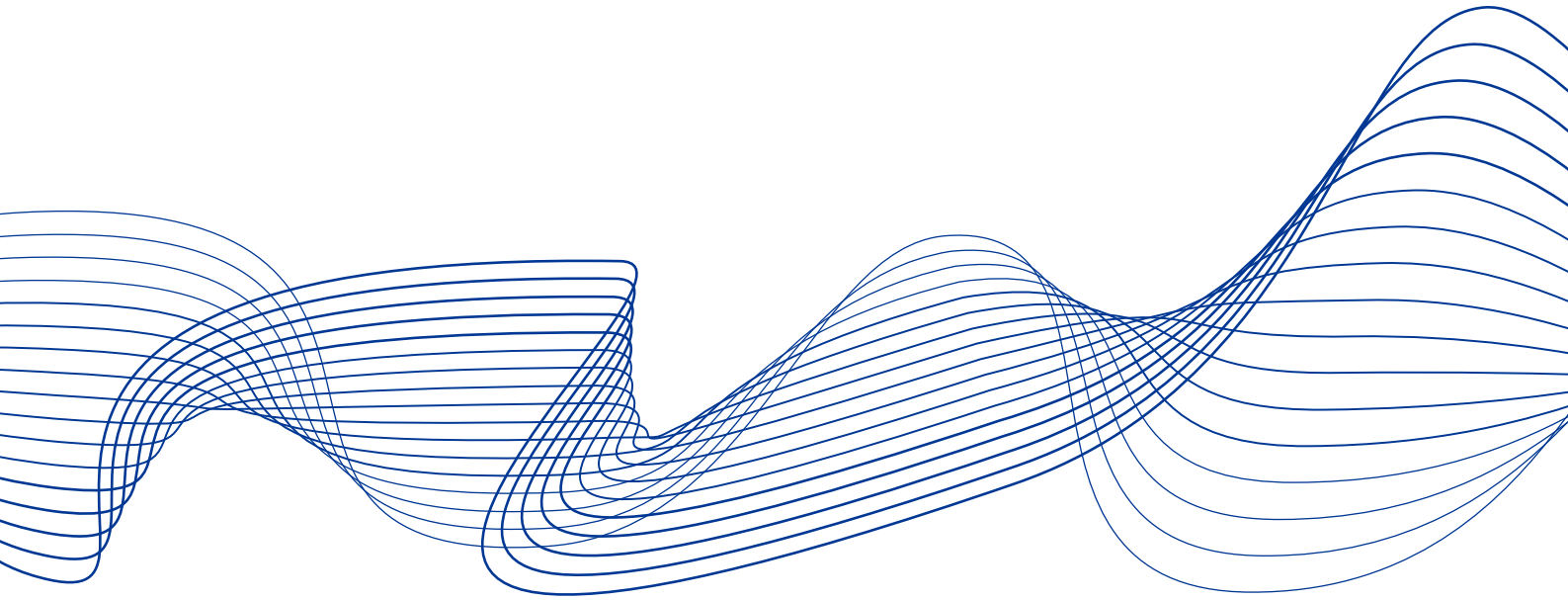
A Review of Macroprudential Policy in the EU in 2019

Special Features

April 2020



ESRB
European Systemic Risk Board
European System of Financial Supervision

Contents

Special Feature A: The ESRB as a coordination and notification hub under CRD V and CRR II[1]

The Capital Requirements Directive V (CRD V) and the Capital Requirements Regulation II (CRR II) have clarified and expanded the ESRB's role in coordinating macroprudential policies in the European Union (EU). In May 2019, the European Parliament and the Council adopted amendments to the Capital Requirements Regulation and Directive[2]. In addition to making changes to the macroprudential instruments[3], the CRR II and CRD V clarify and strengthen the role of the ESRB in the macroprudential decision-making process. Furthermore, they both require the ESRB to contribute to the further development of the macroprudential framework. Most of the provisions pertaining to the ESRB's role will come into force at the end of 2020.

A.1 The overarching objective of the ESRB's coordination role

The CRD V clarifies the overarching objective of the ESRB's coordination role. Recital 25[4] states that to ensure appropriate policy responses by Member States, the ESRB should monitor whether the macroprudential policy measures taken by them are sufficient and consistent.[5] This includes the assessment by the ESRB whether the macroprudential instruments are used in a non-overlapping manner. The ESRB is working with its members to form a common understanding of these concepts and to put them into operation.

A.2 Transmission of information ("Notification Hub")

The ESRB will be given a central role in the transmission of information on macroprudential measures. Under the CRD IV/CRR, the relevant authorities notify the ESRB and other stakeholders of the macroprudential measures that are planned or have been implemented,

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1 Prepared by Emmanouil Karfis, Eleni Katsigianni, Tiago de Oliveira Bolhão Páscoa, Christian Schett and Stéphanie Stolz (all ESRB Secretariat).

2 **Directive (EU) 2019/878**, OJ L 150, 7.6.2019, pp. 253-295, and **Regulation (EU) 2019/876**, OJ L 150, 7.6.2019, p. 1. These amendments form part of a broader overhaul of the EU's prudential and resolution rules for banks. The so-called banking package contains changes to the Capital Requirements Directive (**Directive 2013/36/EU**, OJ L 176, 27.6.2013, p. 338), the Capital Requirements Regulation (**Regulation (EU) No 575/2013**, OJ L 176, 27.6.2013, p. 1), the Bank Recovery and Resolution Directive (**Directive 2014/59/EU**, OJ L 173, 12.6.2014, p. 190) and the Single Resolution Mechanism Regulation (**Regulation (EU) No 806/2014**, OJ L 225, 30.7.2014, p. 1).

3 The changes pertain to eliminating the macroprudential use of Pillar 2, increasing the flexibility in the use of the systemic risk buffer (SyRB) and other systemically important institutions (O-SII) buffer, clarifying the scope of the SyRB as well as the roles and responsibilities of authorities in tackling financial stability risk linked to real estate exposures, streamlining activation and reciprocation procedures for macroprudential instruments, revising global systemically important institutions (G-SII) buffer requirements and the G-SII score methodology, and requiring the European Commission to reassess the macroprudential framework in banking by 30 June 2022 and every five years thereafter. For more information, see Special Feature C of **A Review of Macroprudential Policy in the EU in 2018**, ESRB, April 2019.

4 "[...] The ESRB…is expected to play a key role in the coordination of macroprudential measures, as well as the transmission of information on planned macroprudential measures in Member States, in particular through the publication of adopted macroprudential measures on its website and through information sharing across authorities following the notifications of planned macroprudential measures. In order to ensure appropriate policy responses among Member States, the ESRB is expected to monitor the sufficiency and consistency of Member States' macroprudential policies, including by monitoring whether tools are used in a consistent and non-overlapping manner."

5 Recitals form part of EU legal acts. While recitals of EU legal acts have no binding legal force, they spell out the intention of the European legislator, thereby providing important guidance on the interpretation of the respective legal act.

depending on the type of measure. Under the CRD V/CRR II, the ESRB has been assigned the role of notification hub: the relevant authorities will notify the ESRB of their planned/implemented macroprudential measures and the ESRB will, without delay, transmit the information to the other stakeholders depending on the type of measure taken (see Table A.1).

Table A.1
Transmission of information by the ESRB as mandated by CRD V/CRR II

Measure	Short description	Send notification to:					
		EC	EP	Council	EBA	CA/DA	MS
CCoB: (Art. 129(2) CRD V)	Exception for small and medium-sized investment firms	●			●	●	
CCyB: (Art. 130(2) CRD V)	Exception for small and medium-sized investment firms	●			●	●	
SII: (Art. 131(7) and 131(12) CRD V)	Setting or resetting of O-SII buffer	●			●	●	
	Identification of G-SII and O-SII (and subcategories)	●			●		
SyRB: (Art. 133(9) and 134(2) CRD V)	Setting or resetting	●			●	●	
	For third country exposures					●*	
	Reciprocation	●			●		●
Stricter national measures (Art. 458 (2) CRR II)**	Notification of stricter national measures		●	●	●		

Source: ESRB.
Notes: (*) Relevant supervisory authorities of third countries; (**) CRR II does not change the notification requirements that apply to reciprocation of stricter national measures. Therefore, Member States will continue to send the notification of stricter national measures to all relevant recipients at the same time they send it to the ESRB.

A.3 Publication requirements

In its role as a notification hub, the ESRB will also be required to publish some of the information it receives. The CRD IV/CRR already requires the ESRB to publish Member States' countercyclical capital buffer (CCyB) rates and related information on its website. Under Articles 124 and 164 of the CRR II, the ESRB will also be required to publish information on global systemically important institutions (G-SIIs) and other systemically important institutions (O-SIIs) buffers and real estate measures taken (see Table A.2).

Table A.2
Publication by the ESRB

Measure	Publication	New task
CCyB (Art. 136(7) CRD V)	Buffer rates and related information	
G-SII and O-SII (Art. 131(12) CRD V)	Names of G-/O-SII (and sub-categories)	●
Risk Weights (Art. 124(2) CRR II)	Risk weights and criteria for exposures as implemented for each relevant authority	●
Loss Given Default (Art. 164(6) CRR II)	Loss Given Default (LGD) values	●

Source: ESRB.

A.4 Requirements to issue ESRB opinions

The ESRB's existing role in the authorisation procedure for national macroprudential measures – e.g. in the activation of stricter national measures under Article 458 of the CRR or the activation of a systemic risk buffer (SyRB) rate above a certain threshold – has been broadened further to include other macroprudential measures, such as the O-SII buffer.

Stricter national measures under Article 458 of the CRR (flexible measures)

Article 458 of the CRR enables national authorities to enact macroprudential measures imposing stricter prudential requirements for domestically authorised institutions or a subset of those institutions provided that certain substantive conditions are met. The ESRB and the European Banking Authority (EBA) must already provide their opinions on these conditions to the Council, the Commission and the Member State concerned.[6]

Systemic Risk Buffer

The CRD V maintains the role of the ESRB in the activation of a SyRB rate above certain thresholds by the competent or designated authority, as applicable. The ESRB is required to issue a recommendation if the SyRB rate applies to a subsidiary of a parent company in another Member State and results in a combined SyRB rate of 3-5%. Where the setting or resetting of the SyRB rate results in a combined systemic risk buffer rate of above 5%, the ESRB must provide the Commission with an opinion as to whether the SyRB is appropriate. Furthermore, a Member State that sets a SyRB rate may ask the ESRB to issue a recommendation to other Member States which may then reciprocate the rate.

O-SII buffer

Where the competent or designated authority requires O-SIIs to maintain a buffer higher than 3%, the ESRB must provide the Commission with an opinion as to whether the O-SII buffer is appropriate. The opinion must be issued within six weeks of receipt of the notification by the competent or designated authority.

Combined SyRB and O-SII/G-SII buffer

In cases where the sum of the SyRB rate and the O-SII /G-SII buffer rate to which the same institution is subject to would be higher than 5%, the ESRB must give an opinion to the Commission on whether the SyRB rate is appropriate.

CRR II will also require the ESRB to issue an opinion on any adjustments to the risk weights and criteria relating to exposures secured by mortgages on immovable property under Article 124 of the CRR II and on the setting of higher minimum loss given default (LGD) values under Article 164 of the CRR II.

