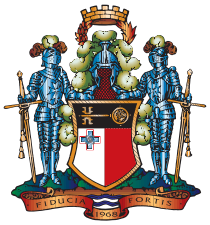

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MONITORING FINANCIAL STABILITY RISKS: A HEATMAP APPROACH

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BOX 1: MONITORING FINANCIAL STABILITY RISKS: A HEATMAP APPROACH[1]

Introduction

Effective monitoring of financial stability depends on the timely identification of emerging risks and vulnerabilities that could undermine the resilience of the financial system. By aggregating information across a broad set of indicators, including macroeconomic conditions, financial market developments, credit dynamics and confidence measures, the financial stability heatmap facilitates the identification of areas where vulnerabilities may be gradually accumulating. Within the broader financial stability surveillance framework, the heatmap provides a concise system-wide perspective that complements the more in-depth sectoral analyses presented elsewhere in the *Financial Stability Report*.

From a financial stability perspective, this approach strengthens risk monitoring by enabling policymakers to track changes in the risk environment over time and across sectors. It supports the identification of emerging vulnerabilities, helping to prioritise areas for further analysis and inform discussions on appropriate macroprudential responses. This boxed article begins by describing the methodology underpinning the heatmap, then presents the results and associated insights, and concludes with a summary of key findings.

Methodology

The heatmap monitors potential risks and vulnerabilities across seven broad categories. Of these, three capture developments in the financial sector, while the remaining indicators cover macroeconomic conditions and developments in the real economy relevant for financial stability assessment.

For the financial sector, the framework evaluates key indicators for the core domestic banks, domestically relevant insurance companies, and domestically relevant investment funds. It focuses on metrics related to solvency, profitability and liquidity alongside business model-specific indicators, as derived from the respective internal dashboards (see Table 1a). Given that most of the categories comprise multiple indicators, variables were standardised using z-scores to ensure comparability. These standardised indicators are then aggregated within each category using equal weighting. The aggregated standardised indicators for each category are weighted according to the relative size of the respective financial institutions, ensuring that larger entities have a proportionate influence on the final assessment. Where necessary, indicators are transformed so that higher values consistently correspond to higher levels of risk, thereby ensuring a coherent and intuitive interpretation across indicators and categories.[2]

The domestic and external macroeconomic environment also serves as a backdrop through which potential risks may transmit to the financial sector. Accordingly, the framework incorporates indicators capturing the economic sentiment and systemic stress for both Malta and the euro area, alongside other headline macroeconomic variables such as GDP growth, inflation, government debt levels and the current account balance.[3] In addition, the heatmap considers vulnerabilities arising from domestic non-financial corporates (NFC) and households, including indicators related

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[1] Authored by Mr Christian Mamo, Principal Economist within the Financial Stability Surveillance and Risk Assessment Department. The author would like to thank Mr Stefan Scerri, Ms Luana Camilleri, and Mr Luke Camilleri for their work on the risk dashboards, as well as Mr Andrew Spiteri, Ms Wendy Zammit, Mr Alan Cassar, Deputy Governors Oliver Bonello and Rita Schembri, and Governor Alexander Demarco for their valuable suggestions.

[2] These include indicators such as Tier 1 capital, LCR and ROA.

[3] For the ESI, the current account-to-GDP ratio and the GDP growth rate, scores are inverted, such that higher values correspond to lower levels of risk. GDP growth and the inflation rate refer to annual growth rates. GDP growth is in real terms. The current account as a share of GDP is calculated as a four-quarter moving average.

