These concerns could be addressed ex ante if investments in TLAC bonds by hedge funds were to account only for a small share of the overall investor base of any given G-SIB.

Summing up, for resolution to be both credible and feasible, it is therefore crucial that certain conditions be satisfied: i) investors in TLAC debt must be aware of the tail risk entailed by these securities; ii) in the case of households in particular, TLAC investments should not comprise too large a proportion of their wealth; and iii) the broader investor base of TLAC debt must be adequately diversified and include enough long-term, stable, and well diversified investors. We empirically address these issues in the next sections.

4 Data

The analysis focuses on the TLAC-eligible securities issued between 2013 and June 2020 by the eight euro area banking groups designated as G-SIBs according to the list published by the FSB in November 2020.⁷ A bond

⁷BNP Paribas, Deutsche Bank, Groupe BPCE, Groupe Crédit Agricole, ING Bank, Santander, Société Générale, Unicredit. The list is unchanged relative to November 2019. All the banking

is classified as TLAC-eligible on the basis of the information provided by Bloomberg. The information on the volume issued is also reported by Bloomberg, checked against the information provided by Dealogic and by Refinitiv, and adjusted when necessary.⁸

Euro area G-SIBs issued 1,715 TLAC-eligible securities during the period considered. This accounts for almost one third of the total (about 5,270) TLAC-eligible securities issued during the same period by all G-SIBs globally. Figure 1 shows the number of TLAC-eligible securities issued each year by the euro area G-SIBs, split by seniority. There was a significant increase in issuances from 2013 to 2016, followed by a stabilization in the subsequent two years and a decline since 2019. TLAC securities issuances in the first six months of 2020 were half of those in the first semester of 2017. In terms of seniority, the majority of issuances is given by senior unsecured bonds, which account for 68.9 per cent of total issuances across the period. Subordinated bonds account for 17.7 per cent of total issuances while senior non-preferred debt accounts for 13.5 per cent. However, considering that senior non-preferred bonds started to be issued only in 2017, after the introduction of the new type of subordination under BRRD2, senior non-preferred bonds account for a much higher share of total issuances. In fact, in the period 2017 to 2020 they represent 24.3 per cent of total issuances.

A similar picture emerges from Figure 2 which shows the volumes of TLAC debt issued. Looking jointly at the dynamics in terms of number and volume, three features can be highlighted. First, although both aggregates grow exponentially in 2014 and 2015, they peak with different timings: the volume peaks in 2015 while the number peaks in 2016. Second, the volume declines significantly after the peak while the number of issuances does not, suggesting a momentum in tapping the market notwithstanding the lower volumes. Third, the new category of senior non-preferred bonds has accounted for an important share of total issuances since 2017, both in terms of number and volume. The preference for senior non-preferred bonds becomes even more visible in terms of volumes in 2020. This growth has partly crowded out both subordinated and senior unsecured debt issuances.

Information on the holdings of the G-SIBs' TLAC-eligible securities is

groups have been designated as G-SIBs every year since 2013, with the exception of BPCE, which was removed from the list in 2017 and re-designated in 2018.

⁸The correctness of the information about volumes is checked at the level of each single ISIN: when it has been found inconsistent across the three data providers that we used, we adopted the value that is common to at least two sources. As a further check, information from the press releases of the issuing banks on the website of the relevant stock exchanges has also been considered. Issuances in non-euro currencies are converted into euro using the exchange rate observed on the issuance date.

reported by the ECB's Securities Holding Statistics - SHS by Sector (SHSS). SHSS is a unique dataset that provides information about the holdings of euro area banks' securities by euro area residents and by non-euro area residents to the extent that their investments are deposited with a euro area custodian. For euro area investors the information is more detailed and includes the institutional sector in addition to the country of residence (European Central Bank, 2015). The issuances not covered by SHSS include the securities bought by non-euro area investors and held by custodians not headquartered in the SHSS reporting countries.⁹ Data have been collected by SHSS since end 2013. To our knowledge no comparable source of information exists for other jurisdictions.

For the period between 2013 and June 2020 SHSS has data on 1,381 TLAC-eligible securities issued by euro area G-SIBs out of a total of 1,715 securities issued. This corresponds to a notional volume of € 751.1 billion out of a total of € 776 billion. The gap between reported and total issuances is likely due to the securities that are placed and fully held outside the jurisdictions covered by SHSS. In addition, as expected, the actual volume of the holdings reported in SHSS for the 1,381 TLAC bonds is lower than their total volume at issuance because SHSS does not necessarily include all the holdings of a given bond, as already explained. The weighted average amount held by euro area residents and by euro area custodians on behalf of non-euro area residents, and hence reported in SHSS, is € 262.7 billion (35.0 per cent of the total).¹⁰

Figure 3 provides a snapshot of the coverage of SHSS, both in terms of the number and volume of TLAC securities over time. The coverage was high in the period considered in terms of number, ranging from 72 per cent of yearly issuances to the peak of 93.9 per cent in 2019. In terms of the value of the holdings reported by SHSS the picture is different. The coverage is lower and more volatile. It dropped from 48.2 per cent in 2013 to 17.3 per cent in 2015, to then recover in the following four years to reach 57.8 per cent in 2019 (56.4 per cent in June 2020).

Despite the uniqueness of the dataset one more observation about its accuracy is necessary. Della Corte and Federico, 2016 note that SHSS data may suffer from two different biases: i) a 'custodian bias', related to the possibility that the custodian does not know the final investor, especially if its customer

⁹SHS collects information from 25 EU countries (i.e. all 19 euro area countries plus Bulgaria, Czech Republic, Denmark, Hungary, Poland and Romania).

¹⁰The average volume for each security reported in SHSS is computed as the average of the share of the volume issued and reported in SHSS in each quarter from the year of issuance to 2020. The average share is attributed to the year of issuance of the security. Then, the average amount held and reported in SHSS in a given year is the simple average of all the average holdings in the same year.

is an institution acting on behalf of a third party/customer; ii) an ‘upward bias’, that is a problem of ‘double-counting’ deriving from the combination of multiple and unrelated sources of data. This latter bias, according to Della Corte and Federico, 2016, implies a possible overestimation for more than 20 per cent of the securities, for which SHSS reports holding amounts higher than the volume actually issued.