Table A.3 below provides an overview of the existing and new requirements for the ESRB to issue opinions on the activation of macroprudential measures.

[6] Šesták, L. and Bolhão Páscoa, T (2019), "Special Feature A: Use of national flexibility measures under Article 458 of the CRR", **A Review of Macroprudential Policy in the EU in 2018**, European Systemic Risk Board, Frankfurt am Main, April 2018.

Table A.3

Requirements to issue ESRB opinions

Measure	Short description	Deadline	New task
O-SII (Art. 131(5a) CRD V)	Appropriateness of the O-SII buffer above 3%	6 weeks	●
G/O-SII and SyRB (Art. 131(15) CRD V)	Appropriateness of buffer where the sum of SyRB and G/O-SII > 5%	6 weeks	●
SyRB (Art. 133(12) CRD V)	Appropriateness of buffer above 5%*	6 weeks	●**
Risk Weights (Art. 124(2) CRR II)	Adjustments to risk weights and criteria for exposures secured by mortgages on immovable property	1 month	●
Loss Given Default (Art. 164(6) CRR II)	Setting higher minimum Loss Given Default values for exposures secured by mortgages on immovable property	1 month	●
Stricter national measures (Art. 458 (4) and (9) CRR II)	Notification of stricter national measures	1 month	
	Extensions	1 month	

Source: ESRB.
*Notes: *If the proposed rate applies to a subsidiary of a parent company established in another Member State and is between 3-5%, the ESRB must issue a recommendation. **CRD IV already requires the ESRB to issue an opinion on the appropriateness of the SyRB rate to the Commission. CRD V changes the circumstances in which such an opinion is required.*

A.5 ESRB contributions to the further development of the macroprudential framework

The CRD V and CRR II require the ESRB to contribute to the further development of the macroprudential framework. The ESRB will collaborate closely with the EBA which has the mandate to develop draft regulatory technical standards (RTS) to provide more details on certain elements of Articles 124 and 164 of the CRR II. Under the same articles, the ESRB may give guidance in the form of recommendations, on factors which could “adversely affect current or future financial stability”, and on indicative benchmarks that are to be taken into account when determining higher risk weights or higher minimum LGD values. Furthermore, the ESRB will be consulted by the EBA on its report to the Commission on the appropriate methodology for the design and calibration of O-SII buffer rates and on its guidelines on the appropriate subset of exposures for the sectoral SyRB. In addition to these immediate tasks, the ESRB will be consulted by the EBA on its report on sustainable finance in 2025 and by the European Commission on the review of macroprudential rules in 2022 and every five years thereafter. Table A.4 below provides an overview of the ESRB’s mandates to further develop the macroprudential framework.

Table A.4

ESRB contributions to the further development of the macroprudential framework mandated by CRD V/CRR II

Measure	Short description	ESRB involvement	Deadline
O-SII (Art. 131(3) CRD V)	EBA report to the European Commission (EC) on the calibration of O-SII buffer rates	Consultation by EBA	31 December 2020
SyRB (Art. 133(6) CRD V)	EBA guidelines on appropriate subset of exposures	Consultation by EBA	30 June 2020
Risk Weights (Art. 124(4) and (5) CRR II)	EBA draft RTS on assessment of mortgage values and appropriateness of risk weights	Close cooperation with EBA	31 December 2019
	Guidance on factors which could "adversely affect current or future financial stability" and on indicative benchmarks that are to be taken into account when determining higher risk weights	ESRB recommendation	No deadline
Loss Given Default (Art. 164(8) and (9) CRR II)	EBA draft RTS on appropriateness of LGD values	Close cooperation with EBA	31 December 2019
	Guidance on factors which could "adversely affect current or future financial stability" and on indicative benchmarks that are to be taken into account when determining higher minimum LGD values	ESRB recommendation	No deadline
Sustainable Finance (Art. 501c CRR II)	EBA report assessing the justification for dedicated prudential treatment of exposures related to assets or activities associated substantially with environmental and/or social objectives	Consultation by EBA	28 June 2025
Review of macroprudential rules (Art. 513(1) and (2) CRR II)	EC reviews whether the macroprudential rules are sufficient to mitigate systemic risk in sectors, regions and Member States	Consultation by EC	30 June 2022 and every five years thereafter
	EC report to the European Parliament and to the Council on above assessment	Consultation by EC	31 December 2022 and every five years thereafter

Source: ESRB

A.6 Conclusion

CRD V and the CRR II have reinforced the role played by the ESRB in the oversight of macroprudential policy and its suitability to identify sources of systemic risk and mitigate its effects if and when such risks materialise. Accordingly, the new role of the ESRB as a notification hub will help it to improve its monitoring of the sufficiency and consistency of Member States' macroprudential policies. In addition, the ESRB's scope of intervention has been expanded regarding the issuing of opinions before authorities can implement certain macroprudential measures. This will streamline the use of macroprudential tools and allow the ESRB to safeguard their harmonised application throughout the EU and ensure that they are used in a consistent and non-overlapping manner.

Furthermore, the new requirements for EU institutions and authorities to cooperate with and consult the ESRB will provide the organisation with an opportunity to contribute its skills and experience to the further development of the macroprudential framework.

Special Feature B: Third country monitoring for the purpose of the CCyB[7]

Overview of third country monitoring by the ESRB

This special feature provides an overview of some of the approaches taken by the ESRB to monitor the financial stability vulnerabilities of third countries identified as material from a European Economic Area (EEA) perspective.[8] The annual monitoring exercise identifies financial stability risks in third countries which could affect the resilience of the EU banking system due to potential losses on its exposures. The monitoring exercise may result in the ESRB issuing warnings and recommendations for the EU to take macroprudential measures, such as the activation of a countercyclical capital buffer (CCyB) for third country exposures, or other similar measures. The ESRB collaborates closely with the ECB and EU supervisory authorities to avoid a double-counting of risks should the vulnerabilities identified be of a non-systemic nature, and therefore fall under the remit of microprudential supervisors.

B.1 Regulatory framework and basis for monitoring

The ESRB assesses macroprudential risks stemming from developments within the Union as well as in third countries. It is responsible for the macroprudential oversight of the financial system within the Union in order to contribute to the prevention or mitigation of systemic risks to the financial system[9]. Such risks could arise from cross-border exposures of the Union's banking system to third countries, which might act as a channel for contagion. For example, if not addressed through macroprudential policies implemented by the country in question, excessive credit growth in a third country could lead to large losses for the banking sector within the Union and ultimately pose a threat to its financial stability[10].

The EU capital rules for banks provide for the possibility of setting capital buffer rates for exposures to third countries. National legislation implementing Article 139 of the CRD gives national authorities the right to set a CCyB rate for third countries that domestic banks must apply when calculating their institution-specific CCyB. This right may be exercised when the third country has not set and published a CCyB or the CCyB is deemed insufficient to protect their banks from the risk of excessive credit growth in said country.

A CCyB on third country exposures is intended to protect EU Member States' domestic banks from the losses that can arise from said exposures. Under the Basel III framework, bank-specific capital buffer requirements are calculated based on the geographic location of their

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7 Prepared by Piotr Kornel Kusmierczyk and Juliet-Nil Uraz (ESRB Secretariat); comments by Silviu Oprică (ECB). Based on the work of the Analysis Working Group/Macroprudential Analysis Group (AWG/MPAG) Project Team on Third Country Monitoring. .

8 The CRD IV has been incorporated into the EEA Agreement with effect from 1 January 2020, so from then on a third country is defined as a non-EEA country for the purpose of setting a third-country CCyB. However, **Recommendation ESRB/2015/1** already recommended interpreting a "third country" as any jurisdiction outside the EEA (in Section 2(1)(g)).

9 See **Regulation (EU) No 1092/2010** establishing a European Systemic Risk Board (Articles 3(1) and 3(2)).

10 See Decision **ESRB/2015/3**.

exposures. Setting a CCyB for third countries therefore aims to strengthen the resilience of domestic banks with international exposures.

Articles 138 and 139 of the CRD provide the ESRB with a specific mandate to address risks arising from excessive credit growth in third countries and to ensure a coherent approach for the buffer settings for third countries. Specifically, when actions taken by authorities in a third country are deemed insufficient, the ESRB can act to protect the EU's banking sector from risks stemming from excessive credit growth in that third country. In particular, the ESRB may, by way of a recommendation, provide guidance to designated authorities within the Union on the appropriate CCyB rate for exposures to a third country[11] where a CCyB rate has not been set or where one has been set but it is not sufficient to protect Union institutions. The ESRB is therefore monitoring credit development in third countries and ensuring the coordination of the potential macroprudential EU policy actions.

B.2 The monitoring framework

Identifying third countries that are material for the EU's banking system

The ESRB does not monitor all third countries but only those identified annually as material for the EU's banking system. The ESRB identifies these material third countries on the basis of three exposure metrics: risk weighted assets, original exposure and defaulted exposures in relation to third countries. The main purpose of using a number of metrics is to provide a comprehensive overview of the nature of the exposures to third countries. The ESRB defines a third country as material when exposures of the Union's banking system to that third country are at least 1% for at least one of the above three metrics for a set period of time.[12] The final list of the material countries is subject to the discretionary decision of the ESRB Advisory Technical Committee, which may amend the list, e.g. by adding countries deemed necessary to monitor.

Since 2015, the ESRB has annually revised the list of third countries identified as material for the EU banking sector, based on the size and nature of the exposures of banks which have their head offices in the Union towards these third countries (see Table B.1).[13] As of 2019, the list includes (in alphabetical order) China, Hong Kong, Russia, Singapore, Switzerland, Turkey and the United States of America.[14]

11 See **Recommendation ESRB/2015/1**.

12 Article 4(1) of **Decision ESRB/2015/3** sets out that for either risk weighted assets, original exposure or defaulted exposures "(a) the arithmetic mean of exposures to the third country in the eight quarters preceding the reference date was at least 1% (…) and (b) the exposures in each of the two quarters preceding the reference date were at least 1% (…)"

13 Please see **Decision ESRB/2015/3** and **A Review of Macroprudential Policy in the EU in 2018**, ESRB, April 2019.

14 Please see **List of material third countries**, ESRB, Frankfurt am Main, 25 June 2019.

Table B.1

List of third countries identified as material for the EU banking sector since 2015

Date	Brazil	China	Hong Kong	Russia	Turkey	United States	Singapore	Switzer-land
December 2015	•	•	•	•	•	•		
June 2017	•	•	•	•	•	•	•	•
June 2018	•	•	•	•	•	•	•	•
June 2019	•	•	•	•	•	•	•	•

Source: ESRB

Obtaining a quantitative picture of macro-financial vulnerabilities and excessive credit growth

The third country risk monitoring framework has been developed by the ESRB and the ECB in collaboration with EU national authorities working within a project team under the auspices of the ESRB's Analysis Working Group (AWG) and the ECB's Macroprudential Analysis Group (MPAG)[15]. The framework consists of a quantitative and a qualitative assessment of each third country identified as material. The quantitative assessment provides the initial input for an expert's qualitative analysis and aims to structure the key sources of macro-financial vulnerabilities in relation to a peer group comparison of countries, which may warrant the involvement of the ESRB Assessment Team[16].

