Securities Losses, Interbank Markets, and Monetary Policy Transmission: Evidence from the Eurozone

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Exploiting large cross-sectional variation in exposure to securities losses across euro area banks, we show that banks more negatively exposed to the July 2022 monetary policy tightening lost access to the interbank market and cut lending, irrespective of whether the securities were booked at market or historical value. Importantly, banking groups provide liquidity to domestic subsidiaries, reducing the impact of their security losses on corporate lending, but foreign subsidiaries of banking groups and stand-alone banks with more significant securities losses reduced lending to corporate borrowers to a larger extent. Our results show how differences in banking structure can contribute to an uneven transmission of monetary policy.

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Differences in financial structure across geographical areas of a monetary union can lead to asymmetries in monetary policy transmission because the extent to which monetary policy decisions affect credit supply depends on bank size and capitalization, firm and household leverage, and other financial conditions (Kashyap and Stein, 2000). While asymmetries in monetary policy transmission have also been documented in the U.S. (Beraja et al., 2019), they may be particularly pronounced in the euro area, where national security laws and regulations segment banking markets along national borders. Bank consolidation and the tendency of banking groups to acquire distant banks have often been considered an important channel for achieving a more homogeneous financial structure and an even transmission mechanism of monetary policy across geographical areas of the monetary union.

We explore whether this is the case in the context of the euro area and also ask whether the interbank market, by transferring liquidity, helps to mitigate shocks to bank net wealth or whether an increase in money market segmentations contributes to amplifying the initial shocks to bank net wealth. We rely on the latest episode of monetary policy tightening. In July 2022, the European Central Bank raised the policy interest rate in response to increasing inflation. Banks with greater holdings of securities in their portfolios were more exposed to the monetary policy tightening through their losses in the value of the securities they held. The adverse shock to the market value of collateral decreased banks' ability to access the interbank market and banks' net wealth. We observe that as a consequence banks extended less credit to firms and that the effects are similar for losses of securities that were booked at market and historical values. Importantly, there were large cross-sectional differences in countries and banks' exposure to the securities losses driven by the monetary tightening. This makes cross-sectional differences in banks' exposure to the monetary tightening through securities losses a perfect laboratory to explore to what extent banking groups spread the negative shocks across borders, leading to a more homogenous monetary transmission.

We thus use this episode to ask whether shocks to banks net wealth are mitigated to the reallocation of liquidity through the money market or are associated with increasing market segmentation that can in principle amplify the initial shock. We also ask whether the reallocation of liquidity between banks that belong to the same banking group (i.e., have the same holding company) reduces the adverse effects of monetary policy shocks and whether the reallocation of liquidity is the same between subsidiaries located in the same country as the headquarters (i.e., domestic subsidiaries) and foreign subsidiaries located within the eurozone.

Using granular data on interbank lending, we show that banks that experience more significant securities losses when monetary policy tightens obtain less credit through the interbank market, indicating that more severe market segmentations contribute to amplify the initial shock. In addition, the interest rate banks pay in the interbank market increases, suggesting that the effect is not merely due to the value of collateral but that the drop in net wealth reduced banks' creditworthiness. Within-group interbank loans partially isolate domestic subsidiaries from the effects of securities losses. The headquarters and other subsidiaries of the same group extend larger loans to those subsidiaries that have experienced more significant securities losses due to the interest rate hike. Integration, however, appears to be incomplete even within the banking group. Foreign subsidiaries experiencing losses do not obtain loans from other group members and receive less credit when their within-group lenders experience losses. Consequently, stand-alone banks and foreign subsidiaries of banking groups that experience securities losses confront reduced access to credit in the interbank market.

Access to liquidity through the interbank markets and intra-group borrowing affect the credit supply to the corporate sector. Thanks to the insurance provided by the other group members, access to credit for a banking group's domestic subsidiaries does not contract. Consequently, domestic subsidiaries of a banking group contract their credit supply less than stand-alone banks that experienced a similarly strong adverse shock to the value of their

security portfolio. Because of the interbank market segmentations affecting within-group loans, foreign subsidiaries of banking groups are as exposed to monetary policy shocks as stand-alone banks.

We make several contributions to the literature. First, we contribute to the literature that leverages credit registry data to study the transmission mechanism of monetary policy (e.g., Jiménez et al., 2012). A few papers in this literature have exploited heterogeneity in banks' securities holdings to capture cross-sectional differences in exposure to monetary policy shocks (Greenwald, Krainer, and Paul, 2024). We are the first to consider within-group reactions to securities losses prompted by monetary tightening and their effects on bank lending. In addition, thanks to the granularity of our data, we can contribute to the debate on the circumstances under which decreases in the valuation of securities holdings affect bank lending. We show that even banks that marked their security portfolios as held to maturity and could use historical cost accounting were negatively affected by the interest rate hike. Accordingly, we provide evidence that the impact of monetary policy through securities losses depends on banks' net wealth and not merely on regulatory capital requirements.

Second, we contribute to a strand of the literature studying the lending channel of monetary policy in stand-alone banks and financial conglomerates (e.g., Campello, 2002; Cetorelli and Goldberg, 2012a) and make two important innovations. First, while existing contributions rely on banks' balance sheets to measure outstanding credit, the granularity of our credit registry data allow us to control for corporate credit demand using the Khwaja and Mian (2008) methodology. Second, we distinguish between domestic and foreign subsidiaries of a banking group. We find that being part of a banking group attenuates the effect of monetary policy shocks on domestic subsidiaries' credit supply. However, the headquarters' propensity to provide liquidity to foreign subsidiaries facing securities losses is limited. Consequently, foreign subsidiaries remain more exposed to monetary policy shocks and contract lending as

much as stand-alone banks. Our results reveal an organizational pecking order within euro area credit groups that, differently from U.S. global banks (Cetorelli and Goldberg, 2012b), do not appear to allocate liquidity according to subsidiaries' investment opportunities.

Finally, we contribute to the literature on the international transmission of bank liquidity shocks. Prior research demonstrates that international banks transmit shocks to their foreign subsidiaries (e.g., Peek and Rosengren, 2000; Schnabl, 2012) and that US banks can access liquidity from foreign subsidiaries during periods of funding stress (Cetorelli and Goldberg, 2011). Moreover, internal capital markets within global banking groups have been shown to play a crucial role in how liquidity and monetary policy shocks in advanced economies affect lending to emerging markets (Cetorelli and Goldberg, 2011, 2012; Morais et al., 2019). Domestically, multi-market banks have also been found to transmit positive liquidity shocks within their U.S. branch networks (Gilje, Loutskina, and Strahan, 2016) and to transmit negative shocks outside their core markets, defined as areas in which banks do not have branches (Cortés and Strahan, 2017). We highlight how access to internal capital markets influences the strength of monetary policy transmission among banks that are equally exposed to the same monetary policy shock within a banking union.

1. Data

We exploit different data sources to evaluate whether differences in banking structure affect monetary transmission.

First, we rely on the Securities Holdings Statistics (SHS-G), which provides detailed information on debt security holdings at the ISIN-bank-quarter level. SHS-G offers granular data on security holdings, including the amount held, book value, market value, and the accounting classification of instruments. The accounting classification allows us to differentiate whether the bank applied an accounting standard that classifies the security at

amortized cost (book value) or at fair value (marked to market). We focus on fixed-income securities held by banks, issued in the Eurozone, and denominated in euros.

Second, we use loan-level data from the European System of Central Banks' AnaCredit (AC) credit register, established in 2018. AC covers information on borrower characteristics (e.g., location, industry), loan types, and loan terms (e.g., loan size, maturity, interest rate, issuance date). Specifically, we use AC to analyze (i) bank lending to non-financial firms (NFCs) and (ii) interbank lending between Eurozone banks.

Finally, we complement our analysis with data from the Individual Balance Sheet Items (IBSI) database, maintained by the ECB. This database contains monthly-level information on banks granular asset and liability items. We use time-varying variables, such as total assets, deposit-to-total-assets ratio, equity ratio, and liquidity ratio, at the bank subsidiary level.

2. Stand-Alone Banks and Banking groups within the Euro Area

We observe 2,862 banks operating across 19 euro area (EA) countries during the sample period from January 2022 to December 2023 (Figure 1 Panel A). We categorize these banks into three distinct groups: i) stand-alone banks, which are not part of any banking group, ii) domestic subsidiaries, which are banks that are part of a domestic banking group, and iii) foreign subsidiaries, which are banks owned by a foreign banking group. In total, the sample includes 1,832 stand-alone banks, 644 domestic subsidiaries, and 386 foreign subsidiaries.