Table 1a
SUMMARY OF RISKS

Risk Category	Core Domestic Banks	Domestically relevant Insurance companies	Domestically relevant Investment funds
Solvency	Tier 1 capital buffers	SCR coverage ratio	Leverage ratio
	Leverage ratio	Quality of own funds	
	Total risk exposures as a share of overall risk exposure	MCR coverage ratio	
		Gross technical reserves / gross premium written	
Credit	NPL ratio	Weighted external credit rating for bond holdings	Weighted external credit rating for security holdings
	Coverage ratio	Weighted external credit rating for equity holdings	
	Forbearance ratio	Exposure to non-traditional investments	
	Share of low & unrated securities		
Profitability	ROA	ROA	ROA
	Cost-to-income	Expense ratio (Life)	Net profit margin
		Combined ratio (Non-life)	
Liquidity	LCR	Liquid assets ratio	Liquid assets ratio
	Customer loans to deposits ratio		Price spread on bonds
	Asset encumberance ratio		Redemption coverage ratio
Operational	Operational risk exposure to total risk exposures		
Concentration	Net large exposures		
	Top three sectoral loans over total assets		
Market	Trading financial assets to total assets	Modified duration	Modified duration
		Corporate bonds volatility indicator	Securities volatility indicator
		Sovereign bonds volatility indicator	
		Equity volatility indicator	
Underwriting		Premia growth	
		Claims growth	
		Reinsurance part of premium	

to indebtedness, leverage and credit gaps.[4,5] Monitoring these sectors is important as financial distress in these sectors can lead to higher defaults, tighter credit conditions, and spillovers to the banking system and the wider economy.

[4] William Gatt (2024), A semi-structural credit gap for Malta: A multivariate filter approach, Central Bank of Malta *Working Paper* 04/2024.
[5] The classification of the CSRI, together with the household and corporate credit gaps, is derived from their position within the quintile distribution of historical observations, rather than from indicator-specific risk thresholds.

The heatmap is based on quarterly data, with most indicators available from December 2015 onwards.[6] Indicators are assessed relative to their historical distributions, allowing for the identification of deviations from past patterns and help distinguish between normal cyclical fluctuations and developments that may signal the accumulation of vulnerabilities. To operationalise this approach, observations are classified into quintiles of each indicator's historical distribution. Values falling within the lowest quintile (bottom 20%) are considered significantly below their historical range and are denoted in dark green, while those in the highest quintile (top 20%) reflect relatively elevated positions within the historical distribution, and denoted in red (see Table 1b). Importantly, these classifications are distribution-based and relative in nature. As such, higher quintiles may point to a build-up of risks or increased vulnerabilities, but do not necessarily imply elevated risk in absolute terms. In some cases, an indicator may lie in the upper part of its historical distribution while remaining within levels that are not, per se, associated with material financial stability concerns.

Table 1b
HEATMAP CLASSIFICATION BASED ON QUINTILES OF HISTORICAL DISTRIBUTION

Historical distribution percentile	Colour scale
0 - 20%	
20 - 40%	
40 - 60%	
60 - 80%	
80 - 100%	

Overall, this framework facilitates a consistent interpretation of developments over time and supports crosssectoral comparison of risk signals.