The analysis is centred on, while not limited to, credit developments in material third countries. The monitoring aims to analyse the selected countries from a macroprudential perspective to ensure the European Union makes informed decisions when deciding on the potential macroprudential measures it will introduce, such as warnings, recommendations or the activation of CCyB for third country exposures. Following the Basel III guidance for operating the CCyB, the deviation of the credit-to-GDP ratio from its long-term trend (commonly referred to as credit-to-GDP gap or the Basel gap) is one of the lead indicators for assessing the sufficiency of the CCyB rate set by the relevant third country authority. The appropriateness of the CCyB rate is assessed for the purpose of protecting EU institutions from the risks of excessive credit growth in any one third country. Several excess credit metrics and indicators of credit growth levels within the third country are included in the analysis to offset the statistical shortcomings of the Basel gap indicator. In addition, the indicators taken into consideration for the activation of the CCyB by the relevant third country authorities themselves when implementing the CCyB framework in their jurisdictions are also valuable information when available. Any additional indicator used when deciding on the CCyB rate at the domestic level is informative to assess the credit cycle in the relevant third country.

For each third country monitored, a set of relevant macro-financial indicators and their latest developments are also taken into consideration. Informed by the broader ESRB systemic risk monitoring framework, the ESRB Risk Dashboard[17], and the wide range of available literature, the indicators were selected on the basis of three main criteria: (i) the theoretical rationale for their use

[15] Project Team on Third Country Monitoring (3CM): co-chairs Carsten Detken (ECB) and Tuomas Peltonen (ESRB Secretariat); Members: Jorge Galán (Banco de España), Domenic Kellner (ECB), Piotr Kusmierczyk (ESRB Secretariat), Silviu Oprică (ECB), James Owen (Bank of England), Virgilijus Rutkauskas (Bank of Lithuania), Riika Nuutilainen (Bank of Finland) and Juliet-Nil Uraz (ESRB Secretariat).

[16] See Article 6(2)(f) of **Decision ESRB/2015/4**.

[17] See **Risk Dashboard**, ESRB.

as early warning indicators of credit vulnerabilities; (ii) the empirical evidence for their usefulness as early warning indicators of credit vulnerabilities; and (iii) the robustness and availability of data for the countries monitored by the ESRB Secretariat.

The indicators taken into consideration can be classified into five broader categories: (i) the real economy; (ii) market-based; (iii) real estate; (iv) balance sheet; and (v) private sector indebtedness. (i) An overview of the broad macroeconomic environment is obtained by looking at changes to GDP, inflation and the unemployment rate. Information about external sustainability is also given due consideration since exchange rate movements and current account imbalances have been well-documented crisis triggers in the past. (ii) Furthermore, equity price indices and interest rate dynamics are some of the financial market environment indicators that are of interest. (iii) Particular attention is paid to real estate market developments given the importance of this sector in triggering the 2007-08 financial crisis. The analysis is complemented by (iv) several banking sector indicators (v) and indicators relating to private sector indebtedness designed to identify any build-up in vulnerabilities.

The analysis involves the consultation of various data sources. Supervisory data provides information on the nature and the concentration of EU banks' exposures towards third countries. In particular, the ESRB asks for access to the supervisory data collected by the European Banking Authority (EBA) in accordance with Decision EBA/DC/2015/130, aggregated to country level, for the purpose of identifying material third countries in accordance with Decision ESRB/2015/3. As regards macro-financial indicators, national sources are consulted first if and when available. International organisations (e.g. Bank for International Settlements (BIS), International Monetary Fund (IMF) and World Bank) act as additional significant data sources, while market intelligence providers provide valuable data on volatile indices.

Macro-financial and credit indicators used for the quantitative assessment

- Credit dynamics: year-on-year (y-o-y) nominal broad credit growth, the Basel gap, broad credit to private sector as a percentage of GDP(1Y change), bank credit to private sector as a percentage of GDP (1Y change), credit to non-financial corporations as a percentage of GDP (1Y change), household credit as a percentage of GDP (1Y change);
- Macroeconomic environment: real GDP (y-o-y growth), inflation rate, unemployment rate, real effective exchange rate (REER) (y-o-y growth);
- Financial markets data: nominal equity price index (y-o-y growth), nominal long-term interest rate;
- Real estate market: nominal residential real estate price (y-o-y growth), nominal commercial real estate price (y-o-y growth);
- Banking sector: leverage ratio, CET1 ratio, liquid assets to short term liabilities, return on assets, deposit-to-loan ratio;
- Private sector indebtedness: household debt as a percentage of GDP, non-financial corporate debt as a percentage of GDP, public sector debt as a percentage of GDP.

Putting the latest developments observed into historical perspective

The analysis is extended by a standardised risk assessment methodology based on two key components: (i) an excess credit growth metric; and (ii) a composite indicator aiming to capture macroeconomic imbalances which may be linked to unsustainable developments. The split is justified by the need to account for substitution effects that may otherwise occur in linear aggregation models. This makes it possible to identify financial stability risks more precisely and to obtain an insight into the appropriate policy action required in accordance with the legal texts. The design of the composite indicator has been informed by the ECB's newly-developed domestic systemic risk indicator (d-SRI)[18]. The sub-components of the composite indicator have been selected on the basis of their signalling power as assessed in the literature, their availability and the frequency and timeliness of their reporting.

This two-dimensional approach is represented in the form of a colour-coded risk matrix. The heat map generated identifies four zones based on whether excessive credit and/or abnormal macro-financial vulnerabilities are detected (see Chart B.1). The thresholds delimiting each zone are calibrated using percentiles of the historical cross-country distributions of the two components. In other words, for each material third country, the last available observation of the credit metric and of the composite indicator is put into perspective with the distribution of these two components over time and across similar countries. A threshold defined as the X^{th} percentile of the historical distribution of the variable Y means that X% of the historical observations of this variable are below or equal to this threshold. Crossing such a threshold can therefore be interpreted as reflecting "abnormal" times or "higher than usual" vulnerabilities.

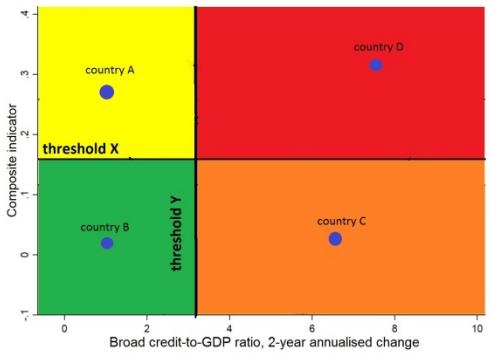
- The **green area** reflects situations where no significant excess credit or macro-financial imbalances have been detected;
- The **yellow area** reflects situations where credit is not seen as excessive but other imbalances captured by the composite indicator are flagged as significant. This scenario warrants closer qualitative investigation into whether the detected macro-financial vulnerabilities are a risk to the EU;
- The **orange area** reflects situations where credit growth is seen as excessive while other macro-financial imbalances are not at a significant level. This scenario, together with input from the qualitative analysis, would support the decision to activate the Assessment Team;
- The **red area** reflects situations where both excess credit and macro-financial imbalances have been identified. This scenario provides stronger evidence than the orange area of the existing imbalances in the material third country and of the risk to exposed EU banking sectors; together with input from the qualitative analysis, this would support the decision to activate the Assessment Team.

[18] Developed in line with insights from Detken, C., Fahr, S. and Lang, J.H., (2018) in "**Predicting the likelihood and severity of financial crises over the medium term with a Cyclical Systemic Risk Indicator**", Special Feature B, *Financial Stability Review*, May.

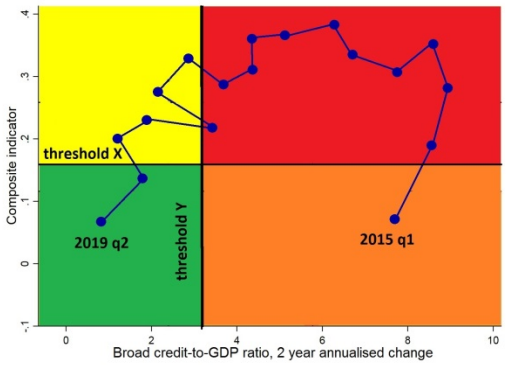
Chart B.1

Methodology for colour-coded risk matrices and hypothetical examples

Overview of several third countries at a given point in time



Change over time for one country



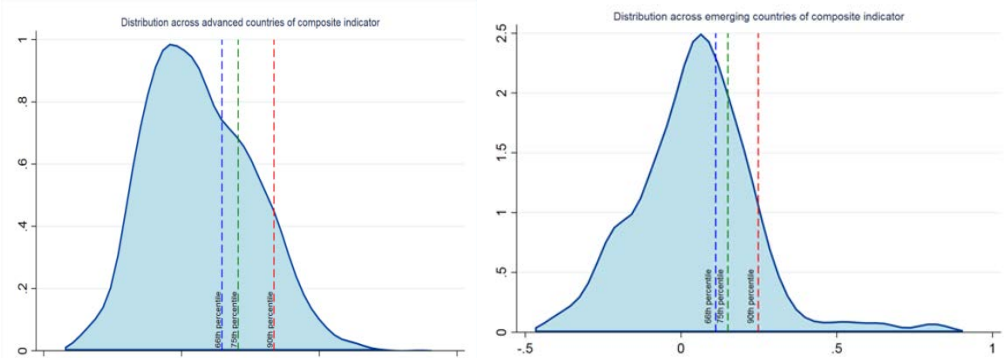
Source: ESRB Secretariat.

Thresholds and their calibration

The thresholds added to each scatter plot are calibrated using the empirical cross-country distributions specific to each of the two categories. Baseline calibrations are done using the 75th percentile. The 66th and 90th percentile thresholds are also added, however, to provide a measure of statistical certainty of the standardised risk identification. For emerging countries, taking into account the more volatile series and potential data quality issues, the coloured regions for the composite indicator are determined by the 66th percentile instead of the 75th.The 75th and 90th percentile dashed lines are nevertheless also presented as confidence intervals (see Chart B.2).

Chart B.2

Cross-country empirical distribution and calibration of the thresholds



Source: ESRB Secretariat

A broad set of countries has been taken into consideration to obtain the pooled cross-country distribution on which the thresholds are calibrated (see Table B.2). For the advanced economies pool, the countries have been selected using the IMF's advanced country classification[19] by excluding EEA Member States and applying a constraint that their 2018 share in world GDP at purchasing power parity (PPP) is above 0.05%. Similarly, for emerging market

[19] Advanced economies are defined on the basis of the advanced country classification in **"Groups and Aggregates information"**, *World Economic Outlook*, International Monetary Fund, October 2018.

economies, a non-advanced and non-low income developing countries group[20] has been defined on the basis of the IMF's classification. Further constraints have been implemented to exclude countries that are experiencing armed conflicts or war,[21] and countries whose 2018 share of world GDP at PPP is below 0.05%.