5 Who holds TLAC-eligible debt?

Figure 4 shows the holdings of TLAC-eligible bonds with a quarterly frequency by country of residence of the holders between 2014Q1 to 2020Q2.¹¹ The highest average shares over time of the total TLAC securities reported in SHSS are held in France, Germany, Italy and Luxembourg (19.3, 13.0, 11.7, and 9.5 per cent respectively). Among non-euro area countries, significant average shares are held in the United States and the United Kingdom (9.4 and 9.3 per cent respectively). The dynamics over time shows some important heterogeneity at country level. Three jurisdictions reduced their share, although by a different magnitude. The share held in Italy dropped by 13.4 percentage points, and that held in Luxembourg and Germany by 3.8 and 2.5 percentage points respectively. A number of countries increased their share of holdings. Investors from Asia and the United States raised their share by 6.4 and 3.6 percentage points, accounting for the entire increase observed for non-euro area investors. Spain and Ireland recorded increases of 4.6 and 2.4 percentage points respectively. The share of holdings by the remaining countries remained broadly unchanged.

Figure 5 groups the holdings of TLAC-eligible debt by sector. Since the sector breakdown is available with more granularity for euro area countries, the holdings by non-euro area countries – which deposit their holdings with euro area custodians – are grouped together as if they were one sector. Non-euro area investors (other than central banks and general government) hold on average 34.0 per cent of the total TLAC holdings reported by SHSS. Based on this information, and on data on the level of coverage by SHSS, it is possible to estimate that about 77.6 per cent of the TLAC-eligible debt issued by euro area G-SIBs is held by investors outside the euro area: an indication of the global trait of the liability side of euro area G-SIBs’ balance sheets. At the same time, it confirms that little is known about non-European investors.

Among euro area investors, the entire financial sector has the highest average share of TLAC debt, with 52.5 per cent. Within this macro sector,

¹¹In some of the following charts for convenience the data are presented with an annual frequency and for different time windows.

non-money market investment funds (non-MMFs) have the highest share with 23.8 per cent on average, followed by insurance companies and pension funds with 17.4 per cent, and banks with 10.2 per cent. Other financial institutions and money market funds (MMFs) hold a marginal share. In the non-financial sector, households have the highest share with 9.3 per cent on average, while marginal shares are held by both non-financial corporations and general government.

These average figures hide some interesting changes which have taken place over time. The most visible one concerns households whose share dropped by about 2/3 during the period considered, i.e. from 16.4 per cent in 2014Q1 to 5.0 per cent in 2020Q2. The non-money market funds also reduced their share by 5.9 percentage points. These contractions have been offset by significant increases in two sectors. Non-euro area investors increased their share by 12.6 percentage points; insurance companies and pension funds by 4.2 percentage points.

Focusing on the euro area only, Figure 6 presents a snapshot of the distribution of the holdings across countries at the end of 2019 for the four most important sectors: households, insurance companies and pensions funds, non-MMFs, and banks. French, German, and Italian investors together hold between 75.8 and 89.8 per cent of the total holdings of TLAC debt in three out of the four sectors, although with some differences in the composition for each one. More in particular, within the household sector, French investors hold 50 per cent of the total exposures. German and Italian households follow with lower shares (both 20 per cent). Also in the insurance and pension funds sector French intermediaries are the first large investors (53.8 per cent of the total), due to the presence in the country of large insurance companies and financial conglomerates. Italian intermediaries are the second largest investors (17.2 per cent) and German and Spanish companies follow with a significantly smaller fraction (7.4 and 7.1 per cent). Also in the banking sector the distribution among the largest investor countries is not even, with credit institutions headquartered in Germany holding almost half of the total TLAC debt held by the sector (47.4 per cent), followed at a distance by the banks in the other main countries (Spanish 16.2, Italian 14.4 per cent, and French 14.0 per cent). A different case emerged for the investment funds sector, in which investors in Luxembourg hold 35 per cent of the total exposure of the sector. German and Irish investment funds have similar shares (18.4 and 18.2 per cent), followed by the French (12.7 per cent). A smaller share is held by the funds located in Spain and Italy (5.6 and 4.1 per cent respectively). The country distribution of investment funds holdings reflects the large number of players domiciled in Luxembourg and Ireland, but also implies that the ultimate exposure is not in these two countries.

Figures 7 to 10 present the dynamics, in euros, of the holdings of TLAC bonds by each sector, and their country composition. These figures shed further light on the weight of each country within a sector, while also considering the sector-specific developments of the holdings in absolute terms over time. At the aggregate level, the holdings have grown by multiples of the initial levels for all sectors. They have increased 8.0 times for insurance companies and pension funds, 6.5 times for banks, 6.0 times for investment funds, and by times for households. The lower growth by households implies the decline in their relative share as shown in Figure 5.

In the households sector (Figure 7), after an initial growth in 2015 relative to 2014 for all countries, in the following years the dynamics became more heterogeneous. Holdings stabilized in Portugal, and went back to the 2014 level in Italy, whereas they kept on growing in France, Germany, Spain, and Belgium. In 2014 Italian households had the highest share (68.8 per cent), while in 2019 the highest share was that of French households (50.1 per cent), followed by Italian (20.1 per cent) and German (19.6 per cent) households.

In the banking sector (Figure 8) all countries increased their holdings, but the increase was more pronounced in some countries than in others, both in absolute and in relative terms. The country with the highest holdings over time was Germany, where banks held 5.5 times the average amount held by the banks in the other countries at the end of 2019. This notwithstanding, a rebalancing of the relative shares occurred over time. The share of German banks declined (from 74.8 to 47.4 per cent) while those of Italian, Spanish, and French banks increased (from 4.4 to 14.4, from 1.0 to 16.2, and from 2.1 to 14.0 per cent respectively).

In the insurance companies and pension funds sector (Figure 9) strong growth of TLAC debt holdings was recorded throughout the period for all euro area countries. France stands out for the highest holdings both at the beginning and at the end of the period (with 69.7 and 53.8 per cent of the total respectively), and recorded the highest increase in euro terms. The holdings by the insurance companies and pension funds sector in France at the end of 2019 were 10.5 times higher than the average holdings in other countries. The second largest holdings in 2019 were those of Italian intermediaries (17.2 per cent).

The investment funds sector (Figure 10) is the one with the highest holdings in value terms. Contrary to the other sectors, the dynamics across countries was less differentiated, as indicated by a much lower standard deviation of the growth rates (7.4 compared with values of between 26.8 and 49.6 for the other sectors). The funds from Luxembourg held the largest share throughout the period, and registered the highest growth in absolute terms, but their share of the total declined slightly over time (from 38.1 to 35.0 per cent). A decline in

the share held took place also for French, Dutch and Italian investment funds, in favor of an increase in the share held by Spanish, Irish, and German funds.