Table 1 Panel A summarizes the descriptive statistics of the EA banking sector. Domestic and foreign subsidiaries collectively belong to 108 banking groups operating in the EA. On average, there are about 151 banks per country, with a median of 26 banks per country. In a median country, there are ten stand-alone banks, six domestic subsidiaries, and nine foreign subsidiaries. In a median country, banking group subsidiaries belong to 13 banking groups, four of which are headquartered domestically. On average, a banking group owns six

subsidiaries and operates in three countries. While banking groups in the EA tend to exhibit a home bias, a significant portion of their assets and corporate loans is held by foreign subsidiaries, accounting for 25% of total assets and 26% of corporate loans, respectively.

Reflecting differences in country size, the distribution of banks is significantly skewed towards the EA Big-4 countries (Germany, Italy, Spain, and France), which together account for around 72% of all banks (see Figure 1 Panel A). In contrast to the median EA country, the vast majority of banks in Big-4 countries are part of a banking group, with 150 subsidiaries compared to 70 stand-alone banks. In addition, Big-4 countries have more than twice as many domestic subsidiaries as foreign ones, with 100 domestic subsidiaries versus 50 foreign ones. These subsidiaries are part of 52 banking groups, 18 of which are headquartered domestically.

While stand-alone banks are significant in numbers, they are typically small and account for a smaller proportion of total assets, corporate lending, and security holdings than subsidiaries of banking groups. Specifically, subsidiaries of banking groups hold, on average, 70% of a country's banking sector assets, with the remaining 30% held by stand-alone banks.

Among subsidiaries, foreign subsidiaries play a crucial role, holding more than a quarter of total assets, while domestic subsidiaries account for 44%. These proportions are similar for corporate lending and securities holdings, with subsidiaries of banking groups representing 67% and 69%, respectively. Foreign subsidiaries are almost as important as stand-alone banks, accounting for 26% of corporate loans and 24% of securities held.

As Figure 1 Panel B highlights, the distribution of domestic and foreign subsidiaries is not homogenous across the EA. Foreign subsidiaries play a disproportionally more important role in countries with smaller domestic banking systems, such as Portugal, Belgium, Luxembourg, Slovakia, Lithuania, and Estonia, where the share of corporate loans extended by foreign subsidiaries is close to 50%.

3. Securities Holdings and Bank Net Wealth

On July 21, 2022, the ECB increased the three key policy rates by 50 basis points. As a consequence of this decision, the interest rate on the main refinancing operations and the interest rates on the marginal lending facility and the deposit facility were increased to 0.50%, 0.75%, and 0.00%, respectively. Naturally, this led to a repricing of the securities in the banks' portfolios, and banks that held relatively more securities experienced more significant losses.

Data from the ECB's SHS-G allows us to compute the losses on the security portfolios of bank subsidiaries and banking groups. Table 1, Panel B, presents the summary statistics. Euro area banks hold a substantial amount of fixed-income securities on their balance sheets, amounting, on average, to EUR 3.2 billion or 18% of their total assets.

The granularity of the SHS-G data allows us to distinguish whether a security is classified as available for sale (AFS) or held to maturity (HTM) in each bank's portfolio. On average as of the end of the first quarter of 2022, we observe that most securities are reported as HTM (65%), while a smaller share (35%) is classified as AFS. This repartition differs from the evidence on bank holding companies (BHCs) in the US, where the 29 largest BHCs classify 60% of their security portfolios as AFS (Greenwald et al., 2024). Thus, since EA banks report most of their securities as HTM they can apply historical cost accounting instead of mark-to-market accounting that applies to AFS securities. The difference in the proportion of AFS and HTM securities in banks' portfolios could be due to institutional differences between the US and EA banking sectors, as well as the fact that our main sample covers a total of 498 banks, revealing important aggregate trends as well as cross-sectional variation that goes beyond the largest EA banks.

We use the SHS-G data to compute a bank's overall securities losses triggered by monetary tightening as well as its securities losses in the AFS and HTM components of its portfolio. Specifically, we measure the effect of the monetary policy tightening on the value of

securities in the bank's portfolio at the end of the first quarter of 2022, which is well before the monetary policy tightening. Holding constant the amount of securities, the overall securities losses of a bank over the period 2022 Q1 – 2023 Q3 are computed as:

$$Security\ Losses_i = \frac{\sum_s \left(\left(\frac{P^S_{2023Q3} - P^S_{2022Q1}}{P^S_{2022Q1}} \right) \times Value\ Held^S_{i,2022Q1} \right)}{Total\ Assets_{i,2022Q1}} \quad (1)$$

While we computed the securities losses over our entire sample period, most of the losses were realized in the third quarter of 2022, in the aftermath of the tightening of the monetary policy stance.

A key advantage of our detailed security-level data is that it enables us to measure the total value change in a bank's ex-ante securities portfolio by capturing fluctuations in individual security prices. By treating a bank's ex-ante security holdings as fixed, we do not incur the problem that banks more negatively affected by the monetary policy tightening may opportunistically choose to mark a larger fraction of their security holdings as HTM to avoid mark-to-market accounting for AFS securities (Granja, 2023).

On average, banks suffer securities losses of 1% of their total assets or 12% of their total equity. Figure 2, Panel A, further summarizes the distribution of overall losses on security portfolios as a share of total assets, highlighting the significant cross-sectional variation in these losses. In Panel B, we decompose the losses in the HTM and AFS portfolios, holding the classification constant as of the first quarter of 2022, and find that the largest securities losses are associated with HTM holdings. HTM losses, on average, amount to 0.84% of total assets (9.8% of total equity), while the mean AFS losses are four times smaller and amount to 0.21% of total assets (2.5% of total equity). In addition to the average losses, we also observe a smaller dispersion of AFS losses, which relates to the fact that EA banks are generally more likely to hold securities as HTM.

There is substantial heterogeneity in security holdings and associated losses across Euro area countries (see Figures 3 and 4). Banks in peripheral countries, such as Italy, Spain, Portugal, and Greece, hold significantly more securities on average than those in core countries like Germany and France. These holdings are concentrated in long-term securities with maturities over three years. Consequently, banks in peripheral countries were more exposed to the ECB's monetary tightening and incurred the largest losses.

In what follows, we exploit this cross-sectional variation to identify the effects of the monetary policy tightening. Specifically, we analyze how changes in the value of those securities subsequently influence the bank's behavior in the interbank market and lending to firms.

4. Monetary Tightening, Interbank Market and Intra-Group Liquidity Provision

4.1. Types of Securities Losses and Interbank Market

4.1.1 Effects of borrowing banks' losses

We ask how banks' behavior in the interbank market changes due to their losses. Euro area banks rely heavily on the interbank market to finance their balance sheets, with an average of 13.8% of bank assets funded through interbank borrowing (see Table 1, Panel B). Since most of the securities in the banks' portfolios appear to be HTM, any effects are unlikely to derive from the fact that a minority of securities AFS must be marked to market. For this reason, we conjecture that banks are unlikely to be affected through their capital requirements after recording losses in their AFS portfolios. Instead, a decrease in the value of HTM and AFS securities can affect banks for two reasons: First, security losses decrease the banks' net wealth and, consequently, their access to liquidity through the interbank market, affecting their lending behavior. Second, securities losses could matter because of a decrease in the value of collateral banks can pledge in repo contracts, which reduces banks' ability to borrow. We thus expect

securities losses to negatively affect a bank's ability to borrow in the interbank market because its creditworthiness and ability to post collateral decrease.

Table 2 tests these hypotheses. We explore how securities losses affect a bank's borrowing ability in the interbank market. We estimate the following model by ordinary least squares (OLS), where the dependent variable, $Loan\ amount_{b,c,l,h,t}$, is the logarithm of the outstanding interbank credit amount issued by bank *l* located in country *h* to bank *b* based in country *c* during month *t*:

$$Loan\ amount_{b,c,l,h,t} = \alpha + \beta(Post_t \times Security\ Losses_b) + \delta_{b,l} + \mu_{c,t} + \theta_{h,t} + \epsilon_{b,c,l,h,t} \quad (2)$$

The variable of interest is the interaction term $Post_t \times Security\ Losses_b$. $Post_t$ is an indicator variable that takes value equal to one starting from August 2022, to capture changes in credit behavior after the monetary policy tightening. $Security\ Losses_b$ denotes the ratio of securities losses to total assets of the borrowing bank as described by Equation (1). The vector $\delta_{b,l}$ denotes interactions of borrowing bank and lending bank fixed effects and controls for the strength of the interbank relation. In addition, $\mu_{c,t}$ and $\theta_{h,t}$ are interactions of the borrowing bank's country and time and the lending bank's country and time fixed effects, respectively, and capture any shocks affecting the borrowing bank's and the lender bank's countries.

