

# INDICATORS OF VULNERABILITY IN EMERGING COUNTRIES WHICH ARE MATERIAL FOR THE SPANISH BANKING SYSTEM

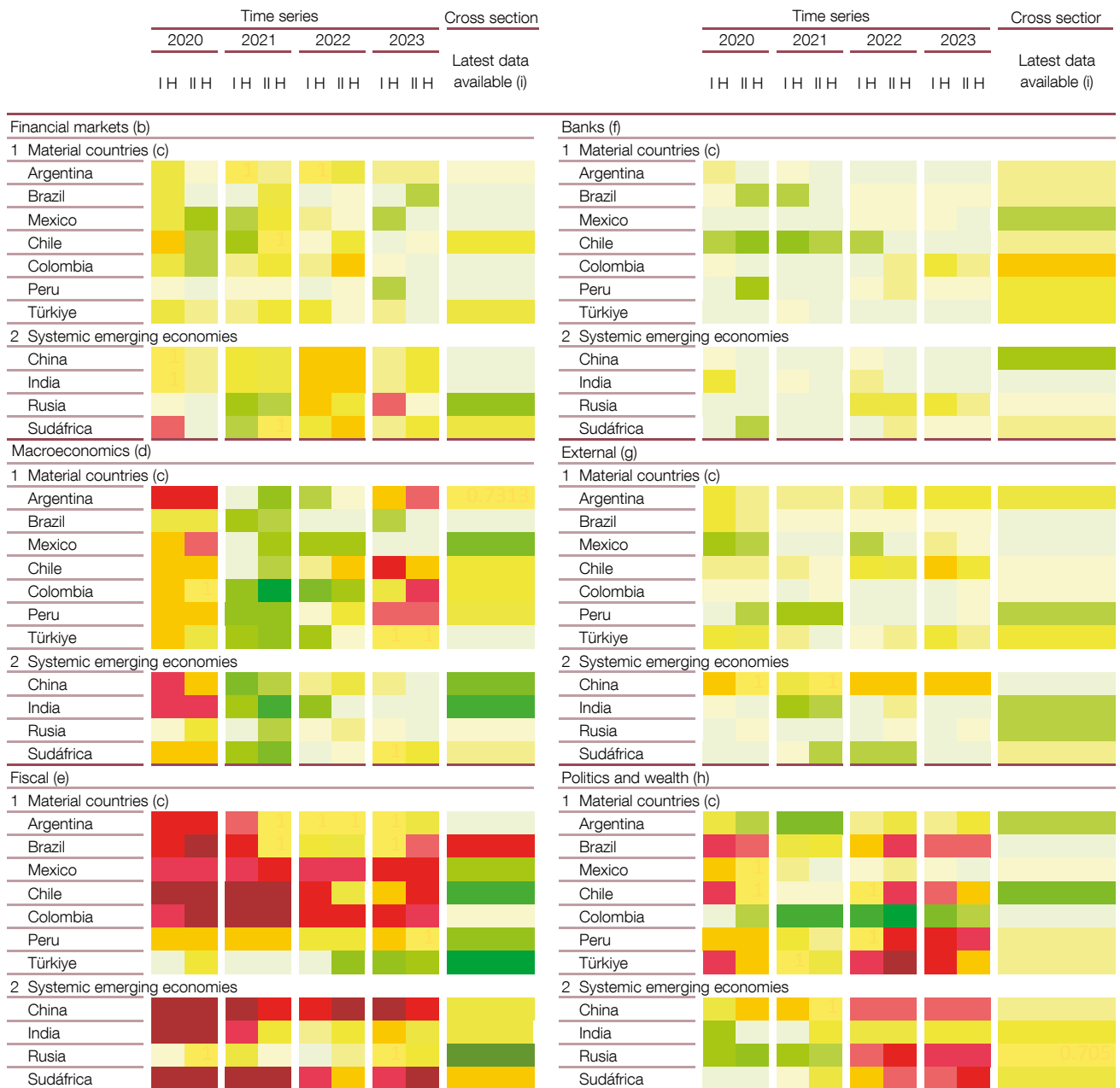
First half of  
2024

International Economics  
and Euro Area Department

BANCO DE **ESPAÑA**  
Eurosistema



Table 1

**Heat map of vulnerability indicators (a)**

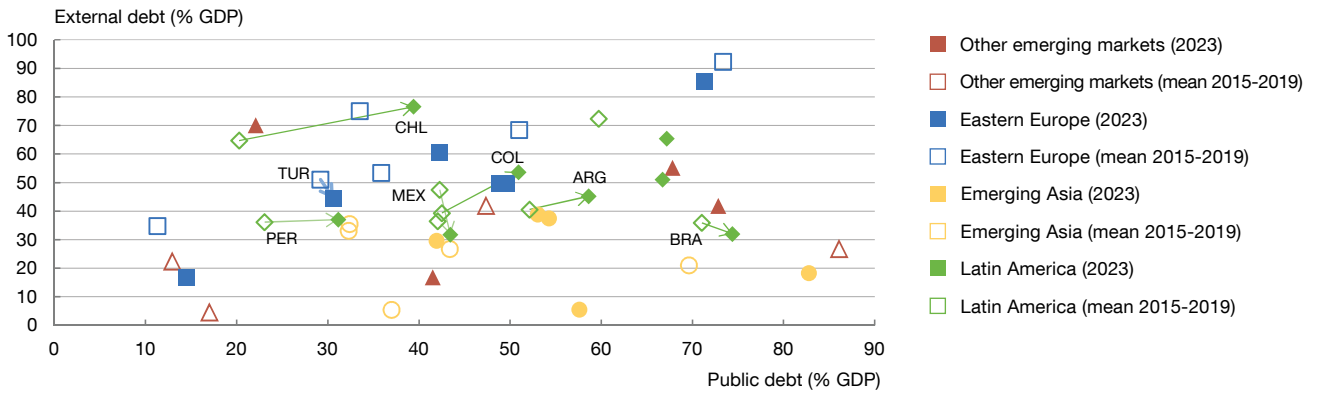
**SOURCE:** Irma Alonso and Luis Molina. (2021). "A GPS navigator to monitor risks in emerging economies: the vulnerability dashboard". Documentos Ocasionales, 2111, Banco de España. <https://www.bde.es/f/webbde/SES/Secciones/Publicaciones/PublicacionesSeridas/DocumentosOcasionales/21/Files/do2111e.pdf>

- a For each indicator the historical frequency distribution (time series since 1993) and the frequency distribution for all emerging indicators at the same moment in time (cross section) are calculated. Then the percentile position of each indicator in each period shown is calculated, assigning a color to each risk level, changing the colour hue every 5% in the frequency distribution. The level of risk is indicated with shades of green (associated with lower levels of vulnerability), yellow (medium vulnerability) or red (variables located in the highest risk percentiles).
- b Sovereign spread (level and quarterly change) and quarterly change in stock market index and exchange rate.
- c Each year, the Banco de España identifies third countries (i.e. outside the European Economic Area) that are materially significant to the Spanish banking system for the purpose of the countercyclical capital buffer (CCyB). To this end, the size of Spanish banks' international exposures is analysed according to the European Systemic Risk Board's guidelines. In 2023 nine material countries were identified – the United States, the United Kingdom and the seven emerging markets economies shown in the table. See the section on the CCyB on the Banco de España's website.
- d Change in GDP and industrial output, inflation rate and change in GDP per capita.
- e General government balance and gross public debt (% of GDP).
- f Real change in credit and deposits, loan-to-deposit ratio, non-performing loans in portfolio, banks' net foreign assets, banks' equity index, interest rate on banks' external debt, qualitative indicators (BICRA/IHS Markit), short-term interbank rate and loan rate minus deposit rate.
- g Current account balance, direct and portfolio investment inflows, external debt, short-term external debt and external debt service, and international reserves.
- h IHS Markit political risk indicator, geopolitical risk index and GDP per capita.
- i December 2023.