The holdings of TLAC-eligible debt can also be assessed by investors' country of residence and by seniority of the issuances, where the levels of seniority are senior unsecured, senior non-preferred, and subordinated.

As shown in Figure 11, in 2015 and 2016 senior unsecured and subordinated were the only classes of subordination of TLAC-eligible bonds, since senior non-preferred debt had not yet been issued. For this period senior bonds represented a small fraction of the total TLAC-eligible debt held in all jurisdictions except for Germany, which showed a much higher share of senior unsecured bonds because of the statutory subordination of this class of securities. The introduction of senior non-preferred bonds in 2017 allowed G-SIBs to enhance their TLAC, leading to a gradual rebalancing of their TLAC-eligible liabilities, with senior non-preferred bond issuances growing at the expense of subordinated debt. This rebalancing could reflect both demand and supply factors. On the supply side, banks are more likely to prefer senior non-preferred bonds to the more expensive subordinated bonds, given that they play the same role for the purpose of the TLAC requirement. On the demand side, senior non-preferred bonds can be appealing to investors with a preference for securities enjoying more protection compared with subordinated bonds, while still offering a better yield than senior unsecured bonds.

The senior non-preferred bonds entered the market in 2017 with a remarkable share of 15.9 per cent of total issuances. Their share increased further in the following years, to 27.7 per cent in 2018 and to 34.5 per cent in 2020. During this period, the higher stock of senior non-preferred debt was consistently held by French investors, followed closely by German, Luxembourg and other countries' investors. The highest holdings by a non-euro area country were those of the UK in 2017 and 2018 and of the US in 2019 and 2020.

In terms of composition of the total country holdings of TLAC-eligible debt, Spanish investors had the largest share of their portfolio invested in senior non-preferred debt during the three years, followed by German and French investors in 2020. As for subordinated debt, the French and the Italians were the largest investors from 2017 to 2019, while in 2020 the French were followed by Asian and US investors. In terms of shares of subordinated debt relative to total TLAC eligible debt, the highest was that of Italian and Swiss investors in the four years considered, followed by French investors.

5.1 TLAC holdings and the Covid-19 health crisis

The aggregate holdings of TLAC eligible debt have not been affected in any significant way by the outbreak of the Covid-19 pandemic. Figure 12 shows the total holdings and those of the main sectors during a 5-quarter window between 2019Q2 and 2020Q2. This period includes three quarters before the start of the pandemic and two quarters after. The first quarter of 2020 is the one in which financial markets faced the strongest tensions before starting to normalize thanks to the huge policy interventions deployed by the fiscal, monetary, and prudential authorities (European Central Bank, 2020 and Banca d'Italia, 2020).

As a first thought, it is noteworthy that in the context of the quite large outflows from the open-end investment funds during the first quarter of 2020, the investment funds holdings of TLAC bonds not only have not fallen but instead they kept on growing. Although the shock has been so far all but a banking crisis, it is certainly a positive fact that - in the context of a financial turmoil - sensitive and active investors have not run away from TLAC bonds. They have in fact maintained their investments in these securities, at least until 2020Q2, our latest observation date. A similar dynamic also occurred for insurance companies and pension funds, and is reflected in the total holdings.

A significant exception to the general interest shown by investors during the pandemic is given by households. They sharply reduced their investments in TLAC bonds in the first two quarters of 2020. This behavior could reflect the severe impact that the health emergency had on households' income.

6 Can the holding structure of TLAC bonds affect resolvability?

Based on the available information, we provide a first assessment of the implications of the holdings of TLAC debt for the feasibility of G-SIB resolution, i.e. to make the TLAC work as expected.

To this end we: i) focus on the two categories of investors defined in Section 3 as potentially 'bad' investors for the purpose of resolvability, i.e. households and hedge funds; ii) provide a high-level assessment of the composition of the investor base for the TLAC issued by the G-SIBs being considered.

6.1 Assessment of TLAC holdings by households and hedge funds

We analyze households' holdings across euro area countries at aggregate level based on the two key features introduced in Section 3 that can make households (un)fit as investors in TLAC, i.e. the incidence of the holdings on households' wealth, and the level of households' financial literacy.

As a measure of households' wealth, we use the sectoral accounts concept of "households' net worth", which is the value of the total assets (financial and housing) held by households minus the value of their total outstanding liabilities. The measure of wealth for euro area countries is constructed as in de Bondt et al., 2020. The authors interestingly highlight the importance that wealth has for households' economic resources in the euro area, as households' net worth amounts to about seven times their annual disposable income.

Information on households' financial literacy is scarce. We leverage on Klapper et al., 2015 who report the results of the S&P Global FinLit Survey carried out in 2014. The survey measured the level of adults' financial education in 142 countries, including all euro area jurisdictions.¹²

Figure 13 shows the quartiles of the distribution across countries of the ratio between households' TLAC holdings and their wealth, together with the ratio for the euro area as a whole. The number for the euro area shows that the aggregate holdings are only a very minor part of households' wealth, on average 3.1 basis points. The distribution of the holdings is skewed to the left, with the median very close to the first quartile, indicating that for most of the countries the ratio is at very low levels. For a handful of countries only the households' portfolio of TLAC bonds represents a significantly higher fraction of their wealth. However, even in these cases, the holdings are still a tiny part. The third quartile is just 2.3 basis points, close to the euro area average.

This evidence is based on a comprehensive measure of wealth which includes net financial assets and housing. It seems however plausible to assume that households could become financially constrained even if losses would only hurt their financial wealth. Indeed, mobilizing housing wealth to release a financial constraint, at least within a short time, is likely to be problematic for several reasons. We think therefore that, for the purpose of our analysis, using a narrower measure of wealth - which considers only net financial wealth - provides a more realistic picture of the possible impact that losses could have on households' financial conditions. Based on this

¹²An alternative source is the G20/OECD and International Network on Financial Education (INFE), 2017 Report which provides a more updated measure of adults' financial literacy but with coverage limited to the G20 countries. This means that from this source data is available only for four euro area jurisdictions (France, Germany, Italy, and the Netherlands).

revised measure, the scale of the numbers just discussed changes and becomes significantly higher, confirming, in the first place, the important role that housing has for households' wealth. The distribution remains very skewed to the left, but the average median (0.8 basis points) is almost 3 times the median based on the broader measure of wealth (0.3 basis points). The third quartile increases in a similar way as does the value for the euro area as a whole (on average to 8.2 basis points of households' financial wealth). Despite the increase however, the impact of any losses on households' net financial wealth would be negligible on aggregate. France and Italy in 2020Q2 had higher households' holdings as a share of their financial wealth than the euro area average (at 15.1 and 10.1 basis points respectively).