Column 1 of Panel A, Table 2 shows that banks that experience more significant securities losses following the monetary tightening receive less credit in the interbank market. The effect is both statistically and economically significant. A one-standard-deviation increase in borrowing banks' losses is associated with a 7.35% decline in credit received in the interbank market. This result suggests that securities losses negatively affect a bank's ability to borrow in the interbank market.

In columns 2 to 4, we distinguish between securities losses in HTM and AFS portfolios. Consistent with the fact that most securities in the banks' portfolios are held to maturity (see Section 3), the overall decline in borrowing capacity is driven by losses in the HTM portfolio. Losses in the AFS portfolio do not appear to affect a bank's access to credit in the interbank market. The positive and statistically insignificant coefficient on AFS losses suggests that these losses may be too small for most banks to matter.

To evaluate the relative importance of the collateral and the net wealth channels, we consider the repo market. Repo loans are subset of the interbank loans we observe through AC. Both the collateral and the net wealth channels would imply a decrease in the amount of credit a bank experiencing considerable securities losses can access. However, the net wealth channel also implies a decrease in bank creditworthiness, resulting in a higher borrowing rate for banks experiencing significant securities losses. To examine the role of the net wealth channel, we estimate an equation analogous to the one for outstanding credit with the interest rates on repo lending as the outcome variable.

Columns 5 and 7 of Table 2 consider the amount of repo credit outstanding in a bilateral relationship and the interest rate on these loans as dependent variables, respectively. In column 5, we continue to observe that securities losses impair the ability of a bank to borrow. Importantly, using repo contracts, which are more homogeneous than other forms of contracts in the interbank market, in column 7, we observe that the interest rates paid by borrowing banks with higher securities losses increase more than for other banks in the interbank market. This suggests that securities losses negatively affect a bank's creditworthiness and that the net wealth channel is at least partially at play.

To provide further support for this interpretation, we consider whether the effects of securities losses differ for well-capitalized banks, whose ability to borrow should be less likely to be impaired because they are unlikely to default on their obligations. Consistent with this

interpretation, in column 6, the coefficient on the triple interaction term, $Post_t \times Security\ Losses_b \times WellCapitalized_b$, is positive and larger than the absolute value of the coefficient on $Post_t \times Security\ Losses_b$. This implies that well-capitalized banks experiencing securities losses are able to borrow more, possibly to increase their liquidity holdings. In column 8, we also do not observe an increase in the interest rate well capitalized banks are able to borrow at.

4.1.2 Effects of lending banks' losses

To the extent that a bank that has experienced a negative shock to its net wealth is less able to attract liquidity through the interbank market, it can also become less inclined to extend credit after experiencing a negative shock to its net wealth. We thus investigate whether securities losses also affect banks' lending behavior. To this end, we estimate equation (1) but focus on the role of the lending bank's ratio of securities losses to total assets. Equation (2) describes our empirical model:

$$Loan\ amount_{b,c,l,h,t} = \alpha + \beta(Post_t \times Security\ Losses_l) + \delta_{b,l} + \mu_{\boldsymbol{c,t}} + \theta_{h,t} + \epsilon_{b,c,l,h,t} \quad (3)$$

where the key variable of interest is the interaction term between the post dummy and the lending bank's ratio of securities losses to total assets ($Post_t \times Security\ Losses_l$).

Panel B of Table 2 presents the results. We find that securities losses not only affect banks' ability to receive credit but also their lending behavior. Banks that experience more significant securities losses extend less credit in the interbank market (column 1). The effect is once again statistically and economically significant, with a one-standard-deviation increase in lending banks' losses associated with a 6.8% decrease in their credit supply in the interbank market. Columns 2 to 4 reveal that both HTM and AFS securities losses have a negative impact

on the amount of credit that a bank extends in the interbank market even though the statistical significance of AFS losses is marginal, arguably because as noted before they exhibit less variation between sample banks.

4.2. Differences between Interbank and Intra-Group Lending

Having established that securities losses hamper banks' access to credit, we evaluate whether their effect in intergroup and intragroup lending subsamples. Subsidiaries of banking groups that experience securities losses may be able to access liquidity from other group subsidiaries, which are naturally less concerned about counterparty creditworthiness than other banks.

While Table 2 considers all interbank loans, Table 3 columns 1 and 2 split the sample in between groups and within group loans. Column 1 confirms our previous results and shows that securities losses are associated with a particularly large drop in a bank's access to credit when we consider between group loans. Column 2 focus on intra-group loans and shows that banks that are part of banking groups receive more intragroup liquidity when they experience considerable liquidity losses. The effect is not only statistically but also economically significant. A one standard deviation increase in borrowing banks' losses is associated with a 5.4% increase in credit received from other banks in the same banking group. Thus, decrease in interbank market borrowing for banks experiencing securities losses is entirely driven by lending from banks that do not belong to the same banking group. Intragroup lending is a counteracting effect.

Columns 3 and 4 consider the effect of lending banks' losses and distinguish between the subsamples of inter-group and intra-group loans. We observe that inter-group loans drive the drop in liquidity provision in the interbank market.

Finally, we consider the effect of securities losses for borrowing and lending banks simultaneously. In columns 5 and 6, we show that our conclusions are qualitatively and quantitatively invariant when we consider simultaneously the securities losses of borrowing and lending banks.

These results provide micro-foundations for the findings of existing literature showing that the outstanding credit on the balance sheets of banks that are part of business groups is less sensitive to monetary policy (Campello, 2002).

5. Credit Flows Between Domestic and Foreign Subsidiaries of a Banking Group

5.1 Within-Group Lending to Domestic and Foreign Subsidiaries

We ask to what extent the insurance provided by the banking groups differs between subsidiaries. Since we are interested in understanding whether cross-border consolidation through business groups favors an even transmission of monetary policy, we distinguish between domestic and foreign subsidiaries of the banking group. For the within-group lending analysis, we use two different definitions of domestic vs. foreign subsidiaries. First, we define a subsidiary as domestic based on the geo-location of the lending and borrowing banks. The borrowing subsidiary is considered domestic if it is based in the same country as the lending subsidiary, and foreign otherwise. Second, we define a subsidiary as domestic with respect to the headquarters. In this case, a subsidiary is considered domestic if it is based in the same country as its banking group headquarters, and foreign otherwise. As in the earlier tests, we perform subsample analysis to facilitate interpretation.

We first ask whether there is a difference in liquidity support provided to domestic and foreign subsidiaries within a banking group that has experienced securities losses. Table 4 columns 1-3 present the results for borrowing subsidiary losses. On average, subsidiaries of a banking group that experience more significant losses receive more intra-group loans (column

1). Importantly, column 2 shows that only domestic subsidiaries receive more loans from another part of the banking group when they experience considerable securities losses while we do not observe an analogous effect for foreign subsidiaries. This is the case whether we consider foreign subsidiaries located in a different country from the lending subsidiary (column 2) or subsidiaries located in a different country from the group headquarters (column 3).

Columns 4 to 6 consider how subsidiaries of the banking group extend liquidity when they experience securities losses. On average, subsidiaries of a banking group do not extend less credit when they experience securities losses (column 4). However, it appears that subsidiaries based in a different country than the headquarters extend less credit (column 6), suggesting that local liquidity pools and firewalls limit their ability to provide insurance within the banking group.

5.2 Between-Group Lending to Domestic and Foreign Subsidiaries

Importantly, the evidence of segmentation along national borders appears to be specific to banking groups. Table 5 considers intergroup lending and how this depends on the securities losses experienced by borrowing and lending banks. In columns 1 and 2, banks that experience larger securities losses obtain less credit from other banks outside the business group, irrespective of whether they are domestic or foreign. In column 2, the difference in coefficients between $Post_t \times Security\ Losses_b \times Domestic_b$ and $Post_t \times Security\ Losses_b \times Foreign_b$ is not statistically significant.

Columns 3 shows that subsidiaries that experience securities losses lend less. Even though the effect appears to be statistically different from zero only for the foreign subsidiaries of a banking group in column 4, the lack of statistical significance for loans to domestic banks is largely due to lack of power. Overall, there is no evidence that banks outside the group provide liquidity support to other banks experiencing securities losses, whether these are

domestic or foreign. Thus, border effects in the interbank market's exposure to monetary policy appear to emerge within banking groups, which could exasperate the effect of market segmentations.

