Short economic and financial analyses

Do unrealised bank losses affect loan pricing?

Author: Matjaž Volk

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Author: Matjaž Volk, Banka Slovenije, email address: matjaz.volk@bsi.si

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As central banks tighten their monetary policies, long-term assets may experience significant drops in their market values. While holding securities until maturity shields banks from direct capital losses resulting from increasing rates, the risk of materialisation of unrealised losses from HTM portfolio may affect bank loan supply decisions. I find that banks with 1 pp higher share of unrealised losses in their risk-weighted assets charge on average 8 bps higher lending rates to corporates in Slovenia. These unrealised losses have a lower impact compared to actual changes in capital, for which the literature establishes an impact of around 10–25 bps.

1 Introduction

The collapse of Silicon Valley Bank has brought attention to how banks' investment portfolios make them vulnerable to interest rate risk.

Silicon Valley Bank's (SVB) collapse on 10 March 2023 has brought attention to banks' susceptibility to interest rate risk stemming from their investment portfolios. Typically, banks hold assets with long-term maturity, whereas they primarily fund their assets through short-term liabilities. This maturity mismatch can result in losses when interest rates begin to increase. As central banks tighten their monetary policies, long-term assets may experience significant drops in their market values. However, if banks can retain these assets on their balance sheets until maturity, this should not result in any issues for banks.

Raising interest rates may incentivise banks to resort to HTM accounting.

The ECB raised its key policy rates by 3.5 percentage points from July 2022 to March 2023 in response to inflation in the euro area. This led to banks experiencing realised or unrealised losses on their investment portfolios, particularly for financial assets available for sale (AFS), which directly impact bank capital through other comprehensive income. While securities held to maturity (HTM) are also affected by increasing rates, the losses are unrealised as they are valued at amortised costs. Banks may be incentivised to switch to HTM accounting to avoid realising losses, but they must declare their intention and ability to hold securities until maturity to do so.

This paper analyses the impact of unrealised bank losses on loan supply, which is largely unexplored in the literature.

Several papers emerged after the collapse of the SVB, studying the association between unrealised losses and deposit withdrawal (Dursun-de Neef et al., 2023, and Jiang, 2023) and incentives for reclassifications from AFS to HTM portfolio by banks (Granja, 2023). This paper instead analysis the impact of unrealised losses on bank lending rates. While the relation between actual bank losses or changes in capital requirements and loan supply is well established in the literature (see for instance Gropp et al., 2019, and Sivec and Volk, 2021), the impact of unrealised losses is largely unexplored.

The results show that banks with higher unrealised losses charge higher rates.

I find that banks with 1 pp higher share of unrealised losses in their risk-weighted assets charge on average 8 bps higher lending rate to corporates in Slovenia. The rationale for this follows from the risk of loss materialisation, which would erode capital. As these are unrealised losses, the impact is lower compared to actual changes in capital, for which the impact is around 10–25 bps (Dagher et al., 2016).

2 AFS vs. HTM accounting and unrealised losses

Banks have to classify their securities either as AFS or as HTM.

With the introduction of IFRS9 in 2018, banks classify financial assets into two categories: financial assets measured at amortised cost and financial assets measured at fair value (either through P&L or other comprehensive income).[1] For simplicity, I use IAS 39 references for the two categories, which are securities held to maturity (HTM) and available for sale (AFS). In order to use HTM accounting, banks must declare their intention and ability to hold securities until maturity, thus avoiding the need to close positions at a substantial accounting loss. Otherwise, banks must resort to AFS accounting, which requires them to mark securities on their balance sheets at current market prices and recognise any unrealised losses on those securities in their statements of comprehensive income.

HTM accounting shields banks from losses resulting from increasing rates

The monetary policy tightening cycle that started at the beginning of 2022 and intensified after July 2022, when the ECB started raising policy rates, had a significant impact on the prices of securities with long maturities. If banks did not use the HTM ac-

[1] IFRS 9 Financial instruments.