These numbers suggest that if the resolution of a G-SIB were to take place, the average aggregate losses suffered by households due to their investments in TLAC bonds would be low on aggregate. There are a few countries where the incidence of TLAC investments on financial wealth is higher than for the rest of the euro area, but even in these cases the aggregate exposures seem in proportion for well diversified portfolios of financial assets. Although here we are not assessing the level of portfolio diversification, it is worth repeating that even for the country with the highest exposure it accounts on average for 0.15 per cent of households' net financial wealth.

An element of prudence emerges from Figure 14 which plots the average holdings of TLAC as a share of the broader concept of wealth against the level of adults' financial literacy in the euro area countries as reported by Klapper et al., 2015. This is based on a survey carried out in 2014 but more recent and equally comprehensive information is not available.¹³ Based on this data, we observe a negative correlation between the level of households' TLAC holdings relative to wealth and their financial education, i.e. the countries with lower financial literacy are those where households own more TLAC bonds relative to their wealth.¹⁴

The information to assess the second category of possibly 'bad' investors, i.e. the leveraged investors, and in particular hedge funds, is instead too scarce. We have no specific information on hedge funds exposure from SHSS, as these funds are included in the broader category of investment funds. We have shown that there has been significant growth in the holdings by this sector over time, but we do not know whether growth has been driven by mutual funds and/or by hedge funds. These two different investors often have very different trading strategies and behave differently in the event of stress.

¹³G20/OECD and International Network on Financial Education (INFE), 2017 has more recent information but it is on G20 countries and hence it includes only four euro area countries

¹⁴The lack of an appropriate understating of TLAC bonds on the part of the investors was also highlighted in a recent FSB workshop (Financial Stability Board, 2020).

Purely anecdotal evidence, based on very infrequent information provided by banks' press releases about the shares of their TLAC bonds bought at issuance by hedge funds and other investors, suggests that hedge funds could hold around 10 per cent of the total holdings of the investment funds sector (i.e. about 2 per cent of total holdings on average). This inference is not robust but if this were effectively the level of holdings, it would mean that the more speculative investors would hold a fraction of TLAC-eligible bonds compared with other more stable investors. This would be reassuring from the perspective of TLAC usability in the context of a G-SIB's resolution, but more evidence on this front is definitely needed.

6.2 TLAC investor base diversification

The expected return on TLAC bonds are relatively high but the risk is all on the downside. This prompts the question of whether the TLAC bond holders have adequately diversified their investments, so that the resolution of one G-SIB does not necessarily impair their portfolio and economic stability.

The available data are not granular enough to conduct a full assessment of the degree of portfolio diversification, but they do allow us to provide a bird's eye view of the holder of each G-SIB's TLAC. In particular, we can group and assess, at the holder sector level, the holdings of the TLAC bonds issued by each euro area G-SIB. The result for the holdings in 2019Q4 is shown in Figure 15. The mixed color circles on the two sides indicate the issuers, the grey circles in the middle indicate the investor sectors, the arrows connecting the side circles to the center circles show who is holding the TLAC issued by each G-SIB. The size of the circles indicate respectively the share of TLAC debt issued by each G-SIB and the share held by each sector. The thickness of the arrows indicates the share of the TLAC debt issued by a given G-SIB and held by a given sector.

On average, the bonds issued by each bank are held by 8.1 sectors on a total of 10 sectors.¹⁵ The bonds issued by three G-SIBs are held by 9 sectors, those issued by another three G-SIBs are held by 8 sectors and only those issued by two G-SIBs are held by 7 sectors. Despite the high average number of holding sectors for all G-SIBs, there appears to be some common distribution across banks. For all but one bank, the largest share of bonds is held by non-euro area investors, followed by non-MMFs. One notable exception is given by G-SIB E for which the largest share of its TLAC is held by households. Insurance companies and pension funds are the third largest investors for most of the G-SIBs. The other sectors play a minor role as investors in the bonds issued by

¹⁵A sector is counted if it holds on average more than 0.5 per cent of the TLAC bonds issued by a given G-SIB. Based on this criteria the sector of MMFs is never counted for any G-SIB

all G-SIBs.

We can synthesize the information of Figure 15 by computing the Herfindahl–Hirschman Index (HHI) in two ways. First, to measure the concentration of each sector's investment portfolio in euro area G-SIB TLAC bonds. Second, to measure the concentration of the investor base of the TLAC bonds issued by each G-SIB. The indexes are shown in Table 1.

The results in panel A indicate that at the sector level there is a moderate concentration, with a cross-sector average HHI of 0.20. The highest concentration, with an HHI of 0.34, is shown for the MMFs sector, which however has very low holdings of TLAC bonds in absolute terms, as shown in Section 5 Figure 5. A high concentration is also shown for households (0.29), which are instead important investors in TLAC bonds. As also indicated by Figure 15 43.9 per cent of their holdings are of bonds issued by one G-SIB only. A similar level of concentration (0.26) is that of central banks and general government from outside the euro area, which however are also small investors in the TLAC bonds issued by euro area G-SIBs. The sectors with the highest shares of holdings, other than households, show instead a significantly lower concentration (between 0.13 non-MMFs funds and 0.17 banks) well below the sample average. Although on the basis of this evidence it is not possible to make a full assessment of the diversification of the overall investment portfolio of each of the sectors (for which one should account for all the investments and not just those in TLAC bonds), it is interesting to observe that the sectors which invest more in TLAC bonds, with the exception of households, are those with a lower concentration of their investments, hence suggesting a diversification of the holdings of this type of securities. Diversification is instead less urgent for the sectors which invest little in TLAC securities, for which a higher concentration of their investments is therefore not a concern.

