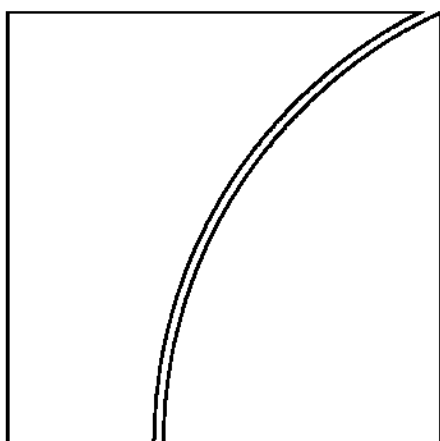Basel Committee
on Banking Supervision

Guidance for national authorities operating the countercyclical capital buffer

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BANK FOR INTERNATIONAL SETTLEMENTS

Contents

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operating the countercyclical capital buffer

1. Introduction

This document sets out procedures and guidance for national authorities operating the countercyclical capital buffer regime. It sets out what is required of the national authorities responsible for operating the countercyclical buffer regime, the principles that they should follow in making buffer decisions and the calculation of the common buffer guide that will feed into buffer decisions across jurisdictions. In addition to providing guidance for national authorities, this document should help banks to understand and anticipate the buffer decisions in the jurisdictions to which they have credit exposures.

2. Objective

The primary aim of the countercyclical capital buffer regime is to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build up of system-wide risk. Protecting the banking sector in this context is not simply ensuring that individual banks remain solvent through a period of stress, as the minimum capital requirement and capital conservation buffer are together designed to fulfil this objective. Rather, the aim is to ensure that the banking sector in aggregate has the capital on hand to help maintain the flow of credit in the economy without its solvency being questioned, when the broader financial system experiences stress after a period of excess credit growth. This should help to reduce the risk of the supply of credit being constrained by regulatory capital requirements that could undermine the performance of the real economy and result in additional credit losses in the banking system.

In addressing the aim of protecting the banking sector from the credit cycle, the countercyclical capital buffer regime may also help to lean against the build-up phase of the cycle in the first place. This would occur through the capital buffer acting to raise the cost of credit, and therefore dampen its demand, when there is evidence that the stock of credit has grown to excessive levels relative to the benchmarks of past experience. This potential moderating effect on the build-up phase of the credit cycle should be viewed as a positive side benefit, rather than the primary aim of the countercyclical capital buffer regime.

3. National buffer decisions

The relevant authority[1] in each jurisdiction will be required to monitor credit growth and make assessments of whether such growth is excessive and is leading to the build up of system-wide risk. Based on this assessment they will need to use their judgement, following the guidance set out in this document, to determine whether a countercyclical buffer requirement should be imposed. They will also need to apply judgement to determine whether the buffer should increase or decrease over time (within the range of zero to 2.5% of risk weighted assets[2]) depending on whether they see system-wide risks increasing or decreasing. Finally they should be prepared to remove the requirement on a timely basis if the system-wide risk crystallises.

Basel III: A global regulatory framework for more resilient banks and banking systems sets out the procedure that each bank must follow to determine the specific countercyclical buffer requirement, which is based on a weighted average of the buffers in effect in the jurisdictions to which they have a credit exposure. This document also explains how the countercyclical buffer will be implemented by extending the size of the minimum buffer range established by the capital conservation buffer.

Any increases in the countercyclical buffer need to be preannounced by up to 12 months to give banks time to meet the additional capital requirements before they take effect, while reductions in the buffer would take effect immediately to help to reduce the risk of the supply of credit being constrained by regulatory capital requirements.[3]

4. Principles underpinning the role of judgement and the common reference guide

Authorities are expected to apply judgment in the setting of the buffer in their jurisdiction after using the best information available to gauge the build-up of system-wide risk. In addition, they are expected to calculate the internationally consistent buffer guide that can serve as a common starting reference point for taking buffer decisions.

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[1] To account for the fact that institutional arrangements vary considerably across the world, the relevant authority to operate the buffer is left to the discretion of each jurisdiction. However, it is important that whichever authority is chosen, the choice of buffer requirement is taken after an assessment of as much of the relevant prevailing supervisory and macroeconomic information as possible, bearing in mind that the operation of the buffer requires information from both of these sources and that it will have implications for the conduct of monetary and fiscal policies, as well as banking supervision. The timely sharing of information among these authorities is therefore necessary to ensure that the actions of all parties are fully informed and consistent with each other.

[2] National authorities can implement a range of additional macroprudential tools, including a buffer in excess of 2.5%, if this is deemed appropriate in their national context. This would apply to domestically domiciled banks, including domestically incorporated subsidiaries of foreign banks. But the international reciprocity provisions set out in this regime would not apply to the amount of the buffer in excess of 2.5% of risk weighted assets.

[3] Banks outside of this jurisdiction with credit exposures to counterparties in this jurisdiction will also be subject to the increased buffer level after the pre-announcement period in respect of these exposures. However, in cases where the pre-announcement period of a jurisdiction is shorter than 12 months, the home authority of such banks should seek to match the preannouncement period where practical, or as soon as possible subject to a maximum pre-announcement period of 12 months, before the new buffer level comes into effect.

The common reference guide is based on the aggregate private sector credit-to-GDP gap. The methodology for calculating this and transforming it into the buffer guide is set out in Annex 1. Also presented in Annex 1 is evidence that shows how this variable would often have been a useful indicator in the past of the build up of system-wide risk.