Interpretation of results

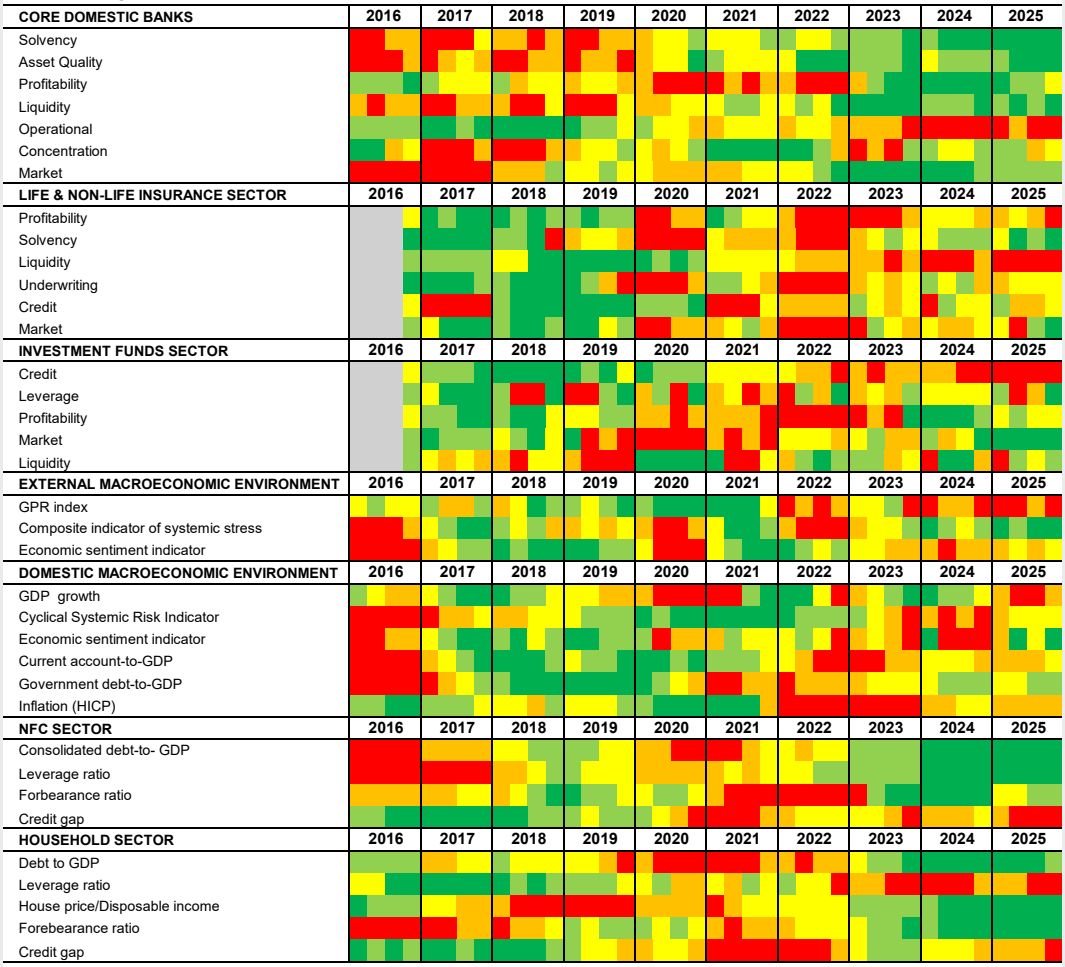
Core domestic banks

The heatmap indicates a broad-based improvement in the profile of the core domestic banks over time, with most categories falling within the lower two quintiles by the end of 2023 and remaining at those levels thereafter (see Table 1c). This improvement is partly attributable to a combination of strengthened regulatory frameworks, proactive de-risking strategies by the banks themselves, and ongoing supervisory-driven reforms. The positive developments are particularly evident in asset quality, with indicators having shown sustained improvement. Notably, the NPL ratio declined to a historical low of 1.8% by end-2025, reflecting the continued resilience of both the household and corporate sectors, as well as the underlying strength of the domestic economy. Banks have maintained strong solvency positions, supported by ample capital buffers. The main exception is operational risk, remaining in the higher quintiles since 2023. This reflects a relative increase in operational risk exposures, with their share of total risk exposures rising to 9.9% as at December 2025 from around 8.8% in 2021. Notwithstanding this increase, operational risk exposures remained lower than the EU average, where the corresponding share stood at 13.4%.[7]

Profitability shows a slight deterioration, to move in the third quintile as at end 2025. This reflects in large part the shift towards a more neutral monetary policy stance, as declining interest rates have weighed on banks' NII. In addition, some banks registered higher operational costs, partly driven by one-off factors. Notwithstanding, the ROA of core domestic banks is still slightly higher than the euro area average. Concentration risk indicators rose, reflecting a more concentrated loan portfolio, as otherwise the share of net large exposures to total capital declined. Overall, the

[6] Insurance and investment funds data is available from December 2016.
[7] EBA risk dashboard 2025Q4.

Table 1c
FINANCIAL STABILITY HEATMAP



Sources: GPR, STOXX 50 Volatility, CISS, ESI, GDP, Current account, Government debt, Inflation rate (HICP), Consolidated debt, NFC leverage, HH leverage, NFC and HH credit gaps, House price to disposable income.

heatmap suggests that banking sector vulnerabilities have generally improved over recent years and remained contained, with no evidence of a broad-based or persistent deterioration across risk categories.

Domestically relevant insurers

Turning to the domestically relevant insurance sector, overall conditions remained favourable, with most risk indicators improving since 2022-23. The sector remained well capitalised, with underwriting and credit risk generally around the historical norm. Market risk also recovered significantly following the peaks reported in the second quarter of 2025. Profitability stood in the fourth quintile, largely reflecting the moderation in the life insurance segment, although the ROA remained broadly in line with the euro area median. Meanwhile, the liquidity metric stood in the top quintile, largely driven by larger insurers recording liquidity positions below their own historical averages, alongside some operators with relatively weaker liquidity ratios. Nonetheless, the median liquidity ratios of domestically relevant insurers remained broadly in line with the euro area median, indicating no widespread deterioration across the sector.