5.3 Robustness — Other Subsidiary Characteristics

One reason banking groups tend to shield domestic subsidiaries from losses to a greater extent could be that the domestic subsidiaries are larger and more central to the group's business. If this is the case, the border could play a minor role in explaining the segmentations in liquidity provision that we observe within the group.

Columns 1 and 2 of Table 6 indeed show that large subsidiaries tend to receive more credit from other subsidiaries of the group when they experience more extensive losses. However, column 3 shows that only large domestic subsidiaries of banking groups obtain liquidity support. The triple interaction term $Post_t \times Security\ Losses_{b,t} \times Large\ Subsidiary_b$ is negative and significant, indicating that not only large foreign subsidiaries do not benefit from the intra-group liquidity support, but also obtain less liquidity than other foreign subsidiaries.

Thus, large domestic subsidiaries, and domestic subsidiaries in general, benefit from the intra group liquidity provision. This finding resonates with Cetorelli and Golberg (2011) that US banks obtain liquidity from their foreign subsidiary when funding conditions at home deteriorate. However, we also show that foreign subsidiaries subject to shocks do not experience similar benefits. We also observe that foreign subsidiaries experiencing losses tend to provide less intragroup credit.

Table 7 instead highlights the importance of border effects for the functioning of internal capital markets. In column 1, we consider the subsample of foreign subsidiaries. It appears that foreign subsidiaries support other subsidiaries that are not located in the same

country as the headquarters and are more affected by the monetary policy shock, while in column 2, domestic subsidiaries lend to other subsidiaries located in the same country as the headquarters. So puzzlingly, the internal capital markets seem to remain segmented arguably because of local liquidity pools and firewalls arising from the lack of a common deposit insurance.

6. Monetary Transmission to Corporate Lending

This section explores whether banks that are more exposed to the monetary tightening through their security holdings lend less to firms and whether subsidiaries of banking groups that benefit from liquidity provision from ingroup subsidiaries insulate their borrowers from the shock. These tests are important to evaluate to what extent stand-alone banks and domestic and foreign subsidiaries of banking groups transmit the monetary tightening to the corporate sector. They also allow us to evaluate to what extent the decrease in liquidity distribution through the interbank market and within banking groups may depend on differences in banks' lending opportunities.

We estimate the following equation for the outstanding credit issued by bank (subsidiary) *b* belonging to group *g* to firm *f* during month *t*:

$$Loan\ amount_{b,g,f,t} = \alpha + \beta(Post_t \times Security\ Losses_b) + \gamma \mathbf{X_{b,t}} + \delta_{f,t} + \mu_{g,t} + \theta_{b,f} + \epsilon_{b,g,f,t} \quad (4)$$

Following Kwaja and Mian (2008), we include throughout the analysis interactions of firm and time fixed effects ($\delta_{f,t}$) to control for demand shocks. We also control for the strength of the relationship between a bank and a firm including interactions of bank and firm fixed effects ($\theta_{b,f}$). Finally, in some specifications, we include subsidiary level controls ($\mathbf{X_{b,t}}$), namely

share of deposits to total assets, equity to total assets, and the logarithm of total assets, to capture group and subsidiary level financial conditions, and interactions of banking group and time fixed effects ($\mu_{g,t}$), which allow us to compare domestic and foreign subsidiaries of the same banking group.

Table 8 shows that banks that experience larger securities losses because of the monetary tightening lend less to a given firm relative to other banks. The effect is both statistically and economically significant. A one-standard-deviation increase in banks' losses is associated with a 1.5% decline in lending to firms (column 3). This seems to be the case whether the losses are in securities that are market-to-market or at historical cost accounting in columns 4 to 6.

Importantly, the estimated parameter on the variable of interest is similar in columns 2 and 3 when we include interactions of group and time fixed effects. This suggests that subsidiaries of a banking group experiencing losses contract lending, notwithstanding the liquidity they receive from other subsidiaries of the group. However, as we will show in Table 9, the average effect conceals important differences between domestic and foreign subsidiaries of the same banking group,

Table 9, column 1 focuses on banks that are part of banking groups. We horse-race the effect of the subsidiary's own losses and the losses reported by the rest of the banking group and find that both the subsidiary's losses and the rest of the group's losses matter.

The remained of Table 9 explores how securities losses affect lending for different types of banks. In column 2, it appears that one euro of securities losses translates into a larger contraction in lending for standalone banks rather than for subsidiaries of banking groups. In column 3, we focus on standalone banks and domestic subsidiaries to compare banks within the same country. The coefficient estimates in column 3 are consistent with column 2 and

confirm that domestic subsidiaries are partially shielded from securities losses by intra-group loans.

Columns 4 restricts the sample to group banks and considers differences between domestic subsidiaries and foreign subsidiaries, defined as subsidiaries located in a different country from the headquarters. Consistent with the finding that foreign subsidiaries of banking groups do not benefit from liquidity redistribution, they appear to contract credit much more for a euro amount of losses.

7. Conclusions

Bank characteristics affect their exposure to monetary policy shocks and, consequently, the supply of credit, potentially causing asymmetries in the transmission mechanism of monetary policy. Specifically, banks with ex ante more securities holdings experienced larger losses when the ECB tightened the monetary policy stance in July 2022. As a result, these banks experienced reduced access to liquidity through the interbank market and cut lending. Since the proportion of securities in bank assets differs dramatically across banks in the euro area, borrowers and regions were differently affected by the credit crunch, potentially leading to asymmetries in monetary policy transmission.

We show that the internal capital market within banking groups tends to mitigate the adverse effects of securities losses at their subsidiaries, which, consequently, can extend more credit than similarly affected stand-alone banks. However, the insurance is limited to the domestic subsidiaries of banking groups. Foreign subsidiaries do not appear to obtain liquidity from their banking groups if they experience losses and cut credit as much as stand-alone banks.

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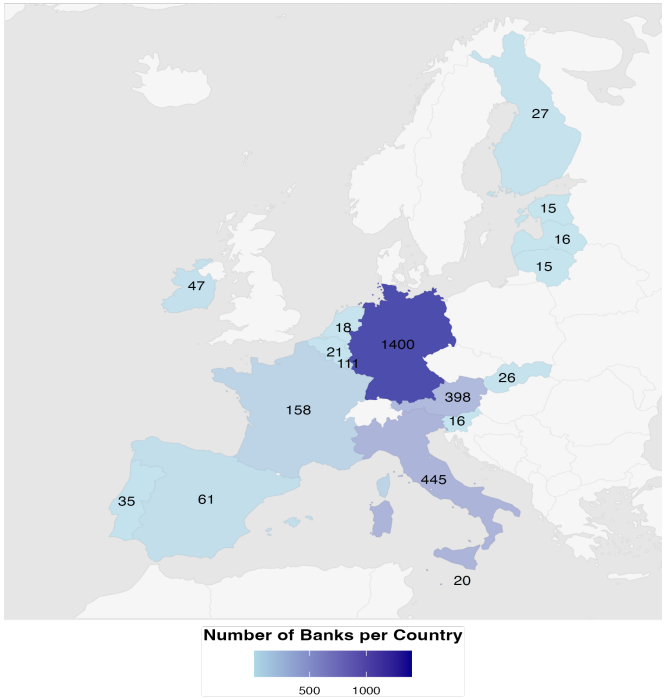
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Figure 1. Distribution of Banks within the Euro Area

The figure plots the country-level distribution of banks and their lending shares across the Euro Area. Panel A shows the number of banks per country. Panel B decomposes the lending shares of standalone banks, domestic and foreign subsidiaries of banking groups in each Euro Area country. A standalone bank refers to a bank that is not part of a larger banking group. A bank (subsidiary) is classified as domestic if it is located in the same country as its banking group's headquarters, and as foreign otherwise.