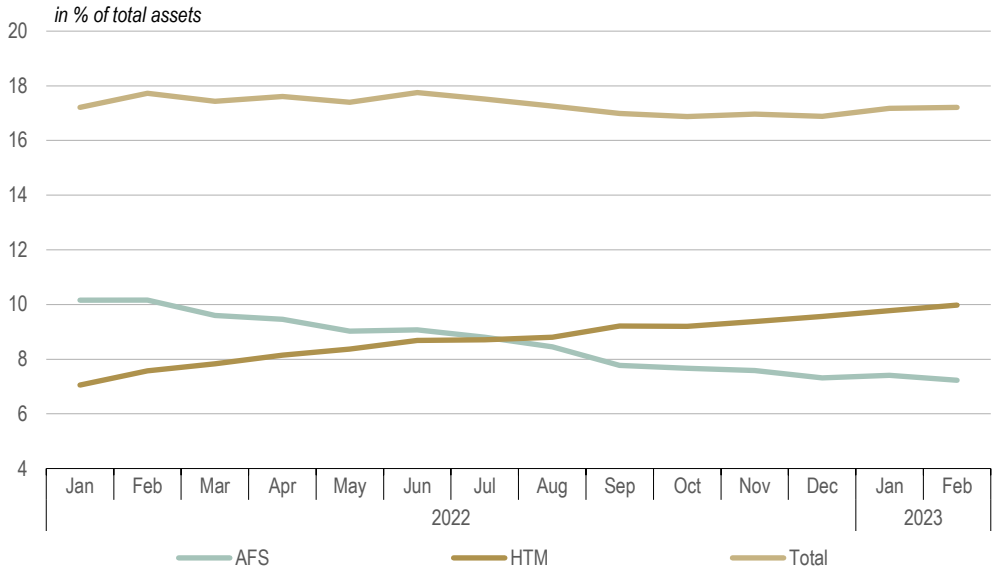
counting approach to value these securities, they would have to recognise losses that would be directly reflected in their capital through other comprehensive income.

In line with the above incentive for banks to use the HTM accounting in the current environment, Figure 1 shows that Slovenian banks were swapping AFS holdings for HTM ones over the last year. Whereas in January 2022, AFS and HTM holdings represented 10% and 7% of banking system total assets respectively, the relation reversed by February 2023, while total financial assets remained constant. The change in the relation in favour of HTM holdings is not due to reclassification from AFS to HTM,[2] but rather reflects the replacement of maturing AFS financial assets with HTM securities.

The banking system's unrealised losses from HTM holdings is equal to 8% of capital, with wide variation across banks.

Raising interest rates resulted in 8% lower market value of HTM securities with respect to the book value measured in February 2023. This amount of unrealised losses represents 8% of the banking system's capital and 1.2% of risk-weighted assets (RWA), which implies that banking system capital adequacy would be lower by 1.2 pp in the event of realisation of these losses. With close to 19% total capital adequacy ratio in December 2022,[3] this amount of potential losses does not seem problematic for the Slovenian banking system as a whole, but it could be more challenging for some banks, as unrealised losses reach up to 22% of bank capital (Figure 2).