The guide does not always work well in all jurisdictions at all times. Judgment coupled with proper communications is thus an integral part of the regime. Rather than rely mechanistically on the credit/GDP guide, authorities are expected to apply judgment in the setting of the buffer in their jurisdiction after using the best information available to gauge the build-up of system-wide risk.

It is crucial, however, that the use of judgment be firmly anchored to a clear set of principles to promote sound decision-making in the setting of the countercyclical capital buffer. By extension, communicating buffer decisions should help banks and other stakeholders understand the rationale underpinning the decisions and promote sound decision making by authorities responsible for operating the buffer. In this respect, the credit/GDP guide provides a useful common reference point against which the exercise of judgment can be understood. The following principles have been formulated by the Committee to guide authorities in the use of judgment in this framework.

*Principle 1: **(Objectives)** Buffer decisions should be guided by the objectives to be achieved by the buffer, namely to protect the banking system against potential future losses when excess credit growth is associated with an increase in system-wide risk.*

The countercyclical capital buffer is meant to provide the banking system with an additional buffer of capital to protect it against potential future losses, when excess credit growth in the financial system as a whole is associated with an increase in system-wide risk. The capital buffer can then be released when the credit cycle turns so that the released capital can be used to help absorb losses and reduce the risk of the supply of credit being constrained by regulatory capital requirements. A side benefit of operating the buffer in this fashion is that it may lean against the build-up of excess credit in the first place.

As such, the buffer is not meant to be used as an instrument to manage economic cycles or asset prices. Where appropriate those may be best addressed through fiscal, monetary and other public policy actions. It is important that buffer decisions be taken after an assessment of as much of the relevant prevailing macroeconomic, financial and supervisory information as possible, bearing in mind that the operation of the buffer may have implications for the conduct of monetary and fiscal policies.

*Principle 2: **(Common reference guide)** The credit/GDP guide is a useful common reference point in taking buffer decisions. It does not need to play a dominant role in the information used by authorities to take and explain buffer decisions. Authorities should explain the information used, and how it is taken into account in formulating buffer decisions.*

Given the guide's close links to the objectives of the buffer and its demonstrated usefulness in many jurisdictions as an indicator of the build up of system-wide risk in a financial system in the past, it is reasonable that it should be part of the information considered by the authorities. Thus, the internationally consistent credit/GDP guide should be considered as a useful starting reference point that authorities should take into account in formulating and explaining buffer decisions. Hence, there is a need to disclose the guide on a regular basis.

Authorities in each jurisdiction are free to emphasise any other variables and qualitative information that make sense to them for purposes of assessing the sustainability of credit growth and the level of system-wide risk, as well as in taking and explaining buffer decisions. This includes constructing additional credit/GDP or other guides that are more closely

aligned to the behaviour of their financial systems. While this does not require that the specific, internationally-consistent credit/GDP guide play a dominant role in this regard, it also does not imply that it should it be totally ignored.

*Principle 3: **(Risk of misleading signals)** Assessments of the information contained in the credit/GDP guide and any other guides should be mindful of the behaviour of the factors that can lead them to give misleading signals.*

In assessing a broad set of information to take buffer decisions in both the build-up and release phases, authorities should look for evidence as to whether the inferences from the credit/GDP guide are consistent with those of other variables. Some examples of other variables that may be useful indicators in both phases include:

- various asset prices;

- funding spreads and CDS spreads;

- credit condition surveys;

- real GDP growth; and

- data on the ability of non-financial entities to meet their debt obligations on a timely basis.

In using the credit/GDP guide it is important to consider whether the behaviour of the GDP denominator reflects the build-up of system-wide risks. For example, it may not be appropriate to adhere to the guide if it had risen purely due to a cyclical slowdown or outright decline in GDP.

In addition, the calculated long-term trend of the credit/GDP ratio is a purely statistical measure that does not capture turning points well. Therefore, authorities should form their own judgments about the sustainable level of credit in the economy; they should use the calculated long-term trend simply as a starting point in their analysis.

Other indicators can also convey misleading information. For example, in many cases a sharp rise in credit spreads may indicate a realisation of system-wide risks and suggest the release of the buffer. However, it would not be appropriate to rely purely on a rise in credit spreads to release the buffer as these indicators can be affected by other factors not related to fundamentals.

*Principle 4: **(Prompt release)** Promptly releasing the buffer in times of stress can help to reduce the risk of the supply of credit being constrained by regulatory capital requirements.*

Authorities can release the buffer gradually in situations where credit growth slows and system-wide risks recede in a benign fashion. In other situations, given that credit growth can be a lagging indicator of stress, promptly releasing the buffer may be required to reduce the risk of the supply of credit being constrained by regulatory capital requirements. In some cases this can be done by timing and pacing the release of the buffer with the publication of banking system financial results so that the buffer is reduced in tandem with the banking sector's use of capital to absorb losses or its need to absorb an increase in risk weighted assets. In other cases, more prompt action may be called for based on relevant market indicators of financial stress to help ensure that the flow of credit in the economy is not jeopardised by uncertainty about when the buffer will be released.

When a decision is taken to release the buffer in a prompt fashion, it is recommended that the relevant authorities indicate how long they expect the release to last. This will help to reduce uncertainty about future bank capital requirements and give comfort to banks that

capital released can be used to absorb losses and avoid constraining asset growth. Any pronouncements in this regard should be reviewed and updated on a regular basis so that any changes in the authorities' outlook can be publicly disseminated on a timely basis.