Table B.2
Sets of countries used for pooled cross-country distribution calibration

Set of advanced countries	Set of emerging countries
Australia, Canada, Hong Kong, Israel, Japan, Korea, Macao, New Zealand, Singapore, Switzerland, Taiwan and the United States	Algeria, Angola, Argentina, Azerbaijan, Bahrain, Belarus, Bolivia, Brazil, Chile, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Egypt, Guatemala, India, Indonesia, Iran, Jordan, Kazakhstan, Kuwait, Malaysia, Mexico, Morocco, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Qatar, Russia, Saudi Arabia, Serbia, South Africa, Sri Lanka, Thailand, Tunisia, Turkey, Turkmenistan, Ukraine, United Arab Emirates, Uruguay and Venezuela

Source: ESRB Secretariat.

Differentiating the monitoring methodology between advanced and emerging third countries

The indicators, which are taken into consideration on the basis of their respective degree of importance in the risk assessment, differ between advanced and emerging economies to take into account the potential differences of the risk channels at play. The differentiation of the resulting analysis makes it possible to examine the distinct economic and financial developments of the two groups. Past experience and the literature have shown that while emerging market economies (EMEs) typically exhibit fiscal, balance of payment or macroeconomic imbalance issues, advanced economies tend to be less volatile but nevertheless build-up financial imbalances over a longer time period. For instance, the specific EME risk assessment would pay greater attention to vulnerabilities resulting from exchange rate misalignments, since the sudden stop of capital inflows has historically been a major threat to financial stability in emerging countries. An early warning model specific for emerging countries which takes into account different types of crisis (e.g. currency, sovereign or systemic banking crisis) is therefore integrated in the monitoring framework. Lastly, the composite indicator of the standardised risk assessment methodology as well as the thresholds delimiting the colour-coded heat maps are also specific to both advanced and EMEs.

Design of the composite indicator

Composite scores for both advanced and emerging countries are calculated as weighted averages of the components at a given point in time. In both cases, the components (see Table B.3) are standardised by subtracting the sample mean and dividing by the sample standard deviation. For the current account to GDP ratio, the mean is set at zero to make it possible to obtain a clear economic interpretation of the surplus/deficit concept. Both the sample mean and the sample deviation are calculated for a broad set of advanced and emerging economies.

[20] Please refer to the October 2018 issue of the IMF's World Economic Outlook (Groups and Aggregates information), and to the report entitled "**Macroeconomic Developments and Prospects in Low-Income Developing Countries**", IMF, March 2018.

[21] As determined by the US State Department's 2018 Level 4 risk classification: "Do not travel".

Table B.3

Components of the composite indicator

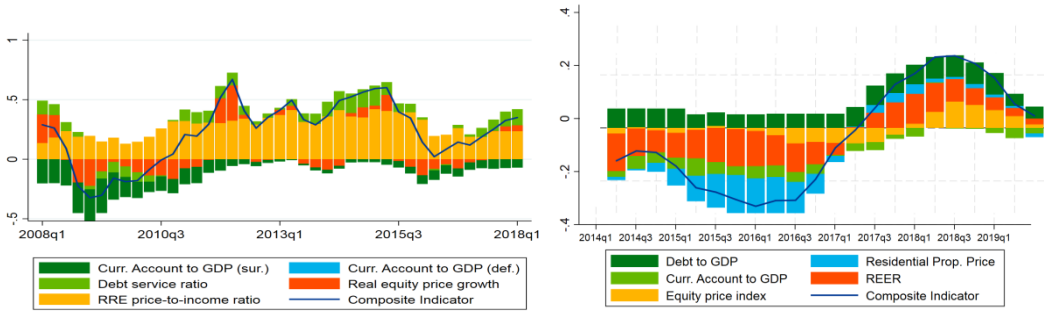
Advanced economies' composite	Emerging economies' composite
- A real equity price index - The residential real estate price to income ratio - The debt service coverage ratio - The current account to GDP ratio (split into its surplus and deficit component to account for the asymmetry between deficit and surplus in relation to financial vulnerability build-up)	- The sovereign debt-to-GDP ratio - Current account to GDP ratio - An equity price index - A residential property price index - The real effective exchange rate

Source: ESRB Secretariat.

Apart from the choice of components, the weighting schemes of composite scores for advanced and emerging countries differ to take into account the fact that the sources of risk between advanced and emerging sets may differ in amplitude owing, inter alia, to greater volatility of macro-financial series; this difference also fully incorporates the insights of the financial stability literature. For advanced economies, the weighting scheme is calibrated using an early warning exercise on a sample of euro area countries experiencing financial distress events, used as a proxy for advanced regions given the euro area's development features. For EMEs, the composite score is computed using an equal-weights approach. This choice was motivated by the inconclusive message given by the literature on this methodological aspect which was reinforced by existing data issues for those countries. In conclusion, it was decided that an overly complex weighting scheme could distort the signalling power of the composite indicator for emerging economies where greater heterogeneity exists.

Chart B.3

Change in the composite indicator over time – hypothetical examples for advanced and emerging third countries



Source: ESRB Secretariat

Including country-specific narrative

A country-specific qualitative assessment is also carried out. This provides a broader picture of the economic situation in each third country and underpins the standardised quantitative assessment. Country experts (from the European Central Bank's Directorate General International & European Relations) who monitor the macro-dynamics and latest market developments on a regular basis are consulted to obtain a more precise and up-to-date overview of the country's situation. Input from experts makes it possible to deal with data availability concerns and reporting delays, especially for emerging countries where the economic outlook can be more

subject to political uncertainty. The quantitative assessment is then put into context by considering the overall macro-financial environment as well as the macroeconomic outlook of each third country. The key financial stability risks, potential triggers, transmission channels and current vulnerabilities are also taken into consideration. Other points of interest for the purpose of monitoring include the credit development narrative together with the overview of countercyclical macroprudential actions already implemented by the respective national authorities. This information is crucial to determine whether cyclical risks in third countries are sufficiently tackled by domestic measures or whether there is a need for a coordinated EU policy response.

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Special Feature C: Framework for assessing cross-border spillover effects of macroprudential policy measures[22]

C.1 Introduction

Macroprudential measures implemented by national authorities may have cross-border repercussions. Macroprudential policy measures within the EU are generally designed to address specific, systemic, financial stability risks in national jurisdictions, including those stemming from specific sectors or even individual financial institutions.

Macroprudential policy cross-border spillovers are often positive as they increase the resilience of the financial sector, thus reducing the impact of systemic crises. Macroprudential policy targets the resilience of the financial sector and contributes to macroeconomic stability by containing credit booms and by reducing the impact of shocks on the provision of credit to the economy. By reducing vulnerabilities and building resilience, macroprudential policy reduces the probability of the emergence of systemic crises in the domestic economy which, if they were to materialise, could also have negative implications for foreign countries through trade and financial linkages.

However, domestic macroprudential policies may also have unintended cross-border effects. Due to substantial cross-border financial intermediation activities within the EU financial system and beyond, a macroprudential policy that targets the activity of domestic financial institutions will often entail reactions owing to regulatory arbitrage and risk management decisions of foreign financial institutions and/or domestic institutions operating abroad, which may in turn have implications for broader trade and economic activities. Some of these responses may give rise to unintended consequences through excessive reductions in financial intermediation and/or circumvention of the policy measures via leakages to institutions not targeted by the policy.

Policy instruments should therefore be designed to reap the benefits of positive spillovers in terms of enhanced financial stability, while also seeking to limit potential negative spillovers. Ensuring effectiveness and consistency of macroprudential policy in the EU requires policymakers to give due consideration to the cross-border effects of macroprudential policy measures adopted by national authorities and to take into account other countries' macroprudential settings when adopting their own macroprudential policies, or when warranted, to adopt suitable reciprocating macroprudential policy measures.[23]

This special feature presents a newly-developed framework for the use of national authorities in the EU to assess the cross-border spillover effects of macroprudential measures. To ensure that considerations on cross-border spillover effects are based on consistent

[22] Prepared by Christoffer Kok (ECB). The special feature is based on the work of the Eurosystem Financial Stability Committee's Task Force on Spillover Effects of macroprudential measures (TFSE). The TFSE was constituted in so-called extended composition format, implying that all EU member states (and not only those within the Banking Union) were represented, including the ESRB Secretariat. The TFSE was co-chaired by Christoffer Kok (ECB) and Dennis Reinhardt (Bank of England).

[23] As stipulated in **Recommendation ESRB/2015/2**.

analytical approaches across the EU countries, the Eurosystem Financial Stability Committee's (FSC) Task Force on Spillover Effects (TFSE) has devised a best practice framework for the analysis and assessment of cross-border spillover effects resulting from the activation of national macroprudential measures.[24] The framework is meant to serve as a starting point for national designated authorities (NDAs) and national competent authorities (NCAs) when assessing and monitoring cross-border spillover effects in the context of activations of macroprudential measures.[25] While the harmonised framework should serve as a starting point, NDAs/NCAs may want to employ complementary analytical tools tailored to country-specific circumstances. Finally, the proposed framework should help inform deliberations on cross-border spillover effects and reciprocity agreements at the EU-wide level under the ESRB umbrella.

This special feature is structured as follows. First, some concepts of the main cross-border transmission channels will be described. Second, the FSC framework will be described, focusing on the extensive recommended Indicator List and then on the so-called Empirical Benchmark tool. Third, some considerations on existing reciprocity arrangements are presented.

C.2 Concepts

Macroprudential measures may induce cross-border spillover effects through a variety of transmission channels. The starting point of the conceptual framework presented in this special feature is Chapter 11 of the ESRB Handbook. Accordingly, it follows the same definitions of cross-border spillover effects. Hence, a country activating a macroprudential policy is referred to as the domestic economy (country d), and other countries which are potentially affected by the policy are referred to as foreign economies (country f).

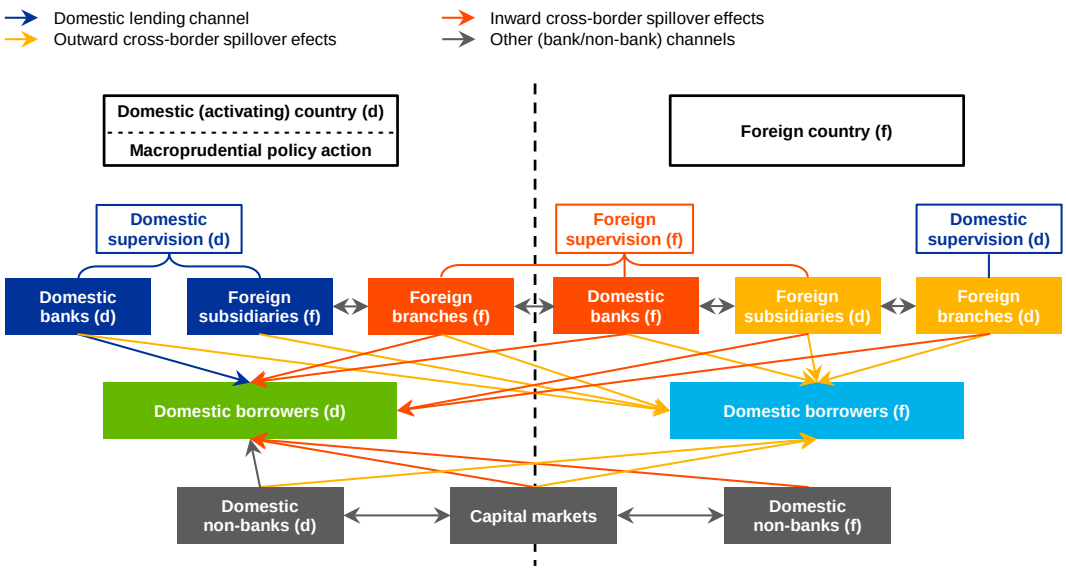
Cross-border spillover effects can be channelled through: (i) an "inward" transmission channel; and (ii) an "outward" transmission channel. Inward and outward cross-border spillover effects refer to the direction in which domestic macroprudential policies interact with foreign economies and institutions. Figure C.1 provides a highly stylised picture of the different transmission channels and the main types of institutions involved.