Figure 1: **AFS and HTM holdings by Slovenian banks**

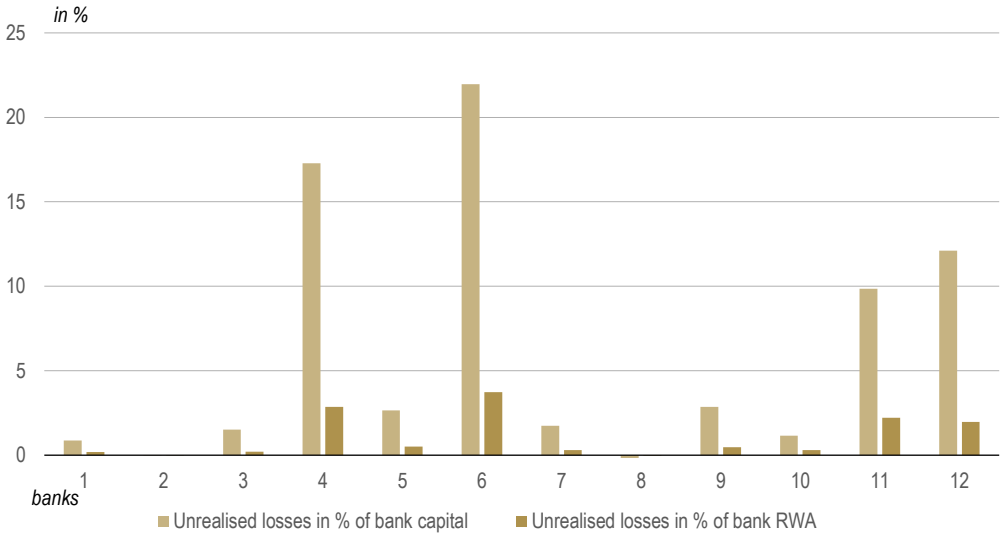


Note: The figure shows the decomposition of securities / financial assets held by banks to AFS and HTM holdings.
Source: Banka Slovenije, own calculations.

[2] Banks approached the regulator with the request to recalssify certain assets from AFS to HTM, but their request was denied.

[3] See Monthly report on bank performance, March 2023.

Figure 2: **Unrealised losses from HTM securities**



Note: The figure shows bank level unrealised losses from HTM debt securities expressed in % of RWA and bank capital.
Source: Banka Slovenije, own calculations.

HTM devaluations could affect bank behaviour.

The unrealised losses from HTM securities do not affect banks' P&L and capital, as long as a bank holds assets until maturity. However, banks could find themselves in a situation where they would need liquidity, which would force them to sell the HTM securities at a loss. An example of this would be a large outflow of deposits. Although the probability of such an event is rather low, the risk always exists, and it could impact banks behaviour, for instance their loan supply decisions. In the following section, I test if unrealised losses affect banks' loan pricing policy.

3 The impact of unrealised losses on bank lending rate

Impact on loan pricing is estimated in a diff-in-diff setup using detailed loan level data covering the period before and during rate hikes.

This section presents the estimates of the impact of unrealised losses on bank loan pricing in Slovenia. I use loan level data and model lending rate for new loans given by bank *b* to firm *f* in time *t* (LR_{fbt}), with the following model specification:

$$LR_{fbt} = \beta \times (t \geq July\ 2022) \times HTMloss_b + \theta Controls_{fbt} + D_{ILST} + D_b + \varepsilon_{fbt}$$

where *HTMloss* are unrealised losses in bank b, measured in February 2023,[4] and expressed either as a share in bank capital or as share in RWA – as presented in

[4] I tested different cut-off dates for accounting losses (from November 2022 to February 2023) and the results are always very similar to the ones presented in the paper. All estimates are available upon request.

Figure 2. The regression controls also for other bank characteristics that might be relevant for explaining bank loan pricing. In particular, the set of controls ($Controls_{fbt}$) includes the following variables: capital adequacy ratio, NPL ratio, ROA, funding costs, log of total assets and annual credit growth at the bank level. All the variables are measured one month before the initial policy rate hike, i.e. in June 2022. In addition, I also control for loan-specific characteristics such as loan maturity, credit rating, collateral and interest rate fixation.

I apply the methodology by Degryse et al. (2019), where the demand side is controlled for with industry-location-size-time fixed effects (D_{lLST}). Further, I include bank fixed effects (D_b) that absorb other time-invariant bank characteristics.