Panel A: Geographical Distribution of Banks



Panel B: Lending Share of Standalone Banks and Banking Groups

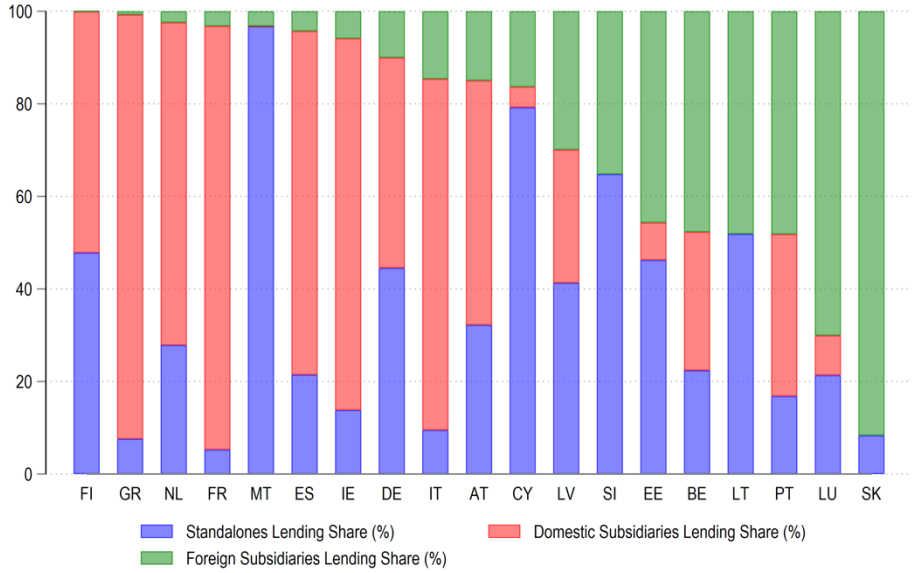
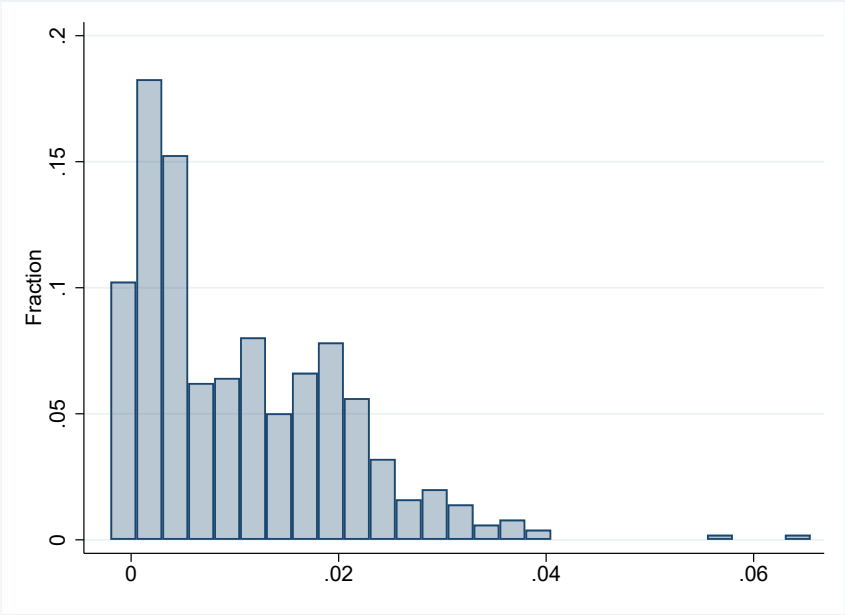


Figure 2. Distribution of Security losses

The figure shows the distribution of security losses as a share of total assets, as described by Equation (1). Panel A presents the distribution of total security losses. Panel B plots the distribution of HTM vs. AFS portfolio losses, respectively.

Panel A: Total Security Losses



Panel B: HTM vs. AFS Security Losses

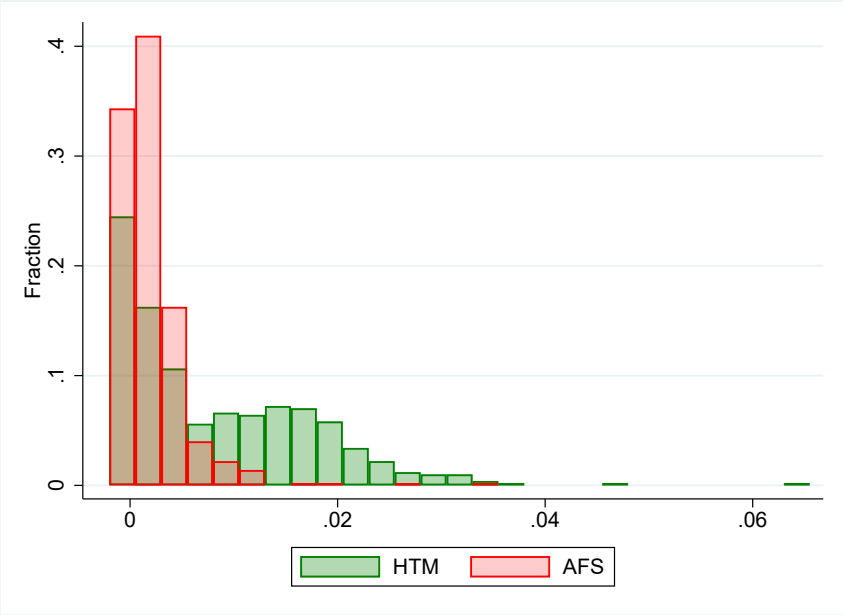
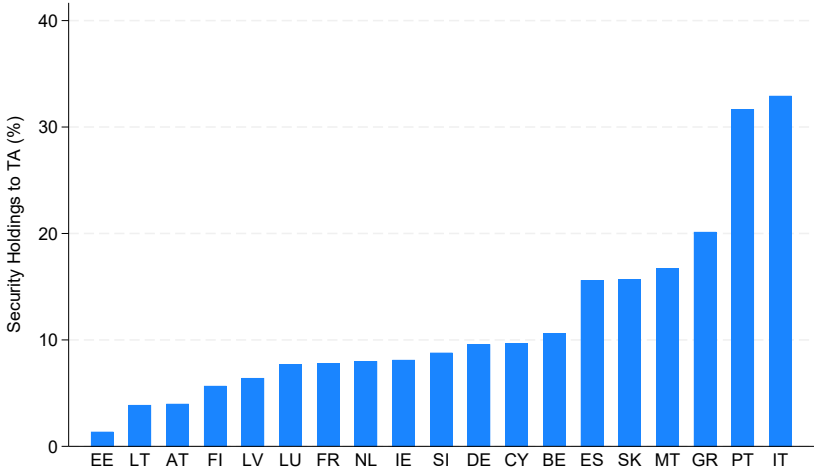


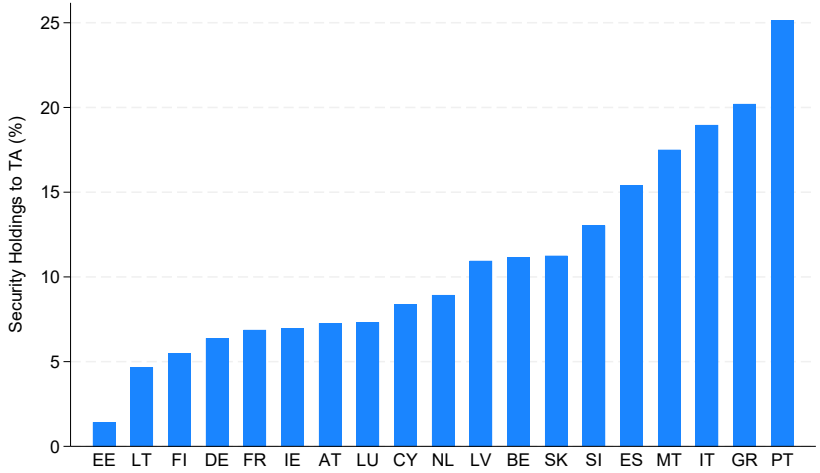
Figure 3: Security Holdings by Country

The figure plots security holdings across Euro Area countries. Panels A and B present the country-level security holdings of all reported securities for a median bank and as a weighted average, respectively. Panels C and D focus on long-term securities with a residual maturity of more than three years, showing the country-level distribution for a median bank and as a weighted average, respectively. All values are reported as a percentage of total assets.