Principle 5: **(Other macroprudential tools)** *The buffer is an important instrument in a suite of macroprudential tools at the disposal of the authorities.*

When excess aggregate credit growth is judged to be associated with a build up of system-wide risks, authorities should deploy the buffer, possibly in tandem with other macroprudential tools, in order to ensure the banking system has an additional buffer of capital to protect it against future potential losses. Alternative tools – such as loan-to-value limits, income gearing limits or sectoral capital buffers – may be deployed in situations where excess credit growth is concentrated in specific sectors but aggregate credit growth is judged not to be excessive or accompanied by increased system-wide risks.

5.   Jurisdictional reciprocity

As detailed in *Basel III: A global regulatory framework for more resilient banks and banking systems*, jurisdictional reciprocity will be applied when it comes to internationally active banks. The host authorities take the lead in setting buffer requirement that would apply to credit exposures held by local entities located in their jurisdiction. They would also be expected to promptly inform their foreign counterparts of buffer decisions so that authorities in other jurisdictions can require their banks to respect them. Meanwhile, the home authorities will be responsible for ensuring that the banks they supervise correctly calculate their buffer requirements based on the geographic location of their exposures. Such reciprocity is necessary to ensure that the application of the countercyclical buffer in a given jurisdiction does not distort the level playing field between domestic banks and foreign banks lending to counterparties in that jurisdiction. This reciprocity does not entail any transfer of power between jurisdictions; the power to set and enforce the regime will ultimately rest with the home authority of the legal entity carrying the credit exposures.

The home authorities will always be able to require that the banks they supervise maintain higher buffers if they judge the host authorities' buffer to be insufficient. However, the home authorities should not implement a lower buffer add-on in respect of their bank's credit exposures to the host jurisdiction. This will help to ensure that concerns about a competitive equity disadvantage to domestic banks (from foreign bank competition) do not discourage the implementation of the buffer add-on.

Also, without such a level playing field on the minimum buffer add-on, the impact of foreign banks (not subject to buffer) increasing their lending in response to lower competition from domestic banks (subject to buffer) could undermine the buffer regime's potential side benefit of reducing excessive credit in a jurisdiction.

In cases where banks have exposures to jurisdictions that do not operate and publish buffer add-ons, the home authorities will be free to set their own buffer add-ons for exposures to those jurisdictions. This can be done using credit and GDP data and other information on economic and financial conditions for those jurisdictions available from the BIS and IMF and other sources.

As with the minimum capital requirement and capital conservation buffer, host authorities would have the right to demand that the countercyclical capital buffer be held at the individual legal entity level or consolidated level within their jurisdiction.

6.   Further details for operating the countercyclical buffer regime

Frequency of buffer decisions and communications

Explaining the information used and how it is synthesised to arrive at buffer decisions should help build understanding and credibility in the buffer decisions taken by authorities among the banks that are required to hold the buffer, authorities in other jurisdictions, and other stakeholders.

As macroeconomic, financial and prudential information are usually updated on at least a quarterly basis, it is sensible for authorities to review this information at their disposal and take countercyclical capital buffer decisions on a quarterly or more frequent basis. Moreover, given the need to preannounce prospective buffer requirements with a lead time of up to 12 months to give banks a reasonable amount of time to adjust their capital plans, taking decisions with this frequency helps to reduce the risk of the buffer not being in place before the credit cycle turns.

While communicating buffer decisions is key to promoting accountability and sound decision-making, some authorities may currently have little experience in publicly commenting on macro financial conditions, much less explaining future buffer decisions. As a result, authorities may wish to take time to gain experience in operating the buffer and take advantage of the transition period before the buffer is fully operational to develop a communications strategy before taking on the task of publicly explaining buffer decisions.

Once authorities have implemented their communication strategies, providing regular updates on their assessment of the macro financial situation and the prospects for potential buffer actions is a useful way of preparing banks and their stakeholders for buffer decisions. In turn, that should help to smooth the adjustment of financial markets to those actions, as well as give banks as much time as possible to adjust their capital planning accordingly. But that does not mean that authorities should be expected to make quarterly statements on their buffer stance on an ongoing basis. Given that the buffer in each jurisdiction is likely to be used infrequently, the Basel Committee believes that once authorities have implemented their communication strategies, it would be appropriate for them to comment on at least an annual basis using whichever communication vehicles are appropriate for their jurisdiction. More frequent communications should be conducted, however, to explain buffer actions when they are taken and to advise banks and other stakeholders promptly when there are significant changes to the authorities' outlook for the prospect of changes to buffer settings.

All announced changes to the prevailing buffer requirement should be reported to the BIS on a timely basis. This will enable a list of prevailing buffers, and pre-announced buffers, to be published on a dedicated page at the BIS website. This will provide banks with the information they need to calculate their specific buffer requirements.

Treatment of surplus when buffer returns to zero

The capital surplus created when the countercyclical buffer is returned to zero should be unfettered, ie there are no restrictions on distributions when the buffer is turned off.   When the buffer is turned off, banks are likely to wish to use the released capital to absorb losses or protect themselves against the impact of problems elsewhere in the financial system. However, if banks did seek to distribute the released capital when the buffer was turned off, and such an action was considered to be imprudent by the supervisory authority given the prevailing circumstances, the authorities could prohibit these distributions in the context of their capital planning discussions with banks.