[24] The FSC framework is explained in more detail in "**Framework to assess cross-border spillover effects of macroprudential policies**", Financial Stability Committee, ECB, April 2020. The report is accompanied by a more extensive paper surveying the literature on cross-border spillovers and national practices in assessing those within the EU; see Kok, C. and Reinhardt, D. (eds.), "Cross-border spillover effects of macroprudential policies: A conceptual framework", *Occasional Paper Series*, ECB, forthcoming. The FSC Task Force worked in close collaboration with the relevant ESRB fora.

[25] The framework focuses on the cross-border spillover effects arising due to activated macroprudential measures. Accordingly, it does not explicitly consider systemic risk spillover effects from domestic financial systems to other countries due to macroprudential policy inaction by domestic authorities.

Figure C.1

Main transmission channels of cross-border spillover effects



Source: "Framework to assess cross-border spillovers of macroprudential policies", Financial Stability Committee, ECB, March 2020.

Inward transmission of cross-border spillover effects refers to the effects of domestic macroprudential policies on the domestic economy (d) related to the actions of entities headquartered in foreign economies (f). The inward transmission of domestic macroprudential policy describes how domestic regulation affects foreign affiliates (bank branches or subsidiaries) located in the domestic country, e.g. through "leakages" or "waterbed" effects, whereby activities migrate to entities not covered by the macroprudential measure. It also describes how domestic regulation affects the direct cross-border activity of foreign institutions in the domestic market. Thus, inward transmission of cross-border spillovers may occasionally reflect circumvention of the targeted national macroprudential measure and may render it less effective.

Outward transmission of cross-border spillover effects refers to the effects of domestic policies (d) on other foreign economies (f) and also, from the opposite perspective, the effect of foreign policies (f) on the domestic economy (d). The outward transmission of domestic macroprudential policy is related, but not restricted to, the international activities of domestic banking groups. Unintended outward effects of a policy may be channelled through the subsidiaries and branches of domestic banking groups operating in a foreign country or direct cross-border lending, or more indirectly through the impact on real activity and involving international trade channels.

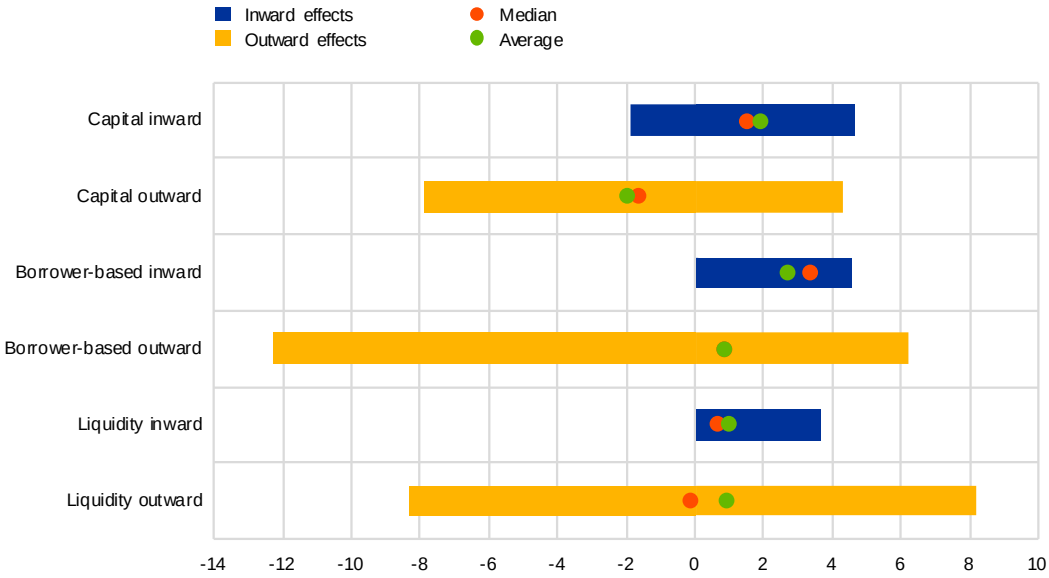
Findings from the empirical literature suggest that cross-border spillover effects can be meaningful. Although the evidence is somewhat mixed, in general it suggests that both inward and outward spillovers can be material (see Chart C.1). The magnitude and direction of the effects are nevertheless found to depend on the specific circumstances. In terms of inward spillovers, there is relatively solid evidence of the presence of leakages of domestic macroprudential measures, particularly through foreign branches not covered by the implementation of domestic policy. This provides a solid case for setting up policy reciprocity frameworks among highly integrated economies and financial systems, such as the EU. Outward spillover effects are also found to be present in most studies, with the effects on lending varying across instruments, bank balance sheet

characteristics and the nature of banks' relationships abroad (e.g. whether it is a core part of their business or more like an ancillary business line).

Chart C.1

Cross-border spillover effects according to the empirical literature across different transmission channels and macroprudential instruments

(loan growth in percentage points following a policy action or 1 p.p. increase in the policy instrument)



Source: "Framework to assess cross-border spillovers of macroprudential policies", Financial Stability Committee, ECB, February 2020.

Focusing on retail lending activity, material cross-border activity tends to be concentrated in specific areas of the EU. As regards retail lending by banks, most EU countries' banking sectors tend to have a strong home bias. In certain EU regions, however, strong cross-border activity has been observed through either bank ownership or exposures, such as among the Baltic and Nordic states, France and the Benelux countries, between Greece and Cyprus, Spain and Portugal, the UK and Ireland, and between Austria and many central and eastern European countries (see Table C.1).

Table C.1

Matrix of cross-border credit provision among EU countries (share of total credit in country column of banks in the sample from country row)

From\To	AT	BE	CY	DE	EE	ES	FI	FR	GR	IE	IT	LT	LU	LV	MT	NL	PT	SI	SK	UK	SE	PL
AT	74.64	0.25	1.83	0.84	0.01	0.23	0.29	0.20	0.10	0.66	0.18	0.44	0.62	0.39	1.08	0.42	0.09	14.78	37.63	0.34	0.15	1.21
BE	0.38	45.39	0.06	0.75	0.01	0.80	0.38	1.20	0.06	4.20	1.29	0.08	2.02	0.46	0.53	1.83	1.53	0.74	12.59	1.42	0.13	0.37
CY	0.01	0.01	66.30	0.09	0.00	0.00	0.00	0.01	0.13	0.02	0.01	0.00	0.01	0.01	0.03	0.01	0.00	0.00	0.00	0.01	0.00	0.00
DE	6.52	3.09	4.07	85.24	1.05	2.88	3.83	2.96	0.89	7.30	3.53	0.62	15.00	2.59	4.28	4.48	2.74	2.37	3.02	4.66	2.74	7.99
EE	0.00	0.00	0.00	0.00	81.03	0.00	0.03	0.00	0.00	0.00	0.00	1.32	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00
ES	0.63	0.75	0.05	1.03	0.05	86.73	1.03	1.39	0.16	1.61	1.93	0.10	2.28	0.05	4.95	0.85	30.92	0.03	0.25	10.76	0.27	7.23
FI	0.12	0.26	1.25	0.20	14.16	0.03	69.83	0.10	0.02	0.20	0.01	17.65	1.04	17.11	0.66	0.20	0.03	0.03	0.02	0.20	11.46	0.04
FR	1.54	28.24	2.14	3.25	0.55	3.52	1.90	90.29	1.11	6.70	13.24	0.14	42.53	0.07	4.45	3.90	4.48	10.54	2.33	4.66	1.46	7.39
GR	0.01	0.00	13.77	0.02	0.00	0.01	0.00	0.02	96.05	0.00	0.02	0.00	0.25	0.00	0.40	0.01	0.02	0.00	0.00	0.24	0.00	0.00
IE	0.25	0.42	0.16	0.30	0.04	0.30	0.19	0.40	0.24	58.90	0.08	0.09	0.54	0.01	0.18	0.75	0.23	1.41	0.46	2.02	0.31	0.10
IT	12.99	0.93	2.96	3.15	0.45	2.25	0.42	0.84	0.60	0.99	77.95	1.27	3.25	2.34	2.16	0.85	0.58	15.31	24.18	1.05	0.12	0.72
LT	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.01	0.00	72.47	0.00	0.38	0.00	0.00	0.00	0.05	0.01	0.00	0.08	0.01
LU	0.15	0.52	0.20	0.11	0.06	0.14	0.17	0.23	0.01	0.28	0.06	0.36	18.61	0.11	0.29	0.28	0.15	0.18	0.29	0.33	0.33	0.18
LV	0.02	0.01	0.17	0.00	1.10	0.00	0.01	0.00	0.01	0.02	0.00	3.35	0.02	71.82	0.02	0.01	0.01	0.00	0.02	0.01	0.04	0.01
MT	0.04	0.05	0.02	0.02	0.04	0.01	0.03	0.03	0.02	0.04	0.02	0.03	0.07	0.16	71.58	0.04	0.01	0.07	0.02	0.06	0.03	0.03
NL	1.59	19.19	3.52	3.12	0.13	1.93	2.15	1.18	0.26	2.32	1.16	0.10	6.20	0.56	2.90	84.42	0.82	0.17	1.34	1.78	0.65	5.51
PT	0.04	0.06	0.00	0.04	0.02	0.60	0.03	0.11	0.08	0.11	0.21	0.01	0.23	0.14	0.24	0.09	57.91	0.00	0.02	0.06	0.03	2.94
SI	0.06	0.04	0.01	0.01	0.01	0.01	0.04	0.01	0.00	0.04	0.01	0.21	0.04	0.28	0.00	0.03	0.01	49.09	0.14	0.01	0.01	0.03
SK	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03	0.00	0.38	0.00	0.00	0.03	12.50	0.00	0.00	0.04
UK	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.49	0.00	11.00	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.00	70.77	0.00	0.00
SE	0.11	0.14	0.18	0.38	0.77	0.02	13.37	0.07	0.00	0.20	0.01	1.50	1.17	1.59	2.34	0.51	0.04	0.01	0.00	1.16	81.78	0.10
PL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.76
Other	0.90	0.63	2.68	1.42	0.08	0.54	6.30	0.44	0.28	5.38	0.30	0.26	6.08	0.97	3.47	1.33	0.43	5.18	5.19	0.47	0.32	0.36
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Sources: ECB and ECB calculations based on COREP reporting. Reference date is Q4 2018.
Notes: The values were calculated using supervisory data at the highest level of consolidation of about 430 banks supervised by the SSM including SIs and LSIs. This implies that credit provided to country "X" by a subsidiary of a bank resident in country "Y" is accounted for as cross-border credit. The total credit of each country is calculated as the sum of the credit from the individual countries, meaning that the total credit does not include credit from banks in non-EU countries, unless these banks have a subsidiary under SSM supervision (in this case the credit is included under the "Other" country).