In panel B we show that for the investor base of the TLAC eligible securities issued by each G-SIB, there is a high average concentration (0.26) across banks and a low standard deviation. This implies that investors are quite concentrated at the sector level for most of the G-SIBs. The three largest sectors investing in TLAC bonds issued by each G-SIB account on average for 82 per cent of the TLAC bonds issued by each G-SIB. The level of concentration is high for four G-SIBs (with the HHI between 0.26 and 0.34) and moderate for the other four (with HHI between 0.21 and 0.25). This implies that should a G-SIB be failing or likely to fail (FOLTF) the market reaction by TLAC bonds investors could significantly depend on the behavior of relatively few investor sectors. The largest bond holders are non-EA investors other than central banks and general government for six out of eight G-SIBs, non-MMFs for one G-SIB, and households for the other one.

7 Conclusions and policy implications

Over the last few years bail-inable debt has become a standard component of banks' funding, and not only because of regulatory considerations. Issuances declined in the spring of 2020 during the market tensions caused by the Covid-19 pandemic but soon resumed when tensions subsided.

We have provided evidence on the holdings of the TLAC-eligible debt issued by the euro area G-SIBs, describing how these securities are distributed among sectors and countries and assessing the implications for resolvability.

The composition of the investors in TLAC bonds issued by euro area G-SIBs has changed significantly over time, with a decline in the share held by households. A large fraction of these securities is held outside Europe and for this portion of investors there is no information comparable to that available for euro area investors. Close coordination with authorities outside the area - provided that the information is available to them - would therefore be necessary to obtain a more complete picture of the investors from outside the euro area. We have also shown that the aggregate holdings of TLAC debt have not been affected in any significant way by the outbreak of the Covid-19 pandemic. Although in the period under consideration the market tensions were caused by Covid-19 and not by problems in the banking system, it is positive that - in the context of a financial turmoil - investors such as investment funds, insurance companies, and pensions funds have not run away from TLAC bonds. On other hand, households' holdings declined in the first half of 2020.

We have discussed the holdings structure from the perspective of the political economy problem that might be faced in the event of the resolution of G-SIBs. There are two potentially 'bad investors' which might complicate this problem: households and hedge funds.

The evidence available for households suggests that on aggregate their holdings of TLAC bonds are likely not to be the main obstacle in the event of the resolution of G-SIBs. Caution is needed however as we have also shown that the higher households' holdings, the lower their financial literacy. In addition, averages might hide pockets of vulnerability which could be due to concentrated higher levels of exposure. An assessment of the distribution across households within a country or region would therefore be needed to make a comprehensive assessment, particularly for the countries showing higher exposure.

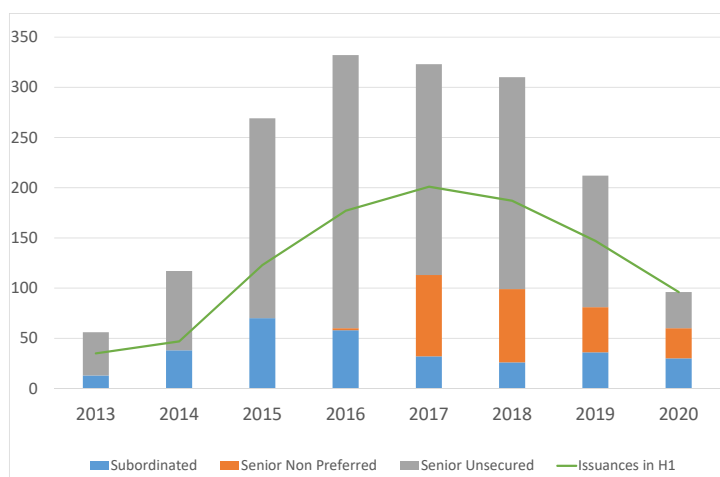
Only a tentative assessment is possible for hedge funds as the available information is far from sufficient. Although their role seems to be limited, their investment strategies are likely to be procyclical and could become significant in the case of FOLTF G-SIBs.

Overall the evidence available provides some comfort about the viability of bail-in in the case of a resolution of a G-SIB, but further efforts are still needed. Despite the usefulness of the information contained in SHSS, more data are necessary on non-euro area investors, which play an important role in G-SIBs' funding. Even at the euro area level, more granular information, at holder level, would be needed for a complete assessment. Other initiatives, e.g. those aimed at enhancing households' financial literacy and ensuring appropriate banks' selling practices would be welcome and could also indirectly contribute to improving the feasibility of resolution.

To conclude, this paper has focused on the holdings of euro area G-SIBs' TLAC issuances. To our knowledge, comparable data is not available for non-euro area G-SIBs. Enhancing information on this front would allow a better assessment of the possible implications of resolution. In addition, in Europe there is the MREL requirement, which is comparable to the TLAC requirement but is applied to all banks. There is therefore scope for further analysis and research on the holdings of MREL-eligible securities issued by euro area banks, which pose the same potential problems as the holdings of TLAC debt in the event of a crisis.

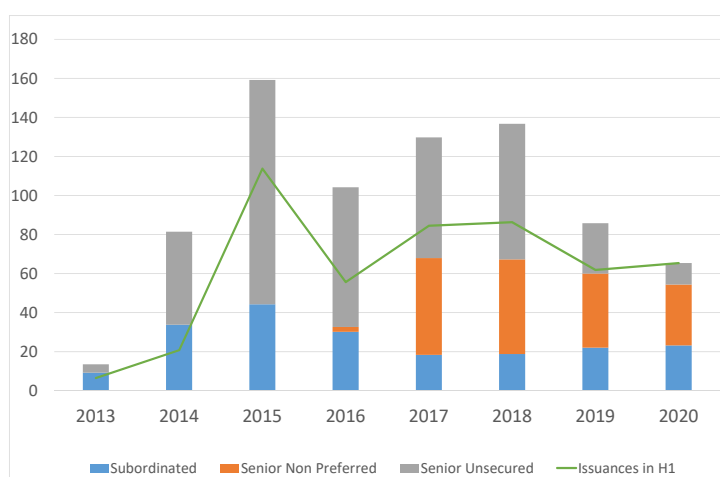
Figures and tables

Figure 1: Number of TLAC-eligible debt issuances by euro area G-SIBs



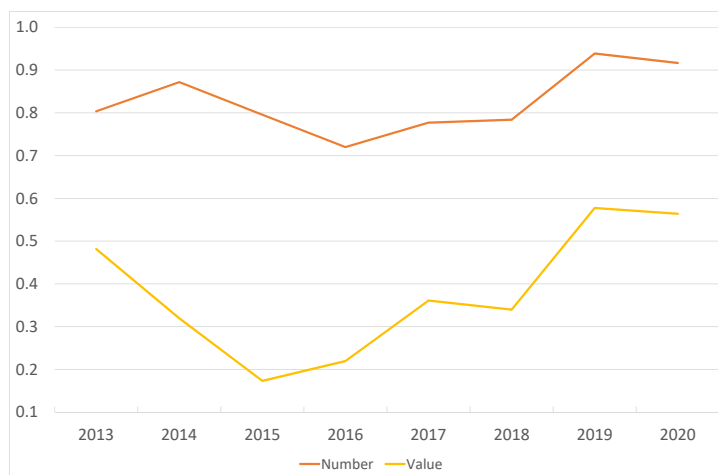
Notes: elaborations on Bloomberg and Dealogic data.