Interaction with Pillar 1 and 2

The countercyclical capital buffer incorporates elements of both Pillar 1 and 2. It is like a Pillar 1 approach in that it is a framework consisting of a set of mandatory rules and disclosure requirements. However, its use of jurisdictional judgement in setting buffer levels and the discretion provided in terms of how authorities explain buffer actions are more akin to a Pillar 2 approach. Irrespective of whether it is considered to be a Pillar 1 or a Pillar 2 approach, it is essentially a disclosed requirement that sits on top of the capital conservation buffer and minimum capital requirement, with a pre-determined set of consequences for banks that do not meet this requirement.

In some jurisdictions, Pillar 2 may need to adapt to accommodate the existence of the countercyclical buffer regime. Specifically, it would make sense for authorities to ensure that a bank's Pillar 2 requirements do not require capital to be held twice for financial system-wide issues, if they are already captured by the countercyclical buffer when the latter is above zero. However, as Pillar 2 may capture additional risks that are not related to system-wide issues (eg concentration risk), capital meeting the countercyclical buffer should not be permitted to be simultaneously used to meet these non-system-wide elements of any Pillar 2 requirement.

Annex 1

The credit-to-GDP guide

To assist the relevant authority in each jurisdiction in its decision on the appropriate setting for the buffer, a methodology has been developed to calculate an internationally consistent buffer guide that can serve as a common starting reference point for taking buffer decisions. This large annex provides detailed information on this credit-to-GDP guide. It is divided into the following sections and sub-sections:

1.   Why the credit-to-GDP guide was selected over other indicator variables

2.   Calculation of the credit-to-GDP guide

        a.   Definition of credit

        b.   Step-by-step guide to calculating the jurisdiction specific guide

        c.   Calibration of thresholds at which the guide indicates a buffer requirement may be appropriate

3.   Historical performance of the guide

4.   Performance of variables for signalling release of the buffer

As stated in the main body of this document, the countercyclical capital buffer regime uses a common starting reference guide for buffer decisions. The evidence presented in this annex suggests that while historically the credit/GDP gap would often have been a useful guide in taking buffer decisions, it does not always work well in all jurisdictions at all times. Judgement coupled with proper communications is thus an integral part of the regime. Rather than rely mechanistically on the credit/GDP guide, authorities are expected to apply judgement in the setting of the buffer in their jurisdiction after using the best information available to gauge the build-up of system-wide risk.

Section 1: Why the credit-to-GDP guide was selected over other indictor variables

A Bank for International Settlements working paper[4] presents an extensive analysis of the properties of a broad range of indicator variables. The variables assessed can be divided into three groups. The first includes aggregate macroeconomic variables: GDP growth, (real) credit growth and deviations of the credit to GDP ratio from a long term trend; deviations of real equity prices as well as real property prices from their respective long term trend. The second includes measures of banking sector performance: profits (earnings) and proxies for (gross) losses. The final group includes proxies for the cost of funding, in the form of credit

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[4]   Drehmann, Borio, Gambacorta, Jimenez and Trucharte (2010) "Countercyclical capital buffers: Exploring options", BIS Working Paper 317.

spreads. The paper considered a composite corporate (investment grade) bond spread. For this final group, however, the available sample is much shorter, and the data cover more than one cycle for only one country (the United States) and one index.

Main conclusions

First, business and financial cycles are related, but fluctuations in output have a higher frequency than those of financial cycles associated with serious financial distress. Episodes of financial distress are rare and reflect longer and larger cycles in credit and asset prices.

Second, credit related variables perform very well. In particular, the credit-to-GDP ratio tends to rise smoothly well above trend before the most serious episodes. The specification of the credit-to-GDP gap has a number of advantages over credit growth. Being expressed as a ratio to GDP, the indicator variable is normalised by the size of the economy. This means it is not influenced by the normal cyclical patterns of credit demand. Being measured as a deviation from its long-term trend, the credit-to-GDP gap allows for the well known secular financial deepening trend. Being a ratio of levels, it is smoother than a variable calculated as differences in levels, such as credit growth, and minimises spurious volatility (no large quarter-to-quarter swings).

Third, deviations of property and equity prices from trend can help to identify the build-up phase. However, the deviations tend to narrow way ahead of the emergence of financial strains, suggesting that they would start releasing the buffer too early. Nevertheless, their past performance could be useful in helping authorities assess and explain the need to release the buffer after the financial system comes under stress.

Fourth, the performance of bank (pre-tax) profits as a signal for the build-up in good times appears to be somewhat uneven. The variable works very well for the United States and United Kingdom in the current crisis and for Spain in the early 1990s. It performs poorly otherwise. In the more recent experience in Spain this may be due in part to changes in accounting practices, including the introduction of dynamic provisioning; at least this effect would need to be filtered out in the analysis. In the United States in the early 1990s it reflects the fact that aggregate pre-tax profits actually increased through the period of stress, even as charge offs surged.

Fifth, proxies for (gross) bank losses do not perform well in building up buffers in good times. The reason is that the simple absence of losses in good times does not differentiate between the intensity of the good times. Building up the buffer on the absence of losses would tend to call for very high buffers early on in the expansion.

Finally, credit spreads perform well in the current crisis: they fall below their long-term average ahead of it and rise very quickly as strains emerge. However, their performance over multiple cycles is less satisfactory, as indicated by data for the United States. Based on the size of their movement, they would have treated the episode around the 2001 recession as worse than that in the late 1980s-early 1990s and would have called for a more sustained and larger build-up in the buffer than ahead of the current crisis.