The potential for cross-border spillovers may be more prevalent in banking sectors with a strong presence of foreign subsidiaries, particularly foreign branches. The empirical literature has provided some evidence that macroprudential leakages may arise due to the presence of foreign branches not being subject to measures targeting the domestic banking sector (i.e. inward spillovers).[26] As shown in Chart C.2, foreign branches are relatively important in a few EU banking sectors such as Luxembourg, Finland, Ireland, Slovakia and Estonia (as well as Malta[27]; not shown). At the same time, the presence of foreign subsidiaries is important in a number of countries, most notably the Baltics and Slovakia.

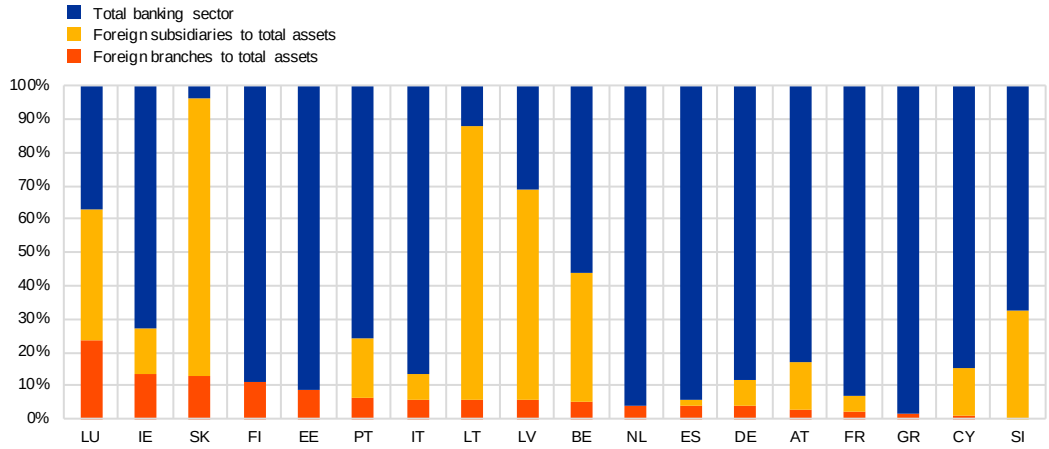
While focusing on bank lending transmission channels, the macroprudential authorities should also consider other potential activity channels and institutions. In addition to traditional bank lending channels, authorities must also keep an eye on the cross-border transmission of macroprudential measures through bank non-lending channels as well as through non-bank lending and market-financing channels. A comprehensive analysis of cross-border spillovers should thus include both an institutional perspective and a market or activity-based analysis.

[26] For a detailed review of the literature, see Kok, C. and Reinhardt, D. (eds.), "Cross-border spillover effects of macroprudential policies: A conceptual framework", *Occasional Paper Series*, ECB, forthcoming.

[27] Notwithstanding the relatively high total assets of foreign branches to domestic GDP ratio for Malta, from a risk-based perspective, these entities exhibit no links with the Maltese domestic economy and thus, the potential risk of inward spillover effects is negligible.

Chart C.2

Total assets of foreign branches and subsidiaries to total banking sector assets



Source: ECB and FSC calculations.
Note: Based on Statistics of Structural Indicators and BSI Statistics. Malta is not shown due to confidentiality reasons. Reference date is Q4 2018

C.3 An extensive list of indicators for assessing cross-border spillovers

A survey of national authority practices conducted by the FSC concluded that there is merit in extending the existing guidance for the assessment of cross-border spillovers. In 2018, the FSC surveyed the practices for assessing cross-border spillovers used by national designated and competent authorities (as well as the ECB).[28] Existing frameworks are primarily indicator-based, relying heavily on the guidance provided in the ESRB Handbook. Besides the guidance provided in this Handbook, a few authorities have used additional inputs as the basis for their assessment, such as findings obtained from empirical models and complementary indicators. Responses to the questionnaire indicated that enhancements to the current operational guidance should address a number of essential gaps: (i) the lack of guidance on suitable models; (ii) the absence of explanations for indicators (including indicative data sources for each indicator); (iii) the difficulties of gathering data to calculate some of the indicators; and (iv) the difficulties in mapping the indicators to the channels and the direction of cross-border effects.

Against this background, the FSC devised an extensive list of cross-border spillover indicators accompanied by operational guidance on how to calculate them.[29] It is recommended that the starting point for the analysis of the existence of cross-border spillover effects in the context of macroprudential policy activations is a set of indicators, which would serve the purpose of signalling the potential for spillovers across the various dimensions highlighted in Figure 1. The harmonised FSC Indicator List should be the starting point for providing macroprudential authorities within the EU with "guided discretion" for assessments of cross-border spillover effects of planned macroprudential measures, as well as for ex post monitoring of these

[28] Apart from a targeted questionnaire to the NCAs/NDAs, the information provided by Member States' relevant authorities to the ESRB follow-up questionnaire on compliance with **Recommendation ESRB/2015/2** was also taken into account.

[29] The FSC Indicator List is published as an annex to "**Framework to assess cross-border spillover effects of macroprudential policies**", Financial Stability Committee, ECB, April 2020.

measures. Authorities are encouraged to complement this with other indicators depending on the circumstances in their jurisdiction. The FSC recommended list of indicators is consistent with, but contains more than, the ESRB Handbook indicators.

The FSC also expands on the ESRB Handbook indicators by making it more operational for practical purposes, providing a detailed description of how to calculate the relevant indicators. The majority of authorities believe it is worthwhile extending the existing guidance. As regards indicators, authorities highlighted that additional practical guidance from the FSC on the build-up of a common set of indicators and possible thresholds to assess the materiality of the spillovers would be very useful. Authorities also mentioned the absence of explanations for indicators (including indicative data sources for each one), the difficulties of gathering data to calculate some of the indicators and the difficulties in mapping the indicators to the channels and the direction of cross-border effects.

The Indicator List is accompanied by guidance on how to calculate and use the indicators. In this regard, the FSC approach contains a shortlist of indicators that should be used as a starting point for an assessment, complemented with a supplementary set of indicators that may or may not be useful depending on the specific situation (as well as data availability). The list of indicators and more detailed guidance on the operational steps needed for calculating and using the indicators is provided by the ECB[30].

The set of indicators takes into account the perspective of the domestic country (d). Both indicators for measuring inward and outward spillovers have been selected from this perspective. As mentioned in the introduction, the starting point of the conceptual framework presented in this report is Chapter 11 of the ESRB Handbook, according to which, a country activating a macroprudential policy is referred to as the domestic economy (d), and other countries which are potentially affected by the policy are referred to as foreign economies (f). Inward transmission refers to the effects of domestic macroprudential policies (d) on the domestic economy (d) related to the actions of entities headquartered in foreign economies (f). Instead, outward transmission of cross-border spillover effects refers to the effects of domestic policies (d) on other foreign economies (f). The effects of foreign macroprudential policies (f) on the domestic economy (d) can be characterised both as outward spillovers from the perspective of the foreign activating countries (f) and as inward spillovers from the perspective of a passive domestic policymaker (i.e. a policymaker confronted with the activation or tightening of a macroprudential measure in another country).

For operational reasons, the list of indicators has a decision tree structure. To facilitate the assessment, the table of indicators is structured as follows: after selecting the bank- or non-bank-channel, the analysis starts with the selection of the policy instrument applied, whether an ex ante or ex post assessment is to be done, then if the assessment is done by the country activating the measure or not and, lastly, what kind of spillover to assess (inward or outward). Conditional on this, policymakers are provided with a range of indicators. Table C.2 illustrates this structure for the bank-channel. It is worth mentioning that some indicators might appear more than once as they might be applicable for ex ante and ex post assessment and/or for more than one policy instrument.

[30] See "**Framework to assess cross-border spillover effects of macroprudential policies**", Financial Stability Committee, ECB, April 2020.

Table C.2

Decision tree structure to determine the relevant indicators

Instrument category	Instruments	Assessment	Activating/ Passive country	Spillover direction	Indicator
Capital, Liquidity or Borrower-Based	A	Ex ante	Activating	Inward	BAI1
					BAI2
				Outward	BAO1
					BAO2
			Passive	Inward	BAI1
					BAI2
		Ex post	Activating	Inward	BPI1
					BPI2
				Outward	BPO1
					BPO2
			Passive	Inward	BPI1
					BPI2
	B	…	…	…	…
	C	…	…	…	…

Source: "Framework to assess cross-border spillovers of macroprudential policies", Financial Stability Committee, ECB, March 2020.

The indicators have been differentiated by category of instrument, distinguishing between capital-based, liquidity-based and borrower-based instruments. The first step in the categorisation process makes it possible to differentiate between spillover channels for each category of instrument. Similarly, further differentiation within categories helps to select the appropriate indicators. The scope of an instrument may differ, for instance. While some capital-based instruments do not (automatically) apply to branches of foreign banks (e.g. those based on Article 458 of the CRR), others do (e.g. the CCyB up to 2.5%).

Both ex ante and ex post indicators have been developed. Ex ante indicators provide insight into the potential for cross-border spillovers by measuring cross-border interlinkages. These indicators are particularly relevant before an instrument is activated. Ex ante indicators are usually measured in levels. Ex post indicators are particularly relevant for gaining insight into the development of potential cross-border spillovers after an instrument has been activated and are therefore usually expressed in terms of changes between periods t and t-1 (where t-1 is the period just prior to the policy activation).

The FSC has also reflected on how to derive relevant threshold values to determine when an indicator would signal the potential for material cross-border spillovers. Apart from pure expert judgement, two approaches to determine relevant threshold values have been considered: (i) a percentile approach based on the historical distribution of the indicator; and (ii) an early warning "signalling" approach based on the indicator's ability to predict material cross-border spillovers. While the latter approach is more conceptually appealing, at this point in time the former was deemed to be the more appropriate in light of current empirical evidence and data availability. Over the medium term, however, and once the information set improves, a signalling approach is

worth pursuing and national authorities together with the ECB and the ESRB should be encouraged to explore this option alongside the more simplistic percentile approach.

In its work on indicators, the FSC has also identified a number of data gaps that to some extent hinders an effective and comprehensive assessment of cross-border spillover effects across the EU. While the common European supervisory reporting framework provides a full, granular and comparable data set for establishing indicators to assess cross-border spillovers through banks, national supervisors do face some considerable obstacles, especially where a significant share of the domestic market relies on foreign branches and lending from foreign banks abroad. NCAs generally do not have access to data on direct cross-border lending of foreign banks to their country. In addition, reporting on foreign branches to host authorities is often very limited. While some information on foreign branches is exchanged between home and host competent authorities, it is often not sufficient to monitor all inward spillover effects.