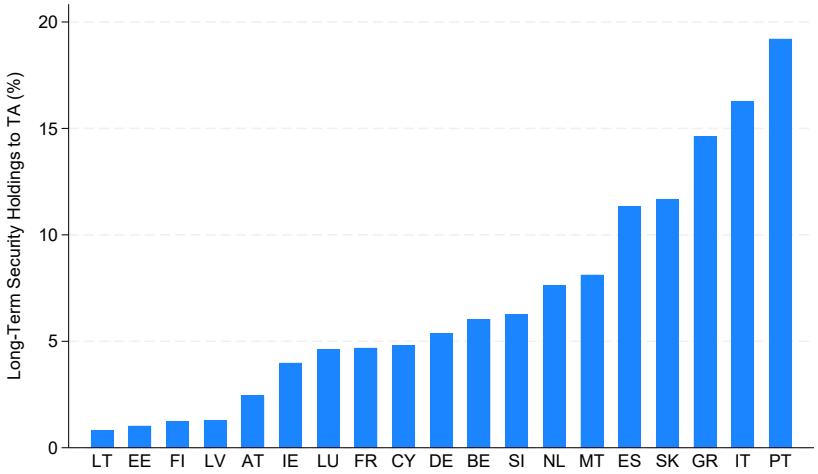
Panel A: All Securities (Median Bank)



Panel B: All Securities (Weighted Average)



Panel C: Long-Term Securities (Median Bank)



Panel D: Long-Term Securities (Weighted Average)

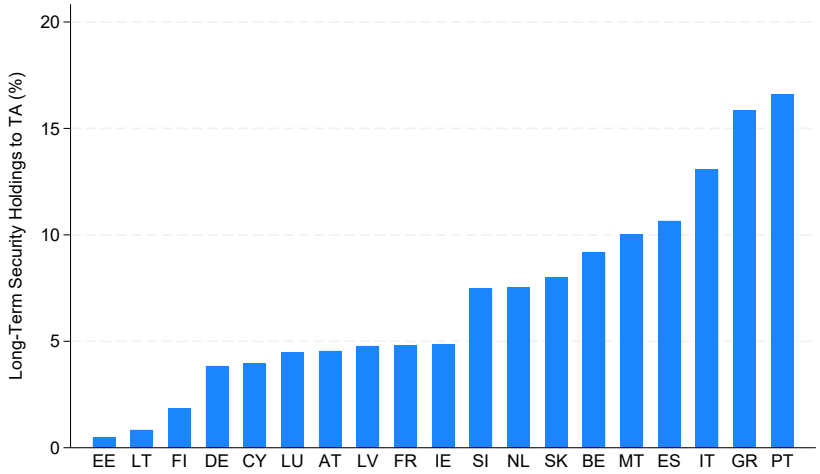
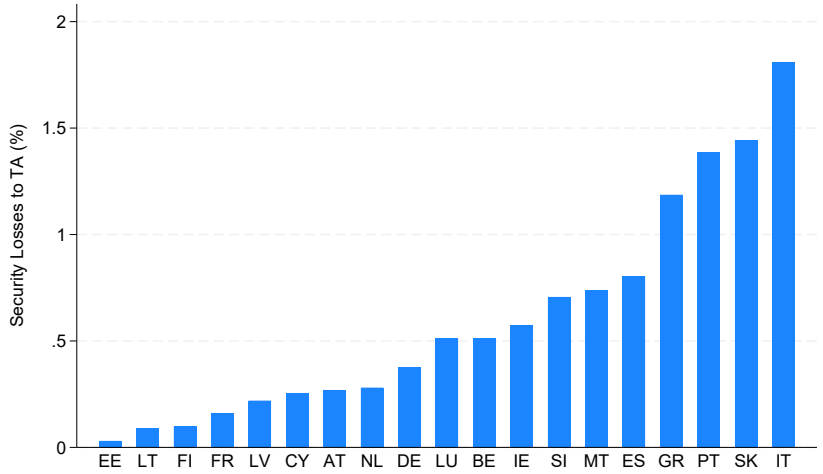


Figure 4: Security Losses by Country

The figure plots security losses across Euro Area countries. Panel A presents the country-level security losses of all reported securities for a median bank. Panel B plots the security losses as a weighted average of banks withing the country. All values are reported as a percentage of total assets.

Panel A: Median Bank



Panel B: Weighted Average

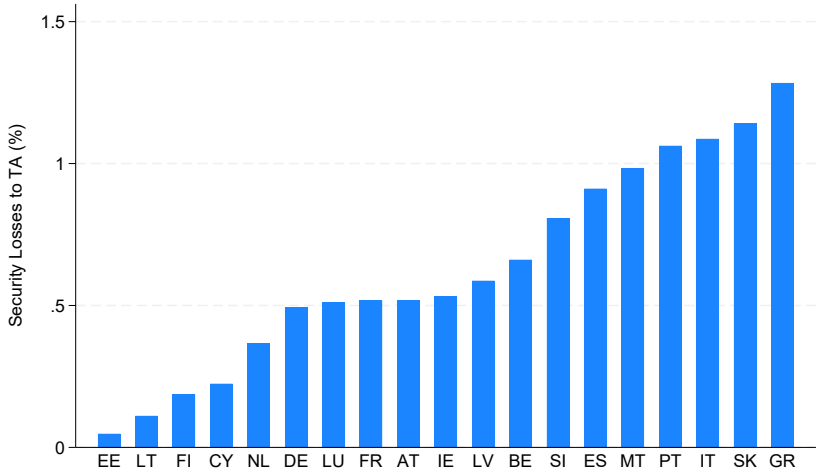


Table 1. Summary Statistics

The table presents summary statistics. Panel A reports summary statistics of stand-alone banks and banking groups in the Euro Area at the country level. Panel B provides descriptive statistics of security holdings and losses at the bank level. Security holdings are as of Q1 2022. Security losses are calculated based on Equation (1), using either total assets or total equity as the denominator. Panel C shows summary statistics for loan-level data.

Panel A: Country-level summary statistics of stand-alone banks and banking groups in the Euro Area

Variable	N	Mean	SD	P10	P50	P90
Number of Banks and Banking Groups per Country						
Total Number of Banks	19	151	328	15	26	445
Number of Standalone Banks	19	96	285	5	10	293
Number of Domestic Subsidiaries	19	34	64	1	6	124
Number of Foreign Subsidiaries	19	20	24	3	9	78
Number of Banking Groups Present in the Country	19	105	294	9	13	314
Composition of Banks per Country (in %)						
Standalone Banks / All Banks	19	43.29	22.97	12.77	44.26	80.00
Domestic Subsidiaries Banks / All Banks	19	25.75	22.02	5.00	21.05	66.67
Foreign Subsidiaries Banks / All Banks	19	30.96	19.54	5.03	27.78	63.83
Composition of Key Balance Sheet Variables per Country (in %)						
Share of NFC Lending by Standalone Banks	19	33.25	25.52	7.58	24.38	79.21
Share of NFC Lending by Domestic Subsidiaries	19	40.83	34.72	0.00	34.99	91.52
Share of NFC Lending by Foreign Subsidiaries	19	25.92	26.43	0.74	14.97	70.07
Share of Total Assets of Standalone Banks	19	30.55	25.08	10.81	18.35	76.23
Share of Total Assets of Domestic Subsidiaries	19	44.24	34.56	0.27	46.06	87.04
Share of Total Assets of Foreign Subsidiaries	19	25.20	25.48	1.15	14.58	70.55
Share of Security Holdings by Standalone Banks	19	30.93	30.14	4.14	18.76	95.88

Share of Security Holdings by Domestic Subsidiaries	19	45.55	35.69	0.00	44.70	93.21
Share of Security Holdings by Foreign Subsidiaries	19	23.52	28.26	0.00	8.30	79.87
Number of Subsidiaries and Key Characteristics per Banking Group						
Number of Subsidiaries	108	6.08	10.96	2	2.5	10
Number of Domestic Subsidiaries	108	3.94	10.08	1	1	5
Number of Foreign Subsidiaries	108	2.14	3.42	0	1	6
Number of Countries Banking Group Operates in	108	2.68	1.98	1	2	6
Share of Group NFC Lending Held Domestically	108	83.29	24.94	49.98	95.35	100.00
Share of Group Total Assets Held Domestically	108	86.25	20.87	64.15	94.67	100.00

Panel B: Bank-level security holdings, security losses and other balance sheet variables

Variable	N	Mean	SD	P10	P50	P90
Security Holdings						
Total Security Holdings (mil EUR)	498	3,164	8,657	38	386	9,592
Security Holdings to Total Assets (in %)	498	18.37	14.45	1.64	14.26	36.96
Security Holdings to Total Equity (in %)	498	216.82	200.86	18.48	183.88	444.18
HTM Securities / Total Security Holdings (in %)	498	64.19	33.26	0.00	71.76	99.98
AFS Securities / Total Security Holdings (in %)	498	35.81	33.26	0.02	28.24	100.00
Security Losses						
Security Losses (% of Total Assets)	498	1.06	0.98	0.04	0.79	2.33
HTM Security Losses (% of Total Assets)	498	0.84	0.90	0.00	0.52	2.02
AFS Security Losses (% of Total Assets)	498	0.21	0.31	0.00	0.11	0.52
Security Losses (% of Total Equity)	498	12.26	12.56	0.51	9.35	26.47
HTM Security Losses (% of Total Equity)	498	9.81	12.24	0.00	6.69	23.05
AFS Security Losses (% of Total Equity)	498	2.45	3.35	0.00	1.27	5.92