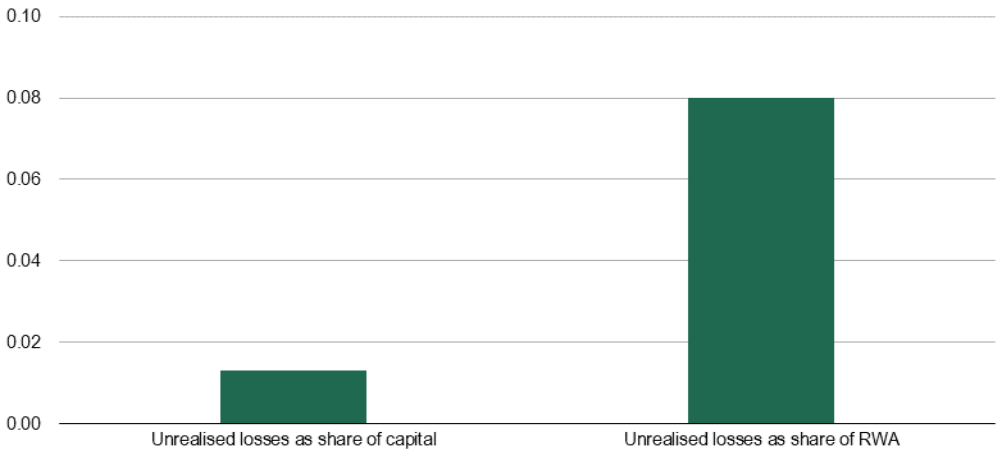
The estimation period consists of data before policy rate hikes and afterwards. In particular, I estimate the above regression for the period from January 2022 to February 2023. Within this, the main interest lies in the period when the ECB key policy rate was increasing, i.e. from July 2022 on. Therefore, the coefficient beta tells the impact of unrealised losses during the period of increasing rates.

The loan level data used for the above estimates are obtained from a reach credit registry database, maintained by the Banka Slovenije, that covers all corporate exposures. The estimates used data at a monthly frequency, resulting in about 61,000 observations over the course of 14 months from January 2022 to February 2023.

Banks with higher unrealised losses charge on average higher lending rates.

The results presented in Figure 3 show that banks with 1 pp higher unrealised losses in their capital charge on average a 1.3 bps higher rate to corporates. For an average bank with 6% share of unrealised losses in its capital, the lending rate during the period of raising policy rates is higher by about 8 bps. A similar conclusion follows for the elasticity of unrealised losses measured as share of RWA, which equals 8 bps, and for an average bank the amount of unrealised losses in percent of RWA is 1%. Both effects are highly significant (t-statistic > 13).

Figure 3: **The impact of unrealised losses on bank lending rate**



Note: The figure shows the impact of unrealised losses from HTM holdings, expressed either as share of bank capital or RWA, on lending rate to corporates in Slovenia after the start of policy rate hiking in July 2022. Estimation period: Jan 2022 - Feb 2023. Impact in pp.
Source: Banka Slovenije, own estimates.

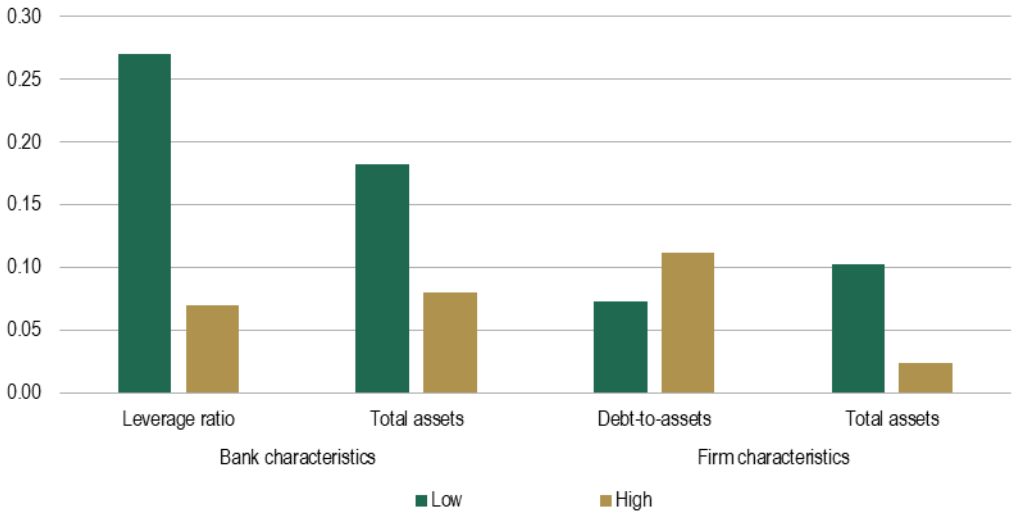
The rationale for the above result follows from the risk of materialisation of the losses, which would erode bank capital. The relation between changes in bank capital and lending rate is well established in the literature (see Dagher et al., 2016), which finds on average 10–25 bps higher lending rate in banks with 1 pp higher capital requirements (or an equivalent decrease in capital). As these are realised changes in capital, as expected they have a higher impact on loan pricing compared to my estimate of 8 bps higher lending rate in bank with 1 pp higher share of unrealised losses in RWA.