Domestically relevant investment funds

The domestic investment funds sector also appears broadly resilient, with gradual improvements in market and profitability indicators. Profitability, however, moderated somewhat in 2025, settling in the middle quintile.[8] While leverage and liquidity indicators[9] have been more volatile, these generally remained benign, with leverage in particular showing only marginal divergences. At the same time, the heatmap highlights that credit risk has remained in the top quintile, following a deterioration in 2024. This may partly reflect increased risk-taking and search-for-yield behaviour as the ECB entered a rate-cutting cycle, which however seems to have ended in mid-2025.

External macro-financial environment

Financial systems are influenced by the global and domestic macroeconomic and geopolitical environment in which they operate. Looking at the indicators related to the external environment, the heatmap points to a scenario shaped primarily by geopolitical developments. The GPR index[10] rose sharply following the outbreak of war in Ukraine in February 2022. While it recovered somewhat during the first three quarters of 2023 as markets and policymakers adjusted, it peaked once again in the last quarter of that year as the Israel-Hamas war erupted, giving rise to heightened uncertainty and risks of regional escalation. It has since remained elevated amid ongoing tensions, including in the Middle East, reaching very high levels in 2025. The heatmap shows that while the initial shock in 2022 was associated with a pronounced increase in the composite indicator of systemic stress,[11] more recent geopolitical tensions have not resulted in comparable increases in market-based stress indicators as some risks may have already been priced in. This divergence reflects strong financial sector fundamentals, which have resulted in contained market volatility and limited transmission of geopolitical shocks to financial markets. By contrast, the economic sentiment indicator fluctuated within the top two quintiles, highlighting that expectations among firms and households have remained sensitive to heightened uncertainty and persistent cost pressures.

Domestic macro-financial environment

On the domestic front, the financial sector can be seen as operating in a benign macroeconomic environment when one interprets the statistical movement of the indicators in relation to economic fundamentals. Annual real GDP growth stood in the top two quintiles throughout 2025. This, however, largely reflected base effects following exceptional growth rates recorded in previous years. Indeed, while real GDP growth remained strong at 4.0%, significantly exceeding the euro area average, it fell below the long-term average of 6.4% estimated since 2015Q4, and was well below the peaks recorded in late 2021 and early 2022, when the economy was recovering from the pandemic. The government debt-to-GDP ratio has declined from around 51% in the first quarter of 2022, to now stand in the second-lowest quintile.

Domestic inflation rose sharply following the outbreak of war in Ukraine, exceeding 7% in late 2022 and early 2023. Since then, inflation has moderated considerably to hover between 2.0% and 2.5% as earlier supply-side pressures unwound. This moderation also reflects the lagged effects of the previous tightening monetary policy cycle of 2022-2023. Nevertheless, it remains within the top quintile, given that average inflation stood at just above 1% prior to 2022.

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[8] Profitability is assessed using data up to September 2025 to ensure consistency in the analysis, given the implementation of revised reporting templates towards the end of the year.

[9] The RCR within the liquidity indicators is estimated based on the worst-case outflow observed over the previous three years. For observations between December 2016 and June 2019, this measure reflects the worst-case outflow within that specific period. This approach differs from the Section 4.2 of the 2025 FSR, which instead considers the worst-case outflow recorded since December 2016 on a cumulative, to-date basis.

[10] The GPR index is based on Caldara Dario and Matteo Iacoviello (2022), "Measuring Geopolitical Risk". It measures the level of geopolitical tensions based on news coverage (e.g. wars, terrorism, political conflicts).

[11] The Composite Indicator of Systemic Stress captures actual stress in financial markets (e.g. volatility, credit spreads, market liquidity), reflecting how those risks are being priced by investors.