Other Balance Sheet Variables						
Total Assets (log)	498	8.48	2.21	5.81	8.02	11.47
Interbank Borrowing (% of Total Assets)	498	13.82	16.05	0.32	13.55	23.73

Panel C: Loan-Level Summary Statistics

Variable	N	Mean	SD	P10	P50	P90
Interbank Lending						
Loan Amount (log)	67,845	16.27	3.48	11.75	16.62	20.39
Security Losses of Borrowing Banks (% of Total Assets)	67,609	0.66	0.62	0.08	0.45	1.59
Security Losses of Lending Banks (% of Total Assets)	67,341	0.65	0.60	0.08	0.45	1.59
Repo Amount (log)	14,820	18.04	2.32	14.92	18.42	21.00
Repo Rates (in %)	14,820	1.03	1.53	-0.35	0.01	3.60
Corporate Lending						
Loan Amount (log)	19,005,930	12.23	1.76	10.31	12.07	14.48
Number of Bank Relationships	19,005,930	3.40	4.25	2	3	6
Security Losses (% of Total Assets)	19,005,930	0.79	0.57	0.08	0.81	1.34

Table 2. Types of Securities Losses and Interbank Market

The table reports the results of the relationship between banks' behavior in the interbank market and security losses. Panel A examines the effect of borrowing banks' losses, as described by Equations (2). Columns 1-4 report the estimates for all instruments, where the dependent variable is the natural logarithm of the outstanding interbank credit amount issued by bank *l* to bank *b* during month *t*. Columns 5-8 focus on repo transaction, with the dependent variables being the log amount of repo credit outstanding in a bilateral relationship and the interest rate on these loans, respectively. Panel B reports the effect of lending banks' losses, as described by Equations (3). In all specifications, the dependent variable is the natural logarithm of the outstanding interbank credit amount issued by bank *l* to bank *b* during month *t*. Security losses are calculated based on Equation (1). OLS regressions are used to estimate the models. Standard errors are two-way clustered at the borrowing bank-time and lending bank-time level. ∗∗∗, ∗∗ and ∗ denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

Panel A. Effects of borrowing banks' losses

	All instruments				Repo			
	Loan amount				Loan amount		Rates	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post_t \times Security\ Losses_b$	-7.505***				-18.84***	-29.65***	0.0846***	0.1373***
	(2.511)				(5.580)	(6.058)	(0.029)	(0.030)
$Post_t \times HTM\ Security\ Losses_b$		-9.288***		-9.262***				
		(2.790)		(2.748)				
$Post_t \times AFS\ Security\ Losses_b$			2.042	0.925				
			(8.321)	(8.248)				
$Post_t \times Security\ Losses_b \times WellCapitalized_b$						47.221***		-0.2338***
						(12.620)		(0.060)
Bank Lender-Bank Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Lender-Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Borrower-Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	67,609	67,609	67,609	67,609	14,820	14,820	14,820	14,820
R^2	0.861	0.861	0.861	0.861	0.749	0.749	0.804	0.804

Panel B. Effects of lending banks' losses

	Loan amount			
	(1)	(2)	(3)	(4)
$Post_t \times Security\ Losses_l$	-6.949***			
	(2.095)			
$Post_t \times HTM\ Security\ Losses_l$		-5.726***		-6.320***
		(2.413)		(2.355)
$Post_t \times AFS\ Security\ Losses_l$			-8.488	-9.960*
			(5.996)	(5.910)
Bank Lender-Bank Borrower FE	Yes	Yes	Yes	Yes
Country Lender-Time FE	Yes	Yes	Yes	Yes
Country Borrower-Time FE	Yes	Yes	Yes	Yes
N	67,314	67,314	67,314	67,314
R^2	0.862	0.862	0.862	0.862

Table 3. Securities Losses and Interbank Market

The table reports the results of the relationship between banks' behavior in the interbank market and security losses for the subsamples of between groups and within group loans, as described by Equations (2) and (3). The dependent variable is the natural logarithm of the outstanding interbank credit amount issued by a lending bank *l* to a borrowing bank *b* during month *t*. Security losses are calculated based on Equation (1). Post is an indicator variable that takes value equal to one starting from August 2022. Standard errors are two-way clustered at the borrowing bank-time and lending bank-time level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Loan amount					
	Borrowing Banks' Losses		*Lending Banks' Losses*		*Borrowing and Lending banks' Losses*	
	Between Banking Groups	Within the Banking Group	Between Banking Groups	Within the Banking Group	Between Banking Groups	Within the Banking Group
	(1)	(2)	(3)	(4)	(5)	(6)
$Post_t \times Security\ Losses_b$	-18.40***	5.496**			-9.528***	0.274
	(4.454)	(2.416)			(3.104)	(2.766)
$Post_t \times Security\ Losses_l$			-9.681***	-0.418	-19.07***	5.793**
			(3.081)	(2.713)	(4.480)	(2.444)
Bank Lender-Bank Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes
Country Lender-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country Borrower-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	47,097	20,468	46,835	20,435	46,721	20,313
R^2	0.817	0.901	0.817	0.902	0.817	0.901

Table 4. Within-Group Lending to Domestic and Foreign Subsidiaries

The table presents the results of the effects of banks' security losses on within-group lending to domestic and foreign subsidiaries, as described by Equations (2) and (3). The dependent variable is the natural logarithm of the outstanding intra-bank credit amount issued by a lending bank *l* to a borrowing bank *b* during month *t*. Security losses are calculated based on Equation (1). Post is an indicator variable that takes value equal to one starting from August 2022. Two different definitions of domestic versus foreign borrowing (lending) subsidiaries are used. Domestic† is based on the location of the lending and borrowing bank: the borrowing subsidiary is classified as domestic if it is located in the same country as the lending subsidiary, and as foreign otherwise. Domestic‡ is based on the subsidiary's location relative to its headquarters: the subsidiary is classified as domestic if it is located in the same country as its banking group's headquarters, and foreign otherwise. Standard errors are two-way clustered at the borrowing bank-time and lending bank-time level. ∗∗∗, ∗∗ and ∗ denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Loan amount					
	Borrowing Subsidiary's Losses			*Lending Subsidiary's Losses*		
Definition of domestic/foreign		Domestic†	Domestic‡		Domestic†	Domestic‡
	(1)	(2)	(3)	(4)	(5)	(6)
$Post_t$ $\times Security\ Losses_b$	9.84*** (2.638)					
$Post_t$ $\times Security\ Losses_b$ $\times Domestic_b$		11.74*** (2.699)	11.21*** (2.709)			
$Post_t$ $\times Security\ Losses_b$ $\times Foreign_b$		4.721 (10.53)	11.06 (10.88)			
$Post_t$ $\times Security\ Losses_l$				-1.280 (3.209)		
$Post_t$ $\times Security\ Losses_l$ $\times Domestic_l$					1.129 (3.300)	3.245 (3.430)
$Post_t$ $\times Security\ Losses_l$ $\times Foreign_l$					-11.07 (9.898)	-41.10*** (12.55)
Bank Lender-Bank Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes
Country Lender-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country Borrower-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	20,468	20,468	20,468	20,435	20,435	20,435
R^2	0.901	0.901	0.901	0.902	0.902	0.902

Table 5. Intergroup Lending to Domestic and Foreign Subsidiaries

The table presents the results of the effects of banks' security losses on between-group lending to domestic and foreign subsidiaries, as described by Equations (2) and (3). The dependent variable is the natural logarithm of the outstanding interbank credit amount issued by a lending bank *l* to a borrowing bank *b* during month *t*. Security losses are calculated based on Equation (1). Post is an indicator variable that takes value equal to one starting from August 2022. Domestic† is based on the location of the lending and borrowing bank: the borrowing subsidiary is classified as domestic if it is located in the same country as the lending subsidiary, and as foreign otherwise. Standard errors are two-way clustered at the borrowing bank-time and lending bank-time level. ∗∗∗, ∗∗ and ∗ denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Loan amount			
	Borrowing Subsidiary's Losses		*Lending Subsidiary's Losses*	
Definition of domestic/foreign		Domestic†		Domestic†
	(1)	(2)	(3)	(4)
$Post_t \times Security\ Losses_b$	-16.88***			
	(4.958)			
$Post_t \times Security\ Losses_b \times Domestic_b$		-18.17***		
		(5.660)		
$Post_t \times Security\ Losses_b \times Foreign_b$		-13.18*		
		(7.053)		
$Post_t \times Security\ Losses_l$			-6.633*	
			(3.719)	
$Post_t \times Security\ Losses_l \times Domestic_l$				-2.349
				(4.232)
$Post_t \times Security\ Losses_l \times Foreign_l$				-10.95*
				(6.193)
Bank Lender-Bank Borrower FE	Yes	Yes	Yes	Yes
Country Lender-Time FE	Yes	Yes	Yes	Yes
Country Borrower-Time FE	Yes	Yes	Yes	Yes
N	47,097	47,097	46,835	46,835
R^2	0.817	0.817	0.817	0.817