Figure 2: Volume of TLAC-eligible debt issuances by euro area G-SIBs



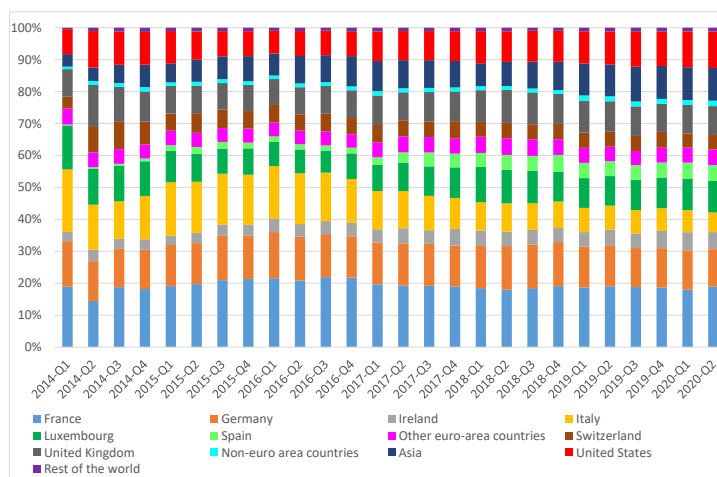
Notes: Billion euros. Elaborations on Bloomberg, Dealogic, Borsa Italiana and Refinitiv data.

Figure 3: Number and amount of TLAC-eligible debt issued by euro area G-SIBs and reported in SHSS



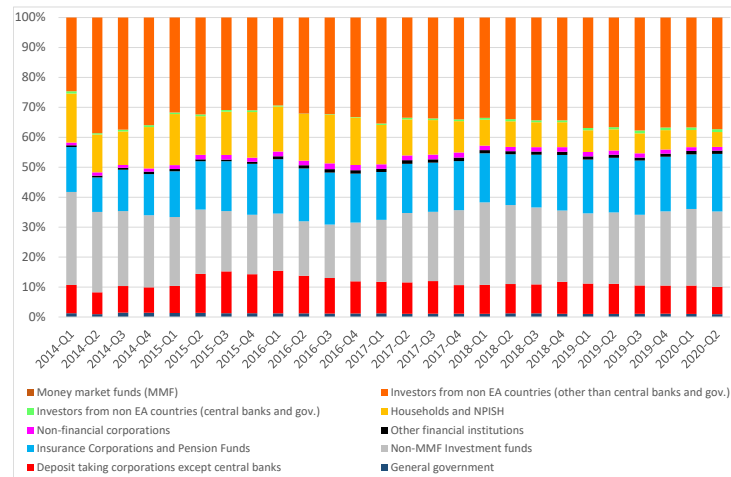
Notes: share of total. Elaborations on Bloomberg and SHSS data.

Figure 4: Euro area G-SIBs TLAC debt holdings by country



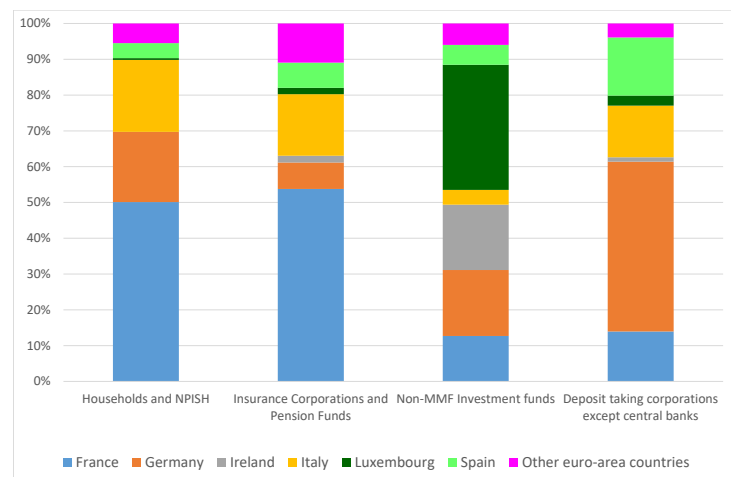
Notes: percentage composition. Elaborations on Bloomberg and SHSS data.

Figure 5: Euro area G-SIBs TLAC debt holdings by sector



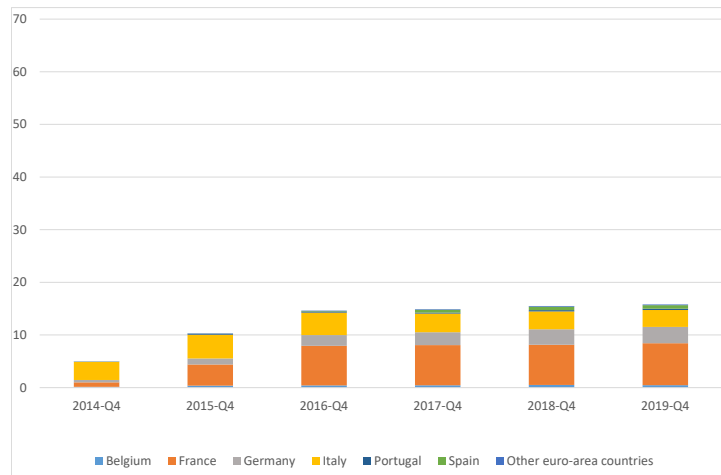
Notes: percentage composition. Elaborations on Bloomberg and SHSS data.