To improve the cross-border spillover monitoring capacity within the EU, further efforts to exchange and potentially centralise relevant information should be encouraged. For NDAs/NCAs, it would be useful to have more supervisory data on significant branches to better assess prospective spillovers. In keeping with the need-to-know and proportionality principles, the exchange of necessary information about relevant branches should be facilitated. A couple of supranational initiatives have already been launched in an attempt to overcome some of these data gaps. Centralising the collection of this data would be beneficial in obtaining a complete overview of exposures. ESRB within the EU context and the ECB in its SSM capacity would be well-placed to access data for a multitude of countries and to benefit from economies of scale in the indicator calculation. The benefits of collecting and exchanging new data should obviously be weighed against the costs, and must be fully justified by the important role it would play in monitoring financial stability.

Data gaps are even bigger for non-bank transmission channels. Cross-border data for non-bank financial institutions is generally scarce and mostly available only at aggregate levels. Hence, for the time being cross-border spillover effects through non-bank channels can at best be measured and monitored only approximately.

C.4 An empirical benchmark tool

In addition to the extensive Indicator List, the FSC has created a user-friendly Excel-based tool to support ex ante assessments of likely spillover effects. Based on an extensive survey of the empirical literature[31], a range of quantitative estimates based on existing studies has been integrated into a user-friendly tool (henceforth referred to as the Empirical Benchmark Tool). The Empirical Benchmark tool, which is published as an annex[32], offers a basis for deeper spillover analysis than is possible from simple indicators (that typically do not contain information about causality). It provides authorities with a user-friendly tool, to be used at their discretion, to gauge the

[31] Kok, C. and Reinhardt, D. (eds.), "Cross-border spillover effects of macroprudential policies: A conceptual framework", *Occasional Paper Series*, ECB, forthcoming.

[32] See "**Framework to assess cross-border spillover effects of macroprudential policies**", Financial Stability Committee, ECB, April 2020.

range of potential spillover effects from considered macroprudential measures, while noting that the output needs to be interpreted with caution (as described in more detail in this report).[33]

The tool currently contains 51 entries from 21 studies. As seen in Table C.3, most studies focus on capital requirements and liquidity requirements. The high number of liquidity requirements is due to the inclusion of reserve requirements, while studies analysing the liquidity coverage ratio and the net stable funding ratio are still rare. A summary of the findings with ranges across different types of instruments is illustrated in Chart C.1.

Table C.3

Number of studies included in the tool

	Direction/Geographical Coverage					
Instrument	**Europe**	**Advanced Countries**	**World**	**Europe**	**Advanced Countries**	**World**
Capital	1	0	6	2	0	10
Borrower-based	2	1	2	2	0	7
Liquidity	1	0	7	2	0	8

Source: "Framework to assess cross-border spillovers of macroprudential policies", Financial Stability Committee, ECB, March 2020.

C.5 Some reflections on reciprocity

To minimise the risk of macroprudential policy leakages arising from inward spillover effects, various reciprocity arrangements, both mandatory and voluntary, have been put in place within the EU.[34] Reciprocity of macroprudential measures taken at domestic level is therefore aimed at ensuring that the measures are effective in achieving their stated objectives by reducing potential cross-border spillover effects. It is of great importance that an effective and efficient reciprocity framework exists for measures for which material spillovers have been observed or could reasonably be expected. The tools and indicators provided by the FSC can inform future discussions on the appropriate intensity of reciprocity by providing information on which macroprudential instrument spillovers are most material. Furthermore, indicator-based analysis reinforces and complements the ESRB guidelines on the design and required flexibility in the use of materiality thresholds.

Flexibility is warranted when setting the materiality threshold to be applied to determine which foreign institutions fall under the reciprocity scope of a macroprudential measure. The orientation value of a 1% materiality threshold has been introduced to balance the costs and benefits of reciprocation and to set a starting point to be considered when requesting reciprocity. However, this orientation value may not work in specific cases. One example could be when many banks from the same jurisdiction operate in another jurisdiction with individually small exposures

[33] The Occasional Paper cited in the previous footnote also contains an extensive review of more theoretically-based simulation models that could complement the Empirical Benchmark tool for ex ante assessments. For a recent application of such a simulation-based assessment of cross-border spillover effects, see Cantone, D., Jahn, N. and Rancoita, E., "**Thinking beyond borders: how important are reciprocity arrangements for the use of sectoral capital buffers?**", *Macroprudential Bulletin*, ECB, September 2019.

[34] Reciprocity, as defined by the ESRB, is an "*arrangement, whereby the relevant authority in one jurisdiction applies the same, or equivalent, macroprudential policy measure, as is set by the relevant activating authority in another jurisdiction, to any financial institutions under its jurisdiction, when they are exposed to the same risk in the latter jurisdiction*". See Section 2, paragraph 1(f) of **Recommendation ESRB/2015/2**.

but material exposures at aggregate level. Another example could be when a foreign institution operates in a host jurisdiction through both a foreign branch and a foreign subsidiary, which could incentivise regulatory arbitrage to avoid being affected by macroprudential measures introduced by host authorities. In those cases, the activating country should be allowed the option of diverging from the 1% rule (e.g. setting a lower threshold or applying the threshold at consolidated level) to ensure the effectiveness of the measure.

The FSC cross-border spillover framework provides a good quantitative basis indicating the need for reciprocity. The FSC framework has identified and presented a number of different indicators that can be calculated to assess the materiality of the spillover effects, which in turn give an indication of the need for reciprocity of a certain measure. Complemented with the expert judgement of the activating authority, this makes for a well-grounded decision on the materiality threshold, with the ESRB Assessment Team acting as a final check-point on the appropriateness of the threshold level.

C.6 Conclusion

This special feature presented a newly-established framework for the monitoring and assessment of cross-border spillover effects. The framework has been devised taking Chapter 11 of the ESRB Handbook as a starting point, as well as existing national practices and an extensive review of existing studies of cross-border spillover effects. The design of the framework (both the Indicator List and the Benchmark Tool) was aimed at making it as practical and operational as possible. This notwithstanding, it is still too early to tell how it works in practice and the FSC is committed to reviewing the framework once initial feedback has been gathered.

Special Feature D: Residential real estate taxation and macroprudential policy[35]

Residential real estate-related (RRE-related) taxes and changes to them may have a significant impact on RRE prices as well as on incentives for mortgage-related household debt. RRE-related taxes rarely account for a substantial portion of fiscal revenue but they can have a considerable influence on financial stability outcomes through the asset (house) price and household debt channels.[36] Taxation acts mainly through demand-side incentives for households to own, rent, invest in RRE or take on mortgage debt. Taxes also affect the supply of residences, but such taxes[37] are more relevant for RRE developers than households.

RRE-related taxes affect the cost of buying, financing, owning, renting, selling, gifting or inheriting property. Taxes that are of particular relevance for financial stability comprise RRE-related transaction tax, recurrent property ownership and income taxes. The latter group includes capital gains tax, rental income taxes, and provisions for mortgage interest deductibility. While tax changes, especially material ones, are likely to be more or less capitalised into house prices immediately, certain RRE-related taxation provisions may also have powerful structural incentives with important long-term macroprudential ramifications for house prices and household indebtedness. This special feature highlights the macroprudential impact of selected RRE-related taxes and describes their interlinkages with macroprudential instruments.

D.1 Residential real estate-related taxation

RRE taxation can be seen as a tax on the consumption of housing services or as a payment for local public services, but in most cases it is closely related to capital taxation rules.[38] Given the prevailing use of RRE taxation as an investment asset, an ideal (first-best) and neutral tax treatment with respect to other investments is to tax the net return from a property, including capital gains, after the deduction of depreciation, maintenance costs and interest payments. In the case of owner-occupied housing, this implies taxing an imputed rent[39], but most countries choose to substitute imputed rent taxation with a blend of transaction and recurrent property taxes. However, the combination of mortgage interest tax relief and a recurrent property tax, the latter often at low rates and based on outdated property values, leads to a bias towards home ownership and debt financing. Therefore, the second-best solution is to abolish the deductibility of mortgage interest payments and the transaction tax, and to levy a recurrent property tax based on up-to-date market valuations instead.

35 Prepared by Tomas Garbaravicius and Edita Giedraite (both Lietuvos bankas).

36 See also "**Report on residential real estate and financial stability in the EU"**, ESRB, December 2015.

37 For example, value added tax for the sale of new buildings or vacancy tax.

38 See Johannesson Lindén, Å. and Gayer, C., "**Possible reforms of real estate taxation: Criteria for successful policies"**, *Occasional Paper Series*, No 119, European Commission, Directorate-General for Economic and Financial Affairs, October 2012.

39 An imputed rent is the rental value of owner-occupied housing (i.e. rental income saved by a homeowner).

Recurrent property tax

The property tax imposes a direct and recurrent cost on homeowners. Despite the fact that RRE usually represents the largest share of household assets, it is still the majority's favourite investment asset. Without a disincentive in the form of a recurrent property tax or other types of tax, most people are therefore likely to prefer RRE to other investments. In the absence of a total wealth tax, the recurrent property tax also serves as a partial wealth tax. In addition, inheritance tax could also be viewed as a postponed recurrent property tax, but the latter is annual, much smaller and thus perhaps easier to stomach over time than the former. Moreover, a large one-off inheritance tax creates strong incentives to avoid it altogether.

The recurrent tax on property may be designed in a multitude of ways, but certain features may have positive financial stability implications by dampening house price volatility. As a general rule, the more punitive and progressive the design, the less attractive RRE becomes for investment purposes. In this regard, three possible features stand out: heavier taxation of non-primary residences, non-deduction of the associated mortgage debt from the tax base, and the use of up-to-date market valuations for the tax base.

First, a higher property tax on secondary and subsequent residences lowers incentives for buy-to-let activity, which is also often debt-financed. Although an optimal supply of RRE for renting is dynamic and market-specific, an excessive increase in debt-financed buy-to-let activity could put pressure on house prices and burden banks with riskier exposures.

Second, using gross rather than net-of-debt property values for the tax base reduces incentives for debt accumulation by households. Allowing the deduction of associated mortgage debt from the property tax base introduces a bias in favour of leveraged investment in RRE, even when it could be achieved without debt financing. Furthermore, it also encourages mortgage equity withdrawal, not least because for households it is usually more difficult to leverage other types of assets. It is also noteworthy that in Norway, for example, the net wealth tax allows for a full deduction of mortgage debt from the wealth tax base, but only a certain portion of debt used to fund other types of assets, thereby creating an additional advantage for RRE investments.

Third, a closer alignment of the tax base with up-to-date market valuations could strengthen the dampening impact on house price volatility. A full and frequent revaluation of cadastral (taxable) values could introduce too much volatility into payable tax liabilities, making it especially burdensome for asset-rich (in the form of housing), low-income households. Some limited smoothing and lagging mechanisms of taxable values could therefore be adopted to alleviate such volatility, but at the same time they should not present much distortion to the allocation of capital among the various types of investments.