In summary, the credit-to-GDP gap was the best performing of the range of variables considered. Furthermore, by being based on credit it has the significant advantage over many of the other variables of appealing directly to the objective of the countercyclical capital buffer, which is to achieve the broader macroprudential goal of protecting the banking sector from periods of excess credit growth.

Taking account of financial systems at different stages of development

An important issue is whether the parameterisation of the function which generates the buffer guide should vary across jurisdictions. Particular consideration was given to the question of how to take account of jurisdictions with financial systems at different stages of development.

It was felt that while a standard methodology for calculating the parameters of the buffer guide should be established, the calculation should ensure that the resulting buffer guide will take account of local market conditions. The regime does this through considering the relevant macro-variable (credit-to-GDP) relative its trend level calculated on a jurisdiction by jurisdiction basis, the results of which will of course vary from jurisdiction to jurisdiction. In addition, each jurisdiction will have the discretion to impose buffers above or below the guide buffer add-on level, subject to appropriate transparency and disclosure requirements. Such discretion will address sudden structural changes which result in the credit-to-GDP gap sending misleading signals.

Another factor which could vary from jurisdiction to jurisdiction, is the threshold credit-to-GDP ratio relative to trend at which the guide buffer becomes active (ie non-zero) and reaches its maximum level. However, initial empirical analysis indicates the performance of a methodology based on any given threshold, in terms of reaching an appropriate balance between identifying credit crises and not sending out too many false signals, does not seem to vary significantly across jurisdictions. As a consequence, the regime is based on common thresholds.

Section 2: Calculation of the credit-to-GDP guide

(a)   Definition of credit

The guide uses a broad definition of credit that will capture all sources of debt funds for the private sector (including funds raised abroad) to calculate a starting buffer guide. This should not be viewed as penalising the banking sector for credit that has been supplied via the non-bank financial sector. Rather it simply recognises the reality that banks can suffer the consequences of a period of excess credit, even if they have not directly driven its growth. This is also the reason why the buffer add-on will apply equally to all banks with credit exposures to a given jurisdiction, irrespective of whether or not they are viewed as being a primary contributor to the credit boom.

Using a broad definition of credit may also limit the scope for unintended consequences such as providing incentives for banks to divert the supply of credit to other parts of the financial system, since the aggregates and resulting buffer would be immune to changes over time in what kinds of entities are supplying funds to private sector.

Aside from the reasons above, the empirical analysis suggests that a broad definition of credit performs considerably better as a predictor of banking sector stress than a narrow definition.

Available credit data varies across jurisdictions and so this complicates the specification of a single series which should be used by all jurisdictions. Ideally the definition of credit should include all credit extended to households and other non-financial private entities in an economy independent of its form and the identity of the supplier of funds. This means that it should include credit extended by domestic and international banks as well as non-bank financial institutions either domestically or directly from abroad, and should also include all debt securities issued domestically or internationally to fund households and other non-financial private entities (including securitisations), regardless of who holds the securities.

This would by definition also include securities held by banks and other financial institutions in their trading portfolios and banking books as well as securities held by other residents and non-residents. Jurisdictions which do not have credit aggregates this broad will have to initially rely on the broadest aggregates at their disposal. Over time jurisdictions could aim to establish broader measures of credit as their financial systems evolve.[5]

Such a broad definition of credit will capture all sources of debt funds for the private sector. This limits the scope for unintended consequences (such as providing incentives for credit to be supplied outside of the banking sector), since the aggregates and hence buffer would be immune to changes over time in what kinds of entities are supplying funds to private sector. It also recognises that banks can suffer the consequences of a period of excess credit, even if they have not directly driven it.[6]

In principle, there is a case for using an even wider definition of credit that includes gross credit flows between financial institutions (including between banks and non-banks). Rapid growth in intra-financial system flows can be a source of systemic risk by increasing the potential for financial contagion through counterparty credit losses, for instance. However, it should be noted that the countercyclical buffer regime does not account for this dimension of systemic risk to avoid overlap with other workstreams.

Furthermore, public sector credit exposures should not be included in the guide as analysis conducted by BIS staff that showed that its inclusion would significantly weaken the performance of the guide in a statistical sense; inclusion of public debt would dilute the cyclical properties of the guide because public debt tends to fall in good times and increase in periods of economic weakness due to the cyclical properties of fiscal policy. However, authorities may wish to pay attention to the behaviour of public debt as one of the indicators used in conjunction with the guide as excessive growth in public debt can contribute to a growth in financial system-wide risk.

The following table sets out the credit series used for the empirical analysis set out in section 2.3 of this annex.

Credit series used for the empirical analysis

Country	Source
Argentina	Central bank (loans granted (including accrued but not paid interests) to private sector + holdings of private bonds in financial entities) & IMF-IFS (32d)
Australia	Central bank (lending and credit aggregates, credits, sa) & IMF-IFS(32d, nsa)
Belgium	Central bank (claims of all domestic credit institutions on enterprises & individuals nsa-disc.) & Central bank (claims of monetary institutions on enterprises & individuals) & IMF-IFS(32d, nsa)

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[5] In establishing these measures, it will be important to avoid the double counting of credit. For example, securities reflected on the balance sheet of banks related to loans held in special purpose entities should not be included in the definition of credit if the loans from these special purpose entities to householders and other non-private firms are themselves included in the definition of credit.

[6] Credit and GDP statistics are susceptible to periodic revisions by statistical authorities. Thus, it will be important to regularly update the buffer guide calculations with the latest available data. However, given that the guide is only used as a starting point for taking decisions on appropriate buffer add-ons, this should not present a significant obstacle to operating the buffer, since allowances can be made for the risk of future data revisions.