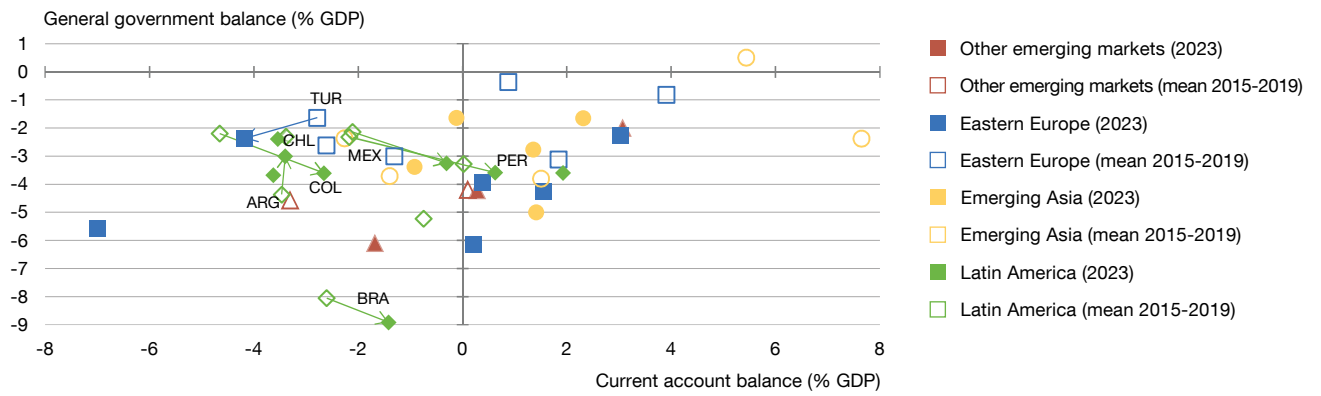
Chart 1

**Public finance and external vulnerabilities**

1.a Stocks (a)



1.b Flows (a)



SOURCES: Refinitiv and national statistics offices.

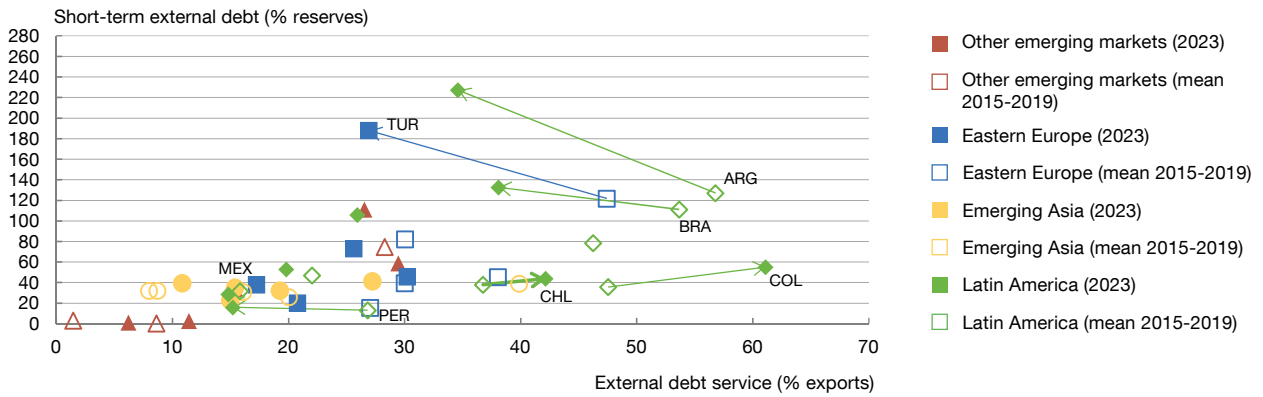
a Pairwise comparison of each variable for the 2015-2019 average and in 2023 Q4 (latest data available). Cumulative four-quarter data. The countries marked in the chart are considered material for the Spanish banking sector.