Table 6. Large Subsidiaries and Intra-Group Domestic and Foreign Lending

The table presents the results of the effects of banks' security losses on intra-group lending to domestic and foreign subsidiaries, differentiated by subsidiary size. The dependent variable is the natural logarithm of the outstanding interbank credit amount issued by a lending bank *l* to a borrowing bank *b* during month *t*. Security losses are calculated based on Equation (1). Post is an indicator variable that takes value equal to one starting from August 2022. In Column 1, subsidiary size is proxied by the log of total assets. Columns 2 and 3 use the Large Subsidiary dummy variable, which takes the value of one if the subsidiary's total assets rank above the median of total assets within its banking group, and zero otherwise. Domestic is an indicator variable that takes the value of one if the subsidiary is located in the same country as its banking group's headquarters, and zero otherwise. Standard errors are two-way clustered at the borrowing bank-time and lending bank-time level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Loan amount		
Large subsidiary proxy	Log(Total Assets)	Large Subsidiary Dummy	
	(1)	(2)	(3)
$Post_t \times Security\ Losses_b$	-23.36	-1.455	18.38
	(16.90)	(3.536)	(12.40)
$Post_t \times Large\ Subsidiary_b$	-0.0318	-0.129	0.0619
	(0.0303)	(0.0926)	(0.142)
$Post_t \times Security\ Losses_b \times Large\ Subsidiary_b$	4.327*	20.20***	-40.59*
	(2.295)	(6.395)	(22.49)
$Post_t \times Domestic_b$			-0.438**
			(0.171)
$Post_t \times Security\ Losses_b \times Domestic_b$			-19.66
			(13.14)
$Post_t \times Large\ Subsidiary_b \times Domestic_b$			-0.210
			(0.180)
$Post_t \times Security\ Losses_b \times Large\ Subsidiary_b \times Domestic_b$			63.17***
			(23.45)
Bank Lender-Bank Borrower FE	Yes	Yes	Yes
Country lender-Time FE	Yes	Yes	Yes
Country borrower-Time FE	Yes	Yes	Yes
N	20,468	20,415	20,468
R^2	0.901	0.900	0.901

Table 7. Intra-Group Lending of Domestic and Foreign Subsidiaries

The table presents the results of the effects of banks' security losses on intra-group lending for the subsamples of foreign and domestic subsidiaries. The dependent variable is the natural logarithm of the outstanding interbank credit amount issued by a lending bank *l* to a borrowing bank *b* during month *t*. Security losses are calculated based on Equation (1) and represent the securities losses of the borrowing subsidiaries. Post is an indicator variable that takes value equal to one starting from August 2022. The subsidiary is classified as domestic if it is located in the same country as its banking group's headquarters, and foreign otherwise. Standard errors are two-way clustered at the borrowing bank-time and lending bank-time level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Loan amount	
Subsamples	Lending only by foreign subsidiaries	Lending only by domestic subsidiaries
	(1)	(2)
$Post_t \times Security\ Losses_b$	92.50**	7.214
$\times Foreign_b$	(36.69)	(12.89)
$Post_t \times Security\ Losses_b$	-4.609	10.31***
$\times Domestic_b$	(29.50)	(2.693)
Bank Lender-Bank Borrower FE	Yes	Yes
Country Lender-Time FE	Yes	Yes
Country Borrower-Time FE	Yes	Yes
N	1,703	18,717
R^2	0.880	0.906

Table 8. Security Losses and Bank Lending to Firms

The table presents the results of the effects of banks' security losses on bank lending to firms, as described by Equation (4). The dependent variable is the natural logarithm of the outstanding credit issued by a bank (subsidiary) *b* to a firm *f* during month *t*. Security losses are calculated based on Equation (1). Post is an indicator variable that takes value equal to one starting from August 2022. Standard errors are two-way clustered at the bank and time level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Loan Amount					
	(1)	(2)	(3)	(4)	(5)	(6)
$Post_t \times Security\ Losses_b$	-1.494***	-1.476***	-1.545***			
	(0.392)	(0.384)	(0.221)			
$Post_t \times HTM\ Security\ Losses_b$				-1.491***		-1.470***
				(0.225)		(0.225)
$Post_t \times AFS\ Security\ Losses_b$					-3.591***	-3.331***
					(0.874)	(0.851)
Bank Controls	No	Yes	Yes	Yes	Yes	Yes
Bank-Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Banking Group-Time FE	No	No	Yes	Yes	Yes	Yes
N	19,005,930	19,005,924	19,005,919	19,005,919	19,005,919	19,005,919
R^2	0.965	0.965	0.965	0.965	0.965	0.965

Table 9. Security Losses, Banking Group Structure and Lending

The table presents the results of the effects of banks' security losses on bank lending to firms, by differentiating different types of banks. The dependent variable is the natural logarithm of the outstanding credit issued by a bank (subsidiary) *b* to a firm *f* during month *t*. Security losses are calculated based on Equation (1). Post is an indicator variable that takes value equal to one starting from August 2022. Columns 1 compares the effect of the subsidiary's own losses and the losses reported by the rest of the banking group. Column 2 contrasts the lending behavior of standalone banks with subsidiaries of the banking groups. Column 3 repeats the analysis from Column 2 but restricts the sample to standalone banks and domestic subsidiaries within the same country. Column 4 restricts the sample to banking group subsidiaries and examines differences between domestic and foreign subsidiaries. A subsidiary is classified as domestic if it is located in the same country as its banking group's headquarters, and as foreign otherwise. Standard errors are two-way clustered at the bank and time level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

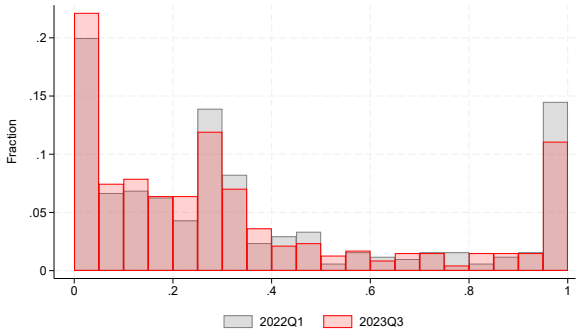
	Loan Amount			
	All Banks	All Banks	Domestic Banks	Banking Groups
	(1)	(3)	(4)	(5)
$Post_t \times Security\ Losses_b$	-3.918***			
	(0.823)			
$Post_t \times Security\ Losses_{g-b}$	-2.521***			
	(0.867)			
$Post_t \times Security\ Losses_b$		-4.839***	-5.195***	
$\times\ Standalone\ Bank_b$		(0.756)	(0.766)	
$Post_t \times Security\ Losses_b$		-0.849**	-1.987***	
$\times\ Subsidiary_b$		(0.405)	(0.403)	
$Post_t \times Security\ Losses_b$				-1.379***
$\times\ Domestic\ Subsidiary_b$				(0.225)
$Post_t \times Security\ Losses_b$				-7.584***
$\times\ Foreign\ Subsidiary_b$				(1.115)
Bank controls	No	No	No	No
Bank-Firm FE	Yes	Yes	Yes	Yes
Firm-Time FE	Yes	Yes	Yes	Yes
Banking Group-Time FE	Yes	No	No	Yes
N	12,525,088	19,005,930	16,106,474	12,525,088
R^2	0.969	0.965	0.965	0.969

Internet Appendix

Figure IA.1: Importance of AFS Portfolio over Time

The figure examines changes in the importance of the AFS (Available for Sale) portfolio. Panel A plots the distribution of the share of all securities held in the AFS portfolio as a percentage of total security holdings in 2022 Q1 versus 2023 Q3. Panel B uses observations at the bank-ISIN level and focuses on the subset of securities that a specific bank *b* has reported in both AFS and HTM portfolios in different periods. It plots the share of securities from this restricted sample that are reported as part of the AFS portfolio in 2022 Q1 versus 2023 Q3.

Panel A: Share of Securities in AFS Portfolio



Panel B: Reclassification