Figure 6: Euro area G-SIBs TLAC debt holdings by sector and country as of 2019Q4



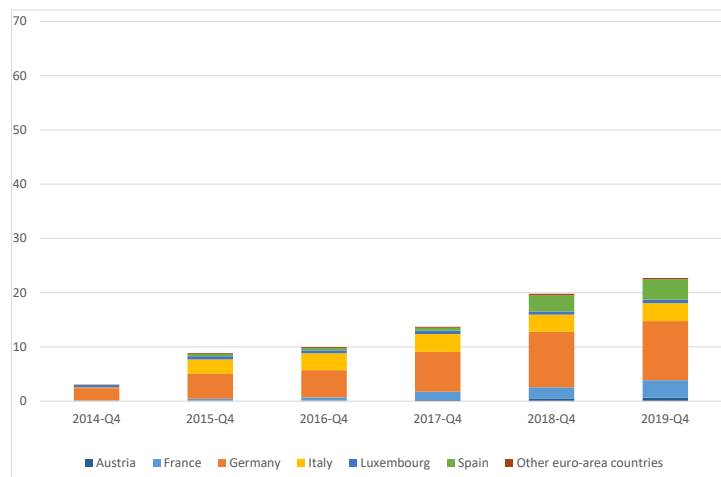
Notes: percentage composition. Elaborations on Bloomberg and SHSS data.

Figure 7: Country distribution of euro area G-SIBs TLAC debt held by households



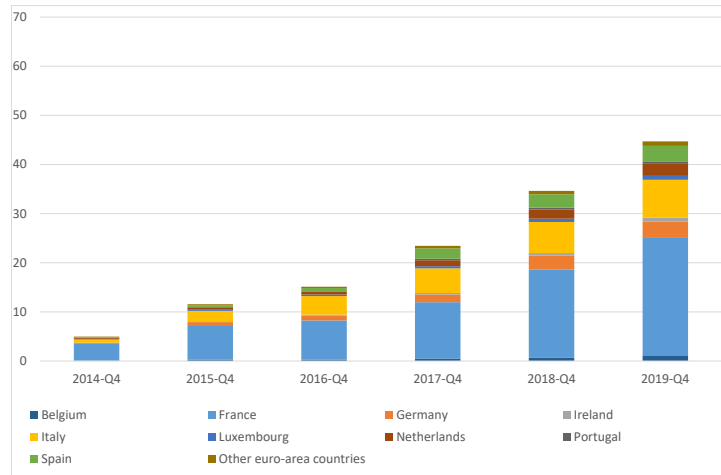
Notes: billion euros. Elaborations on Bloomberg and SHSS data. To improve readability, only the countries with holdings accounting on average for more than 1 per cent are reported. Countries with lower shares are grouped as “Other euro-area countries”.

Figure 8: Country distribution of euro area G-SIBs TLAC debt held by banks



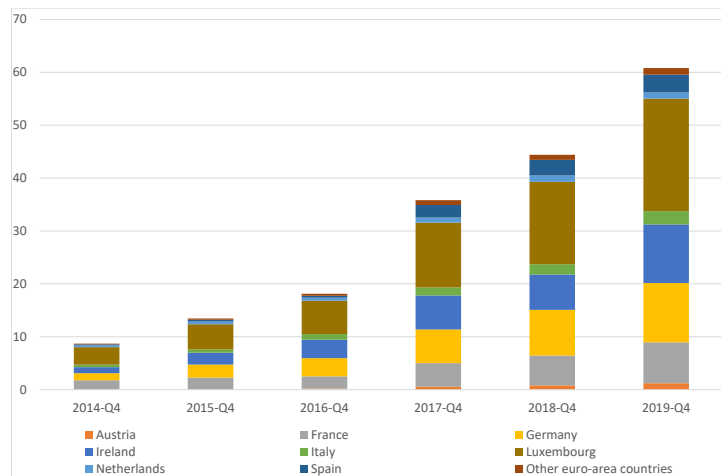
Notes: billion euros. Elaborations on Bloomberg and SHSS data. To improve readability, only the countries with holdings accounting on average for more than 1 per cent are reported. Countries with lower shares are grouped as “Other euro-area countries”.

Figure 9: Country distribution of euro area G-SIBs TLAC debt held by insurance companies and pension funds



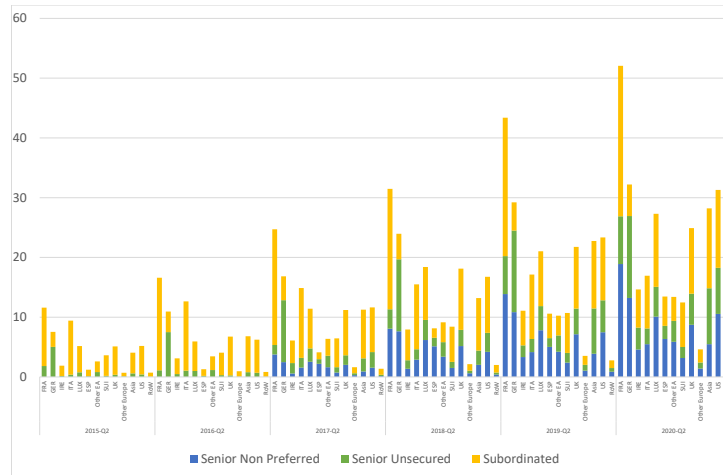
Notes: billion euros. Elaborations on Bloomberg and SHSS data. To improve readability, only the countries with holdings accounting on average for more than 1 per cent are reported. Countries with lower shares are grouped as “Other euro-area countries”.

Figure 10: Country distribution of euro area G-SIBs TLAC debt held by investment funds



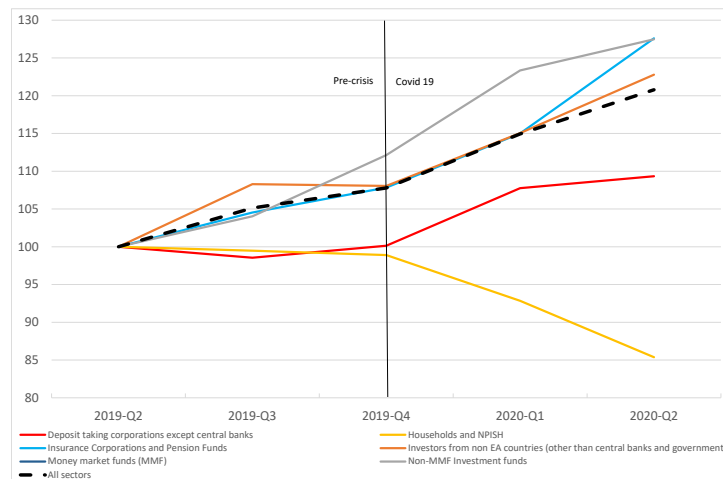
Notes: billion euros. Elaborations on Bloomberg and SHSS data. To improve readability, only the countries with holdings accounting on average for more than 1 per cent are reported. Countries with lower shares are grouped as “Other euro-area countries”.