Transaction tax

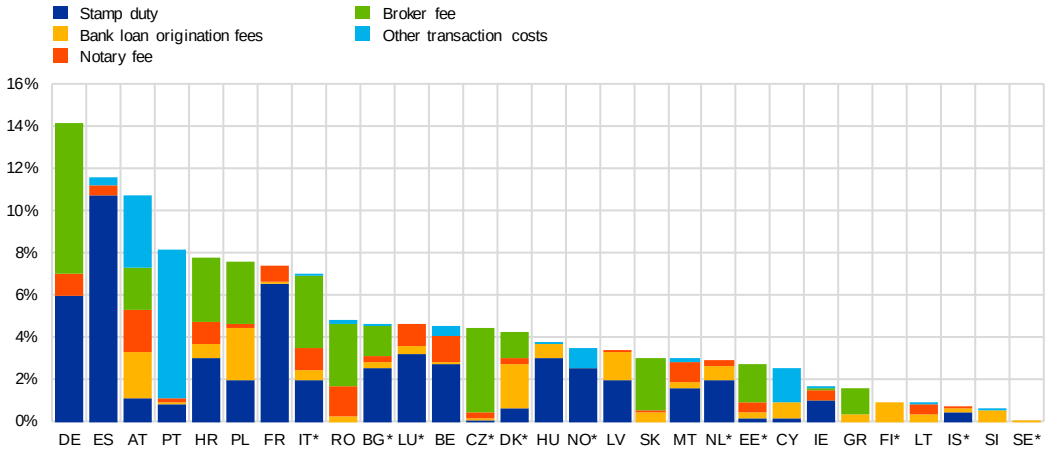
The transaction tax on the transfer of residential property represents a one-off cost of home ownership. Just like other RRE-related taxes, the transaction tax (stamp duty) discourages home ownership and also makes other untaxed assets more attractive when it applies to RRE transactions only. However, it also distorts the reallocation of residential properties, as well as the efficient allocation of capital among different investments in general. Moreover, it reduces market liquidity, creates welfare loss, and also hampers labour mobility and home exchange. The stamp duty is usually charged as a certain percentage of the transaction price, which makes its distorting effects even more significant.

While the property transaction tax is a procyclical source of fiscal revenue, it might have a countercyclical impact on house prices. The stamp duty is not the only, but often by far the largest, part of transaction costs faced by a homebuyer (see Chart D.1). Taken together, these transaction costs represent a significant barrier to entering the housing market. Moreover, most of them are also proportional to the transaction value. As a result, with higher house prices, a larger amount of money is needed to pay the stamp duty and other transaction fees, thereby forcing some potential buyers to postpone purchases and easing pressure on house prices. The evidence on whether a higher transaction tax rate or its increase could, ceteris paribus, deter speculation is not clear-cut. In any case, the EU tax authorities have not been using stamp duty as a tool to moderate house price volatility. Outside the EU - in Canada and New Zealand for example - special transaction taxes have been introduced for acquisitions by non-residents to discourage an influx of foreign RRE investors.

Chart D.1

Estimated cost of entry into the housing market: stamp duty and other transaction costs paid by the buyer

(percentage of average price of a standard apartment bought by a hypothetical family)



Sources: IWG/AWG membership survey and Bank of Lithuania calculations.
Notes: (1) A hypothetical family with two children; both parents earn an average salary and decide to buy their first home (i.e. first-time buyers), namely, a 70 m^2 three-bedroom apartment in a new building located in one of the residential neighbourhoods of the capital city; (2) in some cases, bank fees can also include mortgage registration and notary fees; (3) other transaction costs include property transfer taxes, property and mortgage registration fees, and other administrative costs; (4) in countries that are marked with an asterisk (*), mortgage interest deductibility could be applied based on the family situation; (5) in Norway, the described hypothetical family would not be able to obtain a mortgage for the specified apartment as it would not fulfil existing borrower-based requirements.

Rental income, capital gains taxes and mortgage interest deductibility

Although most EU countries do not tax imputed rents on owner-occupied housing, it is nevertheless important to tax other rental income in the same way as other capital income. Otherwise, RRE investments would have an advantage over other types of capital income, e.g. interest income on bonds or dividends from equity investments.

In the same vein, capital gains from RRE transactions should be taxed as capital gains on the transfer of other assets. However, more often than not various reductions, deferrals or full exemptions apply for capital gains made on a primary residence, properties held for a certain period or when the gain is reinvested in another property (i.e. home exchange or upgrade); this results in another bias in favour of RRE investments. There are also strong doubts as to whether capital

gains tax can meaningfully restrain speculative activity. In contrast to the transaction tax, where tax liability arises when a purchase transaction is made, the capital gains tax liability materialises only when a divestment is made and can be satisfied from the sale proceeds.

Mortgage interest relief is intended to lower costs for homebuyers. However, given that usually neither imputed rents nor capital gains are taxed to the same extent as other investment returns, it leads to a bias towards leveraged RRE investments. The deductibility of interest payments lowers the after-tax cost of debt and thereby creates incentives to use debt financing. Moreover, it specifically promotes mortgage debt, as the deductibility of interest payments on other forms of debt is rarely available to households.

The deductibility of mortgage interest encourages debt-financed homeownership and may lead to adverse macroprudential outcomes. The combination of lower after-tax mortgage interest costs and various other tax benefits of homeownership results in a strong structural bias in favour of debt-financed RRE investments. This is likely to be capitalised in house prices and might contribute to housing bubbles as well as excessive household debt accumulation. In other words, favourable RRE-related taxation represents an important structural vulnerability that poses financial stability risks and increases the probability of a real estate-related banking crisis.[40] Mortgage interest deductibility is still allowed in 11 EEA countries[41]. It is worth mentioning that eight of these countries were included in the list of 11 countries[42] that received ESRB country-specific warnings and recommendations on medium-term vulnerabilities in the RRE sector in September 2019.[43]

D.2 Interaction of macroprudential and RRE-related taxation instruments

Taxation is first and foremost used to meet various fiscal policy objectives, but in so doing can also contribute to financial stability. Individual RRE-related taxes, combinations thereof or specific design features may produce spillovers with macroprudential consequences. Spillovers in the opposite direction are much less direct, but nonetheless material, given that macroprudential policy helps to ensure RRE market stability and macro-financial stability more generally.

The extent to which taxation and macroprudential instruments can be substituted for or complement each other depends on their impact, transmission channels and mutual reinforcement.[44] For instruments to be substitutes, both of them should be able to achieve the same effect through the same transmission channel. If this is the case, then the use of one may call for a deactivation of the other, whereas the choice of an instrument should be based on relative effectiveness. By contrast, instruments would be complements if the use of one enhances the effectiveness of the other or because they operate through different transmission channels. In practice, however, the line between substitutes and complements is often blurred, as even substitutes could be calibrated for joint additional use to achieve a desired effect. Since taxation and macroprudential instruments are activated by different authorities, the coordination needs are greater for instruments that are complementary rather than substitutable, assuming that the conflicting uses of the latter are less likely to happen.

40 "**Report on residential real estate and financial stability in the EU"**, ESRB, December 2015.

41 BG, CZ, DK, EE, FI, IS, IT, LU, NL, NO, SE.

42 BE, CZ, DE, DK, FI, FR, IS, LU, NL, NO, SE, of which only BE, DE and FR do not allow mortgage interest deductibility.

43 "**ESRB issues five warnings and six recommendations on medium-term residential real estate sector vulnerabilities"**, ESRB, press release, 23 September 2019.

44 See Fell, J., **"Real estate-related taxation and macroprudential policy: substitutes or complements?"**, presentation at the Macroprudential Policy Conference 2019 organised by the Bank of Lithuania in Vilnius, 1-2 July 2019.

The transaction tax and the loan-to-value (LTV) requirement could complement each other. Both instruments require a certain amount of savings from a buyer/borrower and thus their joint use (change) could strengthen the effect on house prices and related credit demand. However, the transaction tax would operate mainly through the house price channel, whereas the LTV requirement would operate largely through the credit channel and would also affect household and bank resilience. In the case of special transaction taxes for RRE acquisitions by foreigners, an additional transmission channel would be opened for non-resident investors.

There are many other examples of the interaction between macroprudential and RRE-related taxation instruments, but it all boils down to their impact on house prices and mortgage debt. For example, a stricter debt-to-income (DTI) requirement and lower mortgage interest relief would both reduce credit demand and lower house prices. A higher recurrent property tax and stricter LTV requirement for non-primary residences would both reduce incentives for buy-to-let activity, thereby easing pressure on house prices and reducing demand for related riskier mortgages. However, only capital- and borrower-based macroprudential tools can directly ensure bank and household debt-related resilience, whereas both taxation and macroprudential instruments could be used to moderate house prices and mortgage debt cycles.

It is also important to note that RRE-related taxation has a much more all-encompassing effect on the housing market than macroprudential policy, since the latter operates largely through the credit market. First, RRE-related taxation applies to the entire housing stock, including all properties that are not mortgaged. Second, it also affects all RRE transactions, including speculative investment flows and buy-to-let activity, even if transactions are not financed with debt. Third, RRE-related taxation covers mortgages provided by unregulated entities. Fourth, taxation may also be more successful in capturing cross-border RRE-related activities.

D.3 Conclusions

The shortest summary of how RRE-related taxation could contribute to financial stability would also be the best advice on this matter: RRE-related taxation should not promote debt-financed homeownership. RRE-related taxation features that skew incentives in favour of RRE investments or mortgage debt financing may pose risks to financial stability by putting pressure on house prices and increasing household indebtedness. In this regard, it is critical to phase out the preferential treatment of RRE investments, particularly the deductibility of mortgage interest payments.

The interaction between macroprudential policy and taxation deserves more attention and cooperation between fiscal and macroprudential policymakers. Taxation is a very powerful policy tool, but tax authorities more often than not tend to disregard the macroprudential dimension of various taxes and prioritise other objectives. Moreover, macroprudential and taxation instruments can be both substituted for and complement each other, but their interaction in addressing risks to financial stability remains relatively unexplored, either theoretically or empirically.[45] The relative effectiveness, flexibility and implementation lags of instruments may also differ. Given the importance of taxation, macroprudential authorities must develop expertise and proactively inform fiscal policymakers about the macroprudential aspects of RRE-related taxation.

[45] To strengthen the assessment of the financial stability implications of various RRE-related tax measures, macroprudential policy databases should also include taxation changes, not least because available research points to a quite significant impact of some RRE-related taxation changes on house price and credit dynamics.

Countries and abbreviations

Countries

AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GR	Greece
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom
IS	Iceland
LI	Liechtenstein
NO	Norway

Other

AWG	Analysis Working Group
BIS	Bank for International Settlements
CCoB	capital conservation buffer
CCyB	countercyclical capital buffer
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
d-SRI	domestic systemic risk indicator
EBA	European Banking Authority
EEA	European Economic Area
EME	emerging market economy
EU	European Union
FSC	Eurosystem Financial Stability Committee's
GDP	gross domestic product
G-SII	global systemically important institution
IMF	International Monetary Fund
LGD	Loss Given Default
MPAG	Macroprudential Analysis Group
NCA	national competent authority
NDA	national designated authority
O-SII	other systemically important institution
PPP	purchasing power parity
REER	real effective exchange rate
RRE	residential real estate
RTS	regulatory technical standards
SyRB	systemic risk buffer
TFSE	Task Force on Spillover Effects

Imprint

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