The cSRI, which measures the potential build-up of cyclical systemic risks, fluctuated between the third and fourth quintile in 2025, mainly driven by strong real bank credit and debt levels. Improving financial conditions and a supportive banking sector may have incentivised economic agents to take on more leverage, potentially contributing to a build-up of vulnerabilities in the system. Meanwhile, both the domestic Economic Sentiment Indicator (ESI) and the current account balance as a share of GDP point to an improved position in 2025. The improvement in the ESI reflects rising confidence and optimism among businesses and consumers about the economic outlook, partly due to stronger economic activity. Moreover, after recording a current account deficit in 2022, the current account balance swung to a surplus.

Overall, the heatmap suggests that domestic macroeconomic conditions have been shaped by specific and largely exogenous events, rather than indicative of sustained macro-financial stress. While several indicators, mostly outside the domestic financial system, remained in the top two quintiles, this primarily reflected the exceptionally low levels observed prior to the pandemic and the intensification of geopolitical conflicts, rather than the emergence of new or intensifying underlying imbalances. In contrast, the resilience of the domestic financial system has improved over the time period under review, buttressed by strong capital and liquidity buffers. Therefore, most risks to the domestic financial system originate from the volatile external macroeconomic environment.

Conditions in the domestic NFC and household sectors improved markedly over the review period, as reflected by the generally stable or declining risk signals across most balance sheet indicators. The key exception relates to the semi-structural credit gap, which has remained in the higher two quintiles for the past two years, indicating significantly elevated levels with respect to the historical distribution. This development is primarily driven by strong credit growth, particularly in mortgage lending and lending to corporates mainly operating in property-related activities. It is however noted that during 2025, private corporate lending growth became more broad-based, with a recovery also observed in non-property-related sectors. The household leverage ratio is also indicating historically elevated levels, with the leverage ratio standing at around 23.8%, slightly exceeding the euro area average of 22.7%. However, households' net financial wealth remained very strong and highly liquid, providing an important buffer at the aggregate level. Taken together, this suggests that while credit dynamics warrant continued close monitoring, balance sheet buffers currently provide a meaningful degree of resilience.

Conclusions

The analysis indicates that the domestic financial sector remains sound. However, some well-identified pockets of vulnerability have emerged, particularly in the banking sector's operational risk profile, in tentative signs of concentration risks, and credit risk developments within the investment funds sector. The heatmap shows that these vulnerabilities are largely concentrated rather than system-wide, with limited evidence of risk spillovers across segments. The observed overall improvement is largely driven by tighter regulatory standards, strategic de-risking initiatives, and sustained reform efforts prompted by supervisory expectations, which together have reinforced resilience and compliance. Externally, geopolitical events have been the primary driver behind the top quintile position of some macroeconomic indicators compared to historical distributions. Importantly, the heatmap highlights a divergence between elevated geopolitical uncertainty and relatively contained market-based systemic stress, pointing to the resilience of financial markets amid heightened global tensions.

Domestically, the above-historical-norm levels of certain macroeconomic indicators largely reflected base effects following exceptionally strong economic growth and historically benign fiscal and inflation conditions, rather than a material weakening in fundamentals or the emergence of macro-financial imbalances. Despite some moderation, overall domestic economic conditions remained robust and continued to support financial stability. The heatmap therefore points to a resilient domestic financial system which is nonetheless navigating an uncertain and stressed external environment.

At the same time, risks associated with strong and persistent credit growth dynamics both for mortgages and, more recently, in the domestic corporate sector, appear to be building. While the balance sheets of both households and NFCs remained strong, the persistence of elevated credit gaps and debt levels may suggest a potential build-up of risks. In response, the Bank has expanded the coverage of its sectoral systemic risk buffer (sSyRB) with effect from 30 June 2026 to capture loans backed by all real estate, and not only residential property.[12]

When using the heatmap as a tool to assess financial stability, certain limitations should be acknowledged. A purely mechanical approach cannot fully distinguish between phases of financial deepening and periods characterised by excessive risk-taking or economic overheating. This reflects the fact that the heatmap evaluates risk levels solely relative to historical distributions, which may be influenced by structural shifts in the economy or financial system. Accordingly, expert judgement remains essential when interpreting the signals provided by the heatmap, which should therefore be regarded as a complementary tool supporting ongoing financial stability analysis. The heatmap will be updated regularly, with a summary table included in future *Financial Stability Reports*.

[12] Central Bank of Malta: Statement of decision on the extension of the sectoral systemic risk buffer in Malta, December 2025.