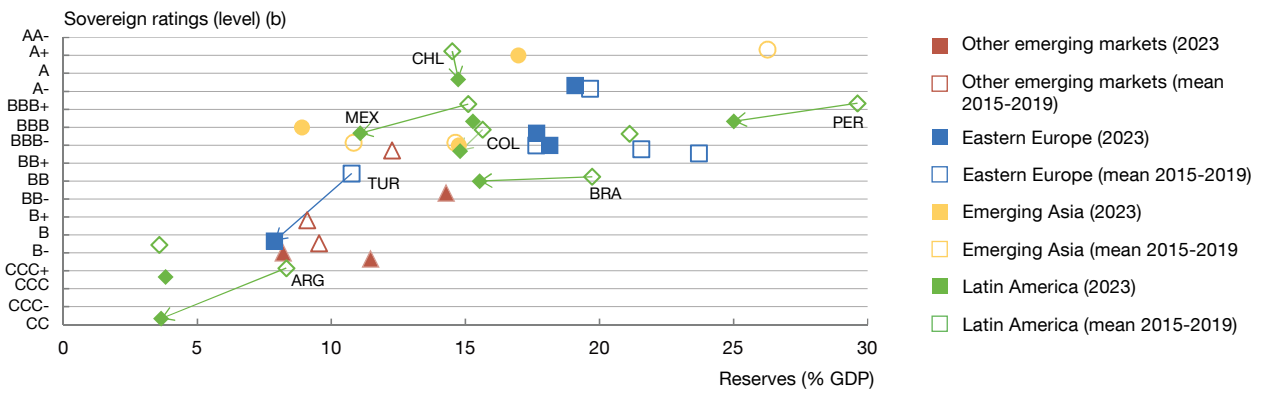
Chart 2

**External vulnerabilities and resilience factors**

**2.a External vulnerabilities: sustainability indicators (a)**



**2.b Resilience factors (a)**



**SOURCES:** Refinitiv and national statistics offices.

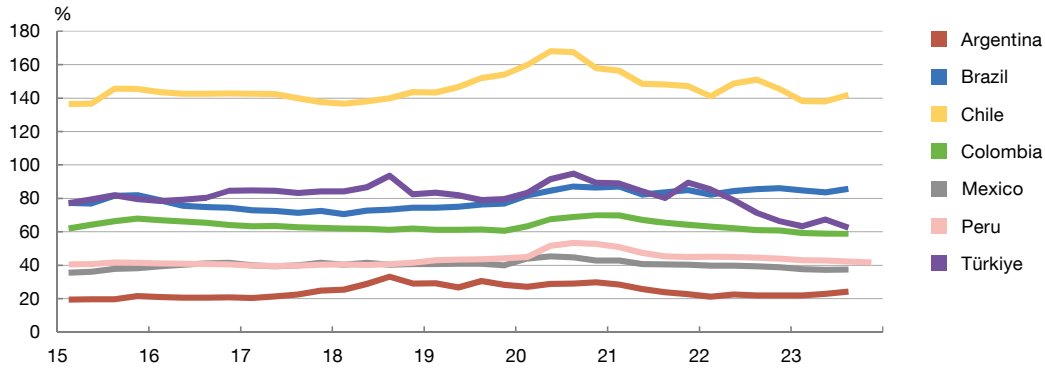
- a Pairwise comparison of each variable in 2015-2019 and in 2023 Q4 (latest data available for all countries). Cumulative four-quarter data for short-term external debt and external debt service. The countries marked in the chart are considered material for the Spanish banking sector.
- b Average ratings for Standard & Poor's, Fitch and Moody's.