Brazil	Central bank (claims of monetary system on private sector)
Canada	Central bank (total business credit + total household credit)
China	Central bank (total credit to the non-financial private sector)
France	IMF-IFS (32d)
Germany	Central bank (credit to domestic enterprises & individuals (including securitisation) - bk. sys. nsa) & IMF-IFS (32d)
India	IMF-IFS (32d)
Indonesia	CEIC & IMF-IFS (32d)
Italy	Central bank (bank lending to firms and individuals) & IMF-IFS (32d)
Japan	Central bank (monetary survey, summary table, assets, claims on other sectors 2003m4 - present) and Central bank (monetary survey, assets, domestic credit, claims on private sector, prior to 2003m4)
Korea	Central bank (total domestic claims on private sector)
Mexico	SDDS data (Total domestic credit to the private sector in the consolidated banking system, including credit in foreign currencies) & IMF-IFS (32d)
Netherlands	Central bank (claims on private sector of monetary institutions) & IMF-IFS (32d)
Russia	Central bank (credit institution assets, lending, total) & IMF-IFS (32d)
Saudi Arabia	IMF-IFS (32d)
South Africa	Central bank (credit extension by all monetary institutions, credit extended to the domestic private sector, total)
Spain	Central bank (credit to private sector, total) & IMF-IFS (32d)
Sweden	Statistics Sweden (MFI lending to Swedish & foreign non MFI) & IMF-IFS (32d)
Switzerland	IMF-IFS (32d)
Turkey	IMF-IFS (32d)
UK	Central bank (counterparts to changes in m4,sterling lending to m4 private sector by banks and building societies, amount outstanding)
US	Central bank (Credit market debt outstanding, non-financial corporate business + household and nonprofit organization sector)

(b)   Step-by-step guide to calculating the jurisdiction specific guide

As a starting point for determining the buffer add-on for a given jurisdiction, the relevant authority will first calculate the guide buffer add-on (expressed in the regime as a percentage of risk weighted assets). There are 3 steps in this process:

• Step 1: Calculate the aggregate private sector credit-to-GDP ratio

• Step 2: Calculate the credit-to-GDP gap (the gap between the ratio and its trend)

• Step 3: Transform the credit-to-GDP gap into the guide buffer add-on

Each step is described in detail below and is followed by and example of how the guide would be calculated for the UK. Section 3 of this annex provides graphs of the credit-to-GDP ratio and the credit-to-GDP gap for BCBS member countries.

Step 1: calculating the credit-to-GDP ratio

The credit-to-GDP ratio in period t for each country is calculated as:

$$RATIO_t = CREDIT_t \, / \, GDP_t \times 100\%$$

GDP_t is domestic GDP and $CREDIT_t$ is a broad measure of credit to the private, non-financial sector in period t. Both GDP and CREDIT are in nominal terms and on a quarterly frequency.

Step 2: calculating the credit-to-GDP gap

The credit-to-GDP ratio is compared to its long term trend. If the credit-to-GDP ratio is significantly above its trend (ie there is a large positive gap) then this is an indication that credit may have grown to excessive levels relative to GDP.

The gap (GAP) in period t for each country is calculated as the actual credit-to-GDP ratio minus its long-term trend (TREND):

$$GAP_t = RATIO_t - TREND_t.$$

TREND is a simple way of approximating something that can be seen as a sustainable average of ratio of credit-to-GDP based on the historical experience of the given economy. While a simple moving average or a linear time trend could be used to establish the trend, the Hodrick-Prescott filter is used in this regime as it has the advantage that it tends to give higher weights to more recent observations. This is useful as such a feature is likely to be able to deal more effectively with structural breaks. The Hodrick-Prescott filter is a standard mathematical tool used in macroeconomics to establish the trend of a variable over time. It is implemented in any statistical package such as EViews, but it is also available as an add-in in Excel. For the purposes of this regime a one sided Hodrick-Prescott filter with a high smoothing parameter is used to establish the trend ($TREND_t$). Only information available at each point in time is used for the construction. The smoothing parameter, generally referred to as lambda in the technical literature, is set to 400,000 to capture the long-term trend in the behaviour of the credit/GDP ratio in each jurisdiction.[7]

Step 3: transforming the credit-to-GDP gap into the guide buffer add-on

The size of the buffer add-on (VB_t) (in percent of risk-weighted assets) is zero when GAP_t is below a certain threshold (L). It then increases with the GAP_t until the buffer reaches its maximum level (VB^{max}) when the GAP exceeds an upper threshold H.

The lower and upper thresholds L and H are key in determining the timing and the speed of the adjustment of the guide buffer add-on to underlying conditions. BCBS analysis has found that an adjustment factor based on L=2 and H=10 provides a reasonable and robust specification based on historical banking crises. However, this depends to some extent on the choice of the smoothing parameter (lambda), the length of the relevant credit and GDP

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[7] The technical literature suggests that lambda is set according to the expected duration of the average cycle and the frequency of observation (see Ravn, M. O. and H. Uhlig, 2002, "On Adjusting the Hodrick-Prescott Filter for the Frequency of Observations", Review of Economics and Statistics). For the business cycle and quarterly observations a value of 1600 is suggested. For cycles with longer durations, such as the credit cycle, a higher value is considered appropriate. The empirical analysis by Drehmann, Borio, Gambacorta, Jimenez and Trucharte (2010) ("Countercyclical capital buffers: Exploring options", BIS Working Paper 317) reveals that trends calculated using a lambda of 400,000 perform well in picking up the long-term trend in private-sector indebtedness.

data, and the exact setting of L and H.[8] Section 2(c) provides a detailed discussion of the results of the BIS work. Table 2C.1 in the annex provides a visualisation based on annual data.