The impact of unrealised losses on lending rate is greater in smaller and lower-capitalised banks and for smaller and more indebted firms.

Next, I explore the heterogeneity of the impact of unrealised losses on lending rates across bank and firm characteristics. In particular, the two characteristics explored in this study are bank/firm size, measured with total assets, and bank/firm indebtedness, which is measured with leverage ratio for banks and with debt-to-asset ratio for firms. For each characteristic, I split banks/firms into two clusters: those above the median value of the variable of interest and those below it. I then interact these dummy variables with the key variable of interest – HTM losses as share of RWA – to obtain the heterogeneous impacts.

Heterogeneous impacts are presented in Figure 4.[5] It shows that banks with below median level of capitalisation show higher response of lending rate to an increase in unrealised losses. In particular, banks in the low capitalisation cluster increase lending rates by over 25 bps for every percentage point increase in unrealised losses, as opposed to a 7 bps impact for banks with high capitalisation. This is expected, as banks with less capital have a lower cushion above capital requirements or above their internal targets. I also find higher responsiveness in smaller banks, which could have more troubles in obtaining additional liquidity or equity in the event of loss mate-

Figure 4: **The heterogeneity of the impact of unrealised losses on lending rate**



Note: The figure shows the heterogeneity of the impact of unrealised losses, expressed as share of RWA, on lending rate to corporates in Slovenia after the start of policy rate hiking in July 2022. The heterogeneity is across bank and firm characteristics, where banks/firms are split to Low/High cluster if the value of the variable of interest (like leverage ratio) lies below/above the median. Estimation period: Jan 2022 - Feb 2023. Impact in pp.
Source: Banka Slovenije, own estimates.

[5] All the presented coefficients and the differences between the Low and High clusters are statistically significant.

rialisation.

Looking at heterogeneity across firms, I find that in response to unrealised losses, banks increased rates by more for more indebted and smaller firms. As both measures are proxies for firm riskiness, this result implies that banks transmitted this impact more to riskier firms. This allocation is desired, as healthier firms, which are likely to be more productive in the longer run, are less affected by the HTM losses.

4 Conclusion

The recent collapse of Silicon Valley Bank has drawn attention to the susceptibility of banks to interest rate risk arising from their investment portfolios. The ECB's 3.5 pp increase in key policy rates from July 2022 to March 2023 led to realised or unrealised losses on investment portfolios, particularly for assets available for sale, which can directly impact bank capital. Banks may switch to holding securities until maturity to avoid realising losses, but they must declare their intention and ability to do so. I find that banks with higher unrealised losses in their risk-weighted assets charge higher lending rates to corporates in Slovenia, reflecting the risk of loss materialisation and potential capital erosion. This contributes to faster transmission of tightening monetary policy to bank lending rates, which was so far very limited through the deposit channel (see Volk, 2023).

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