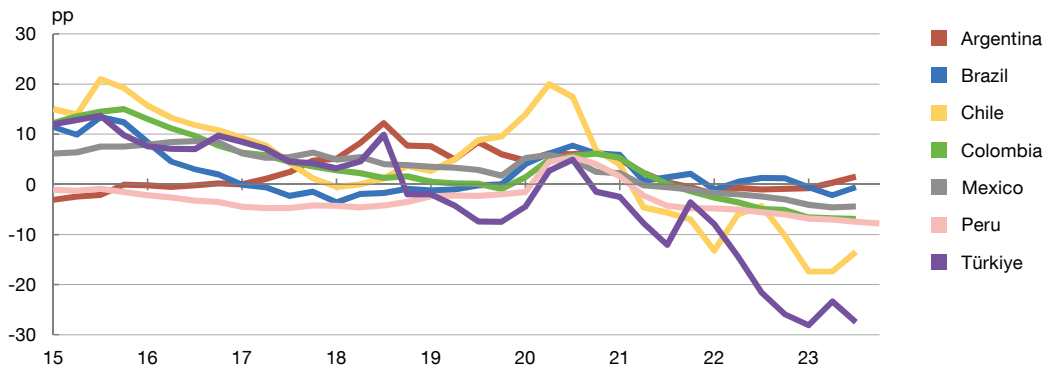
Chart 3

Macprudential indicators

3.a Credit to GDP ratio (a)



3.b Credit-to-GDP gap (b)



SOURCE: Refinitiv.

a Nominal credit to the non-financial private sector divided by nominal GDP. Cumulative four-quarter data.

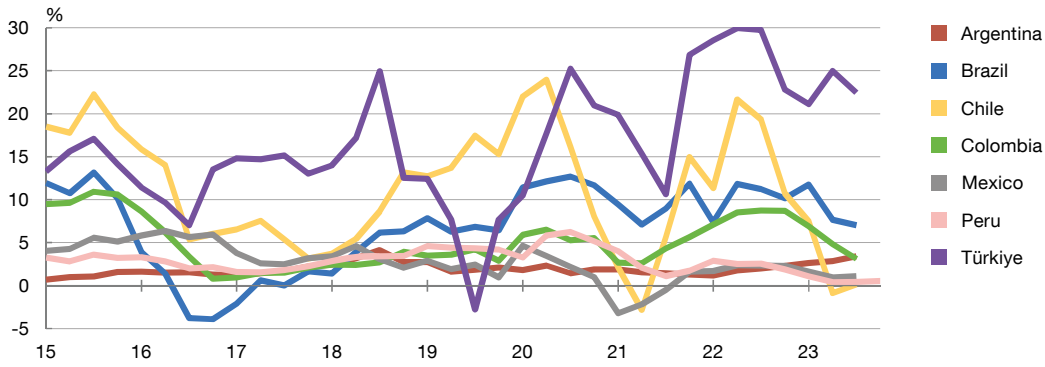
b Difference in percentage points between the observed credit-to-GDP ratio and its long-term trend calculated by applying a Hodrick-Prescott statistical filter with a smoothing parameter of 400,000.



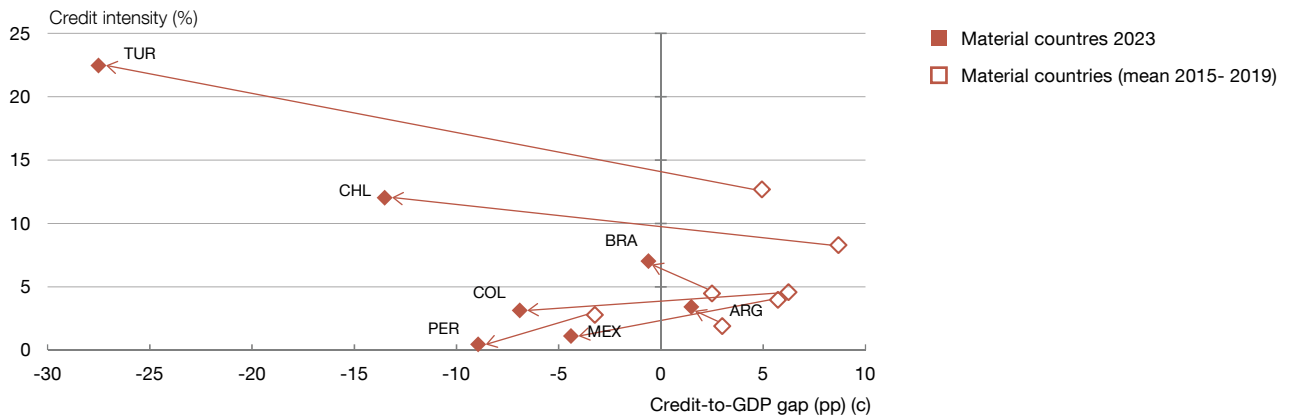
Chart 3

Macroprudential indicators (cont'd)

3.c Credit intensity (a)



3.d Macroprudential indicators (b)



SOURCES: Refinitiv.

a Year-on-year increase in nominal credit divided by nominal GDP.