Figure 11: Euro area G-SIBs TLAC bonds by holding country and seniority



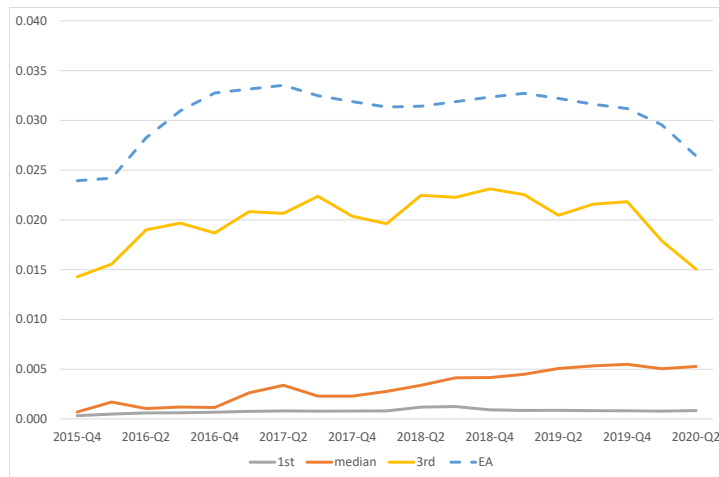
Notes: billion euros. Elaborations on Bloomberg, Dealogic, and SHSS data. To improve readability, only the countries with holdings accounting on average for more than 1 per cent are reported. Countries with lower shares are grouped as “Other euro-area countries”.

Figure 12: TLAC-eligible debt holdings by sector before and after Covid-19 outbreak



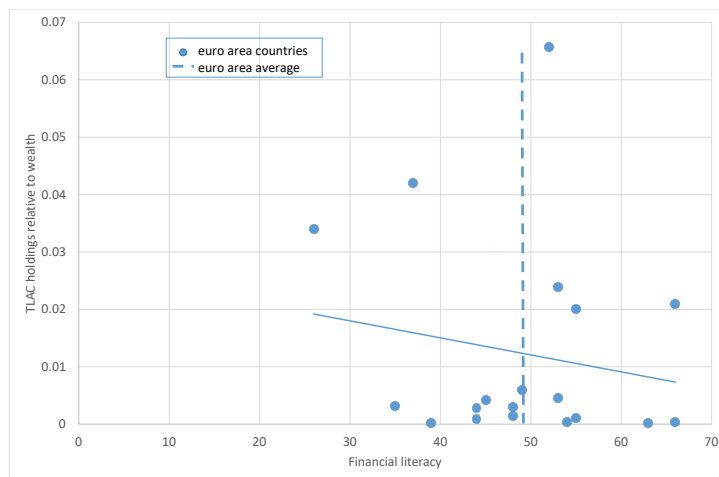
Notes: Indexes: 2019Q2=100. Elaborations on SHSS data. Only the sectors with higher holdings are shown.

Figure 13: Holdings of euro area G-SIBs TLAC bonds by households as a share of their wealth



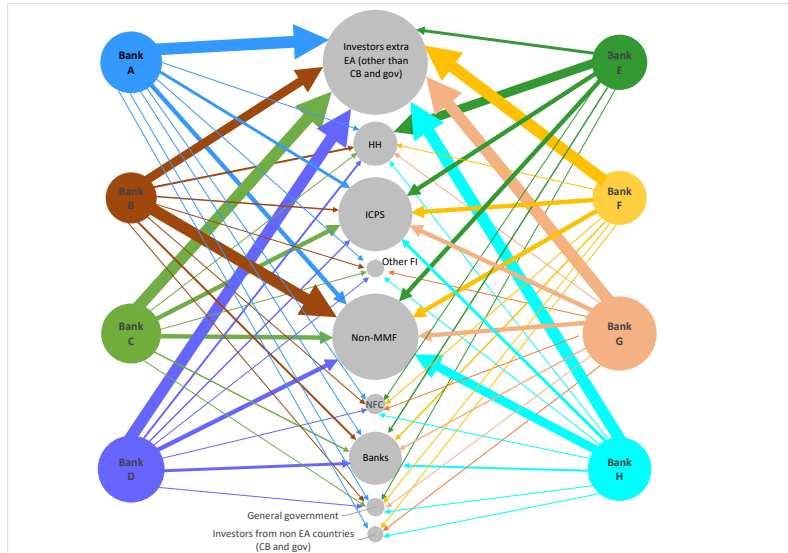
Notes: percentages. Elaborations on SHSS, ECB, National Central Banks, and Eurostat data.

Figure 14: Households' TLAC holdings, wealth and financial literacy



Notes: Elaborations on SHSS, ECB, National Central Banks, Eurostat, and Klapper et al., 2015 data.

Figure 15: TLAC bonds holders and issuers



Notes: The circles on the two sides indicate the issuers, the grey circles in the middle indicate the holding sectors, the arrows connecting the side circles to the center circles show which sector is holding the TLAC issued by each G-SIB. For the readability of the chart arrows are shown only if the share held by a given sector is higher than 0.5 per cent of the bonds issued by a given G-SIB. The size of the circles indicate respectively the share of TLAC debt issued by each G-SIB and the share held by each sector. The thickness of the arrows indicate the share of the TLAC debt issued by a given G-SIB held by a given sector. Elaborations on SHSS data.

Table 1: Concentration of TLAC bond holdings

A. Concentration at sector level		B. Concentration at G-SIB level	
Sector	HHI	G-SIB	HHI
MMFs	0.34	A	0.34
Households	0.29	G	0.29
Investors from non EA countries (CB and gov)	0.26	C	0.29
Other financial institutions	0.18	F	0.26
Banks	0.17	B	0.25
Non-financial corporations	0.17	H	0.24
Non EA Investors other than CB and gov	0.15	D	0.22
Insurance Corporations and Pension Funds	0.15	E	0.21
General government	0.14		
Non-MMFs	0.13		
Average	0.20		0.26
Standard deviation	0.07		0.04

Notes: Elaborations on SHSS data. Panel A shows the concentration (proxied by the Herfindahl-Hirschman index, HHI) of the investments in the TLAC bonds issued by euro area G-SIBs for each sector. Panel B shows the concentration of the investors in TLAC for each G-SIB. G-SIBs are anonymized and indicated by letters A-E.

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