Setting L=2 means that when:

- $((CREDIT_t / GDP_t) \times 100\%) - (TREND_t) < 2\%$, the buffer add-on is zero

Setting H=10 means that when:

- $((CREDIT_t / GDP_t) \times 100\%) - (TREND_t) > 10\%$, the buffer add-on is at its maximum

As an example, we could assume for illustrative purposes that the maximum buffer add-on (VB^{max}) is 2.5% of risk weighted assets. When the credit-to-GDP ratio is 2 percentage points or less above its long term trend, the buffer add-on (VB_t) will be 0%. When the credit-to-GDP ratio exceeds its long term trend by 10 percentage points or more, the buffer add-on will be 2.5% of risk weighted assets. When the credit-to-GDP ratio is between 2 and 10 percentage points of its trend, the buffer add-on will vary linearly between 0% and 2.5%. This will imply, for example, a buffer of 1.25% when the credit-to-GDP gap is 6 (ie half way between 2 and 10).

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[8] It should be noted that fixing L and H at specific absolute levels means that, at the points at which the buffer guide turns on and reaches its maximum, the credit-to-GDP gap will vary as a percentage of the current credit-to-GDP ratio. A consequence of this is that countries with a lower credit-to-GDP ratio can experience higher increases in credit as a percentage of current credit outstanding before the buffer guide turns on and before it reaches its maximum.

Illustration of the calculation of the jurisdiction specific credit-to-GDP guide

Underlying data for calculating the credit-to-GDP gap for the UK

Country	Time period (t)	CREDIT[1]	GDP[2]	RATIO[3]	TREND[4]	GAP[5]
GB	1999q1	915.1	890.6	102.8	110.1	-7.3
GB	1999q2	933.5	903.2	103.4	110.4	-7
GB	1999q3	947.5	916.0	103.4	110.7	-7.3
GB	1999q4	971.4	928.7	104.6	111.1	-6.5
GB	2000q1	1008.6	942.4	107.0	111.5	-4.5
GB	2000q2	1034.1	955.4	108.2	111.9	-3.7
GB	2000q3	1061.4	966.6	109.8	112.5	-2.7
GB	2000q4	1082.5	976.5	110.9	113.1	-2.2
GB	2001q1	1112.0	989.1	112.4	113.7	-1.3
GB	2001q2	1132.9	1000.0	113.3	114.3	-1
GB	2001q3	1147.4	1010.1	113.6	114.9	-1.3
GB	2001q4	1160.2	1021.8	113.5	115.4	-1.9
GB	2002q1	1180.7	1032.9	114.3	116.0	-1.7
GB	2002q2	1204.2	1045.9	115.1	116.6	-1.5
GB	2002q3	1237.5	1060.9	116.7	117.3	-0.6
GB	2002q4	1260.3	1075.6	117.2	117.9	-0.7
GB	2003q1	1276.2	1089.8	117.1	118.5	-1.4
GB	2003q2	1306.7	1105.6	118.2	119.1	-0.9
GB	2003q3	1333.7	1122.1	118.9	119.8	-0.9
GB	2003q4	1369.9	1139.7	120.2	120.4	-0.2
GB	2004q1	1403.0	1155.7	121.4	121.1	0.3
GB	2004q2	1437.3	1171.5	122.7	121.8	0.9
GB	2004q3	1488.3	1186.5	125.4	122.6	2.8
GB	2004q4	1519.2	1203.0	126.3	123.5	2.8
GB	2005q1	1550.0	1217.6	127.3	124.3	3
GB	2005q2	1575.3	1231.9	127.9	125.2	2.7
GB	2005q3	1622.3	1243.2	130.5	126.1	4.4
GB	2005q4	1654.6	1254.1	131.9	127.0	4.9
GB	2006q1	1708.1	1271.4	134.3	128.1	6.2
GB	2006q2	1788.6	1285.8	139.1	129.4	9.7
GB	2006q3	1837.5	1305.9	140.7	130.7	10
GB	2006q4	1868.1	1325.8	140.9	131.9	9
GB	2007q1	1929.5	1343.9	143.6	133.3	10.3
GB	2007q2	1985.5	1364.1	145.5	134.6	10.9
GB	2007q3	2078.0	1382.2	150.3	136.3	14
GB	2007q4	2106.9	1398.9	150.6	137.8	12.8
GB	2008q1	2163.0	1418.0	152.5	139.4	13.1
GB	2008q2	2248.3	1433.6	156.8	141.2	15.6
GB	2008q3	2322.7	1444.4	160.8	143.1	17.7
GB	2008q4	2384.3	1449.6	164.5	145.2	19.3
GB	2009q1	2458.9	1435.8	171.3	147.5	23.8
GB	2009q2	2423.4	1419.7	170.7	149.7	21

Note: [1] Nominal broad credit to the private, non-financial sector. [2] Nominal GDP. [3] In percent. [4] Trend based on a one-sided HP filter using a smoothing parameter (lambda) equal to 400000 and data for the RATIO starting in 1963q1. [5] GAP=RATIO-TREND.

Source: National data, BIS calculations.