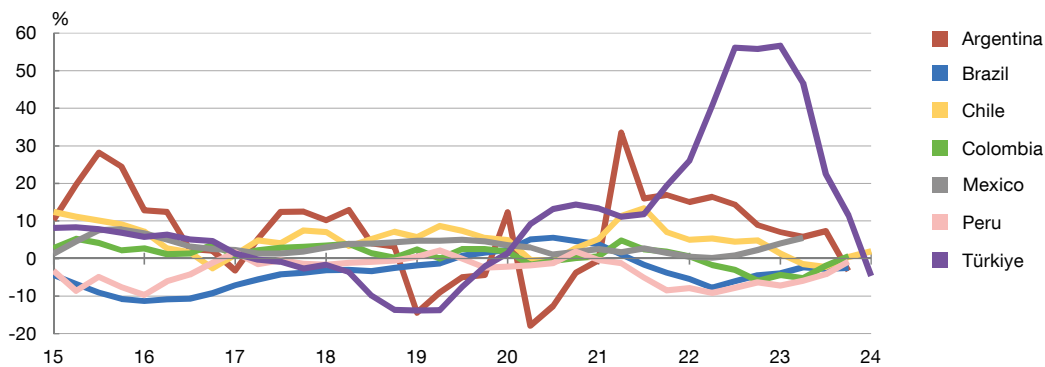
b Pairwise comparison of each variable in 2015-2019 and in 2023 Q4 (latest data available). c Difference in percentage points between the observed credit-to-GDP ratio and its long-term trend calculated by applying a Hodrick-Prescott statistical filter with a smoothing parameter of 400,000.



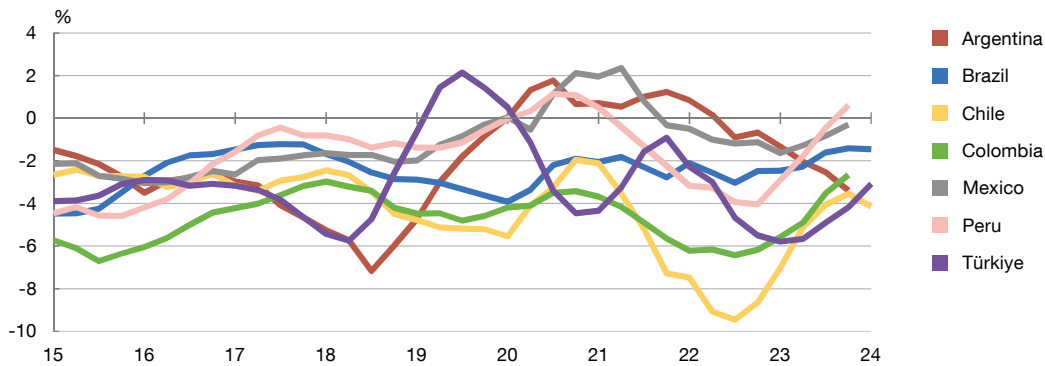
Chart 4

**Macroprudential indicators**

4.a Real property prices (% y-o-y)



4.b Current account balance (% GDP) (a)



SOURCE: Refinitiv.

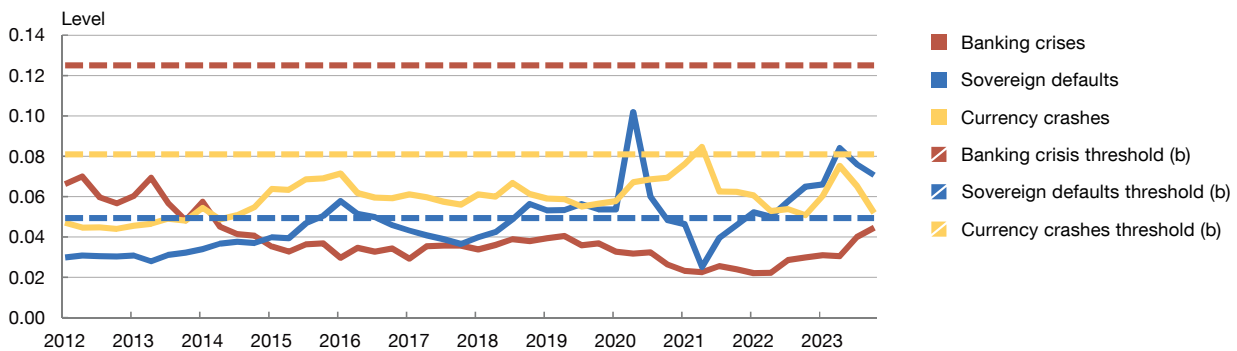
- a Deflated by the Consumer Price Index.
- b Cumulative four-quarter data.



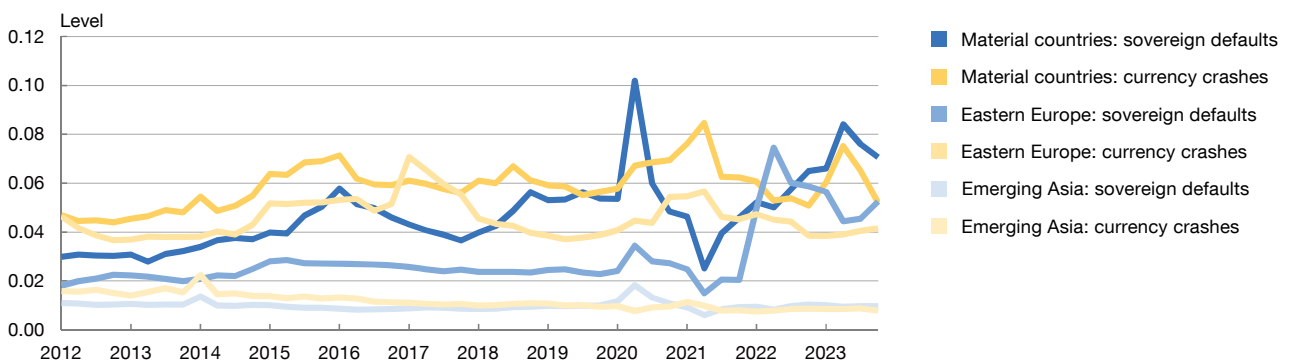
Chart 5

**Synthetic vulnerability indicators**

5.a Synthetic vulnerability indicators: material countries (a)



5.b Synthetic vulnerability indicators: comparison between emerging regions (a)



SOURCE: Banco de España.

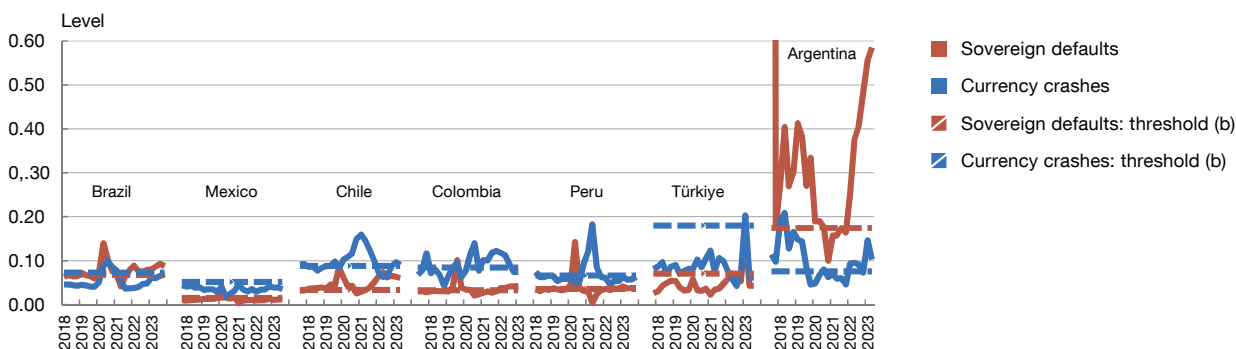
- a The synthetic indicators represent the likelihood of being in a vulnerable state, estimated using a logit model for three types of crisis (banking, currency and sovereign) with pre-selected variables based on the issue of correct signals six quarters before a crisis (threshold of a ROC curve). An increase in a synthetic indicator implies an increase in the likelihood of recording a crisis in each of the categories. The regional indicators are the weighted average of the synthetic indicators for the seven material countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Türkiye), five in emerging Asia (China, India, Indonesia, South Korea and Thailand) and five in Eastern Europe (Czech Republic, Hungary, Poland, Romania and Russia). The weights used for material countries are the original exposures of Spanish banks to each of those countries, and for the other regional aggregates, GDP adjusted with purchasing power parity.
- b The thresholds are references that provide the percentile of the estimated probability of being in a situation of vulnerability, so that in the event of possible adverse shocks the country could experience a crisis with high probability (calculated according to the occurrence of crises in the past). The thresholds are estimated with the last available sample and depend on the level of the synthetic indicators.



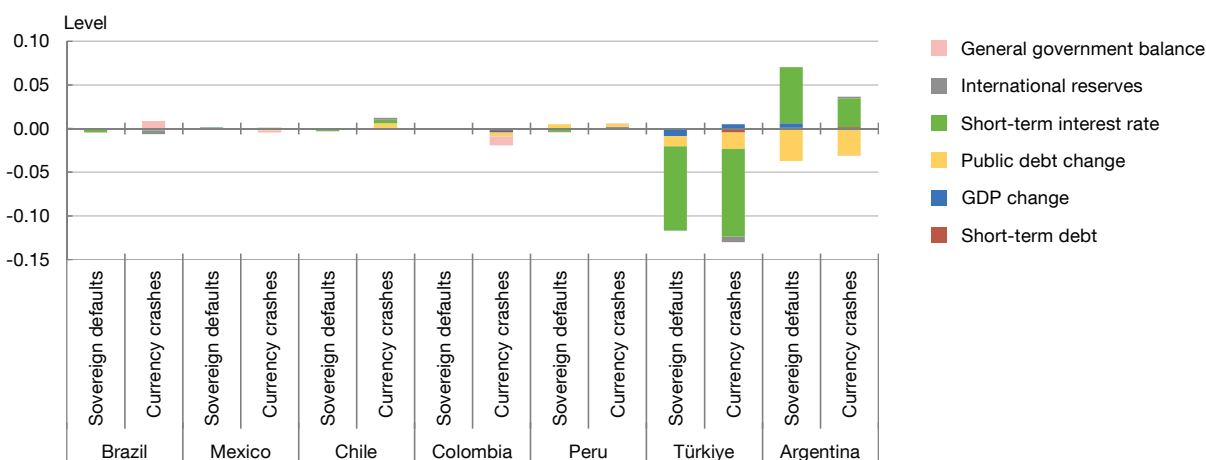


Synthetic vulnerability indicators (cont'd)

5.c Synthetic vulnerability indicators: material countries (a)



5.d Contributions to the change in the synthetic vulnerability indicator (c)



SOURCE: Banco de España.

- a The synthetic indicators represent the likelihood of being in a vulnerable state, estimated using a logit model for three types of crisis (banking, currency and sovereign) with pre-selected variables based on the issue of correct signals six quarters before a crisis (threshold of a ROC curve). An increase in a synthetic indicator thus implies an increase in the likelihood of recording a crisis in each of the categories.
- b The thresholds are references that provide the percentile of the estimated probability of being in a situation of vulnerability, so that in the event of possible adverse shocks the country could experience a crisis with high probability (calculated according to the occurrence of crises in the past). The thresholds are estimated with the last available sample and depend on the level of the synthetic indicators.
- c Contribution of the factors represented to the change in the synthetic vulnerability indicators between the first and second quarters of 2023. The contributions are calculated based on the effect of each of the variables on the linear probability estimated by the model, reweighted.