Graph A1.1

The credit-to-GDP ratio, its trend, the gap and the buffer for the UK

In per cent
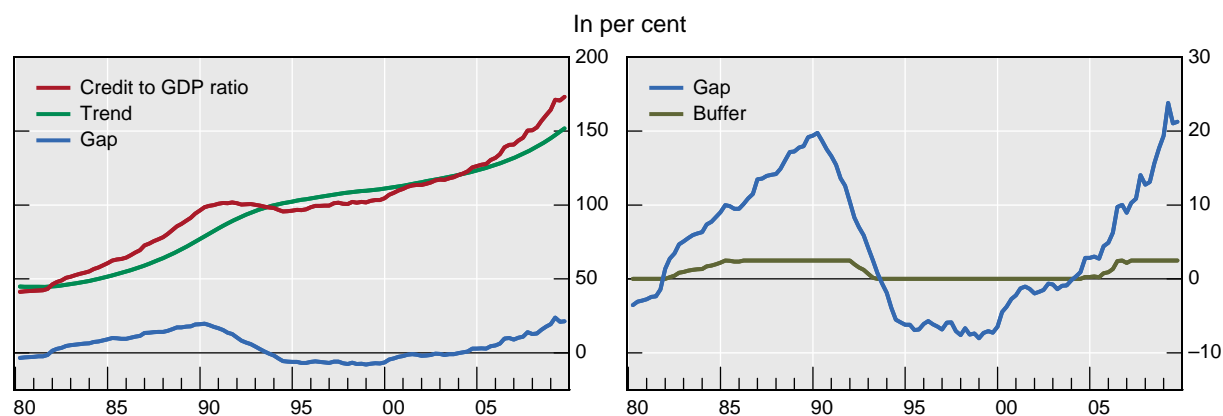
Sources: National data; BIS calculations.

(c)   Calibration of thresholds at which the guide indicates a buffer requirement may be appropriate

Previous academic work has shown that the credit-to-GDP gap can be a powerful predictor for banking crises.[9] Building on the general principle that the objective of the countercyclical buffer is to protect banks from periods of excess credit growth, the group sent out criteria to determine threshold GAP level L, when the rule should start building up capital buffers, and a GAP level H, at which the maximum buffer should be reached. Given the current state of knowledge, the rule simply provides a starting guide to the relevant authorities responsible for deciding the buffer add-on. These authorities retain the right to implement a different buffer add-on than indicated by this simple guide, subject to providing a public and transparent explanation of this decision.

Criteria for the minimum threshold (L) when the guide would start to indicate a need to build up capital

(1)   *L* should be low enough, so that banks are able to build up capital in a gradual fashion before a potential crisis. As banks are given one year to raise additional capital, this means that the indicator should breach the minimum at least 2-3 years prior to a crisis.

(2)   *L* should be high enough, so that no additional capital is required during normal times.

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[9]   This was first shown by Borio, C. and P. Lowe (2002): "Assessing the Risk of Banking Crises", *BIS Quarterly Review*, 43-54. More recent papers are Borio, C. and M. Drehmann (2009): "Assessing the risk of banking crises - revisited", *BIS Quarterly Review,* March 29-46 or Alessi, L. and C. Detken (2009): "Real time early warning indicators for costly asset price boom/bust Cycles: A role for global liquidity", *ECB Working Paper* 1039.

Criteria for the maximum (H) at which point no additional capital would be required, even if the gap would continue to increase

(3)   *H* should be low enough, so that the buffer would be at its maximum prior to major banking crises (such as the current episode in the US or the Japanese crises in the 90s).

Table 2C.1 below shows the development of the credit-to-GDP gap for five years prior to the outbreak of a large sample of systemic banking crises. Given the choice of H and L red cells indicate that the buffer would have been at its maximum, orange (blue) cells indicate that a medium (small) buffer would have been required by the rule.

It is clear that H has to be set to 10 to meet Criterion 3. To ensure that Criteria 3 is met L has to be set at 2 so that the rule would have required the build up of capital for all major banking crises 2-3 years in advanced. L=2 and H=10 would also imply that the rule would have worked very well for other domestic crises and even in the case of some international crises.

Table 2C.2 shows the time series of the gap (as annual average) for all BCBS countries. As before, red cells indicate that the buffer would have been at its maximum, orange (blue) cells indicate that a medium (small) buffer would have been required by the rule. It is apparent that in nearly all countries, the rule would have built up capital buffers ahead of crises, sometimes starting several years earlier. Furthermore, during normal times, the gap is mostly off. But there are episodes which are classified as "normal" but extra buffers would have been demanded. This is for example the case for Germany in the late 1990s. However, in this case banking system experienced severe tensions in early 2000 even though no full blown banking crisis materialised.

A more formal statistical exercise was also undertaken, which showed that L=2 and H=10 provide a very robust trade-off between type 1 errors (a crisis occurs but the gap does not breach the threshold) and type 2 errors (the threshold is breached but not crisis occurs). It also analysed whether the level of the gap is different for different stages of development, eg by looking for correlations between other variables such as income per capita, however, no relationship could be found.

Table 2C.1: The credit to GDP gap before banking crises

	Year -1 max	Year -1 min	Year -1 mean	Year -2 max	Year -2 min	Year -2 mean	Year -3 max	Year -3 min	Year -3 mean	Year -4 max	Year -4 min	Year -4 mean	Year -5 max	Year -5 min	Year -5 mean
Very severe crises															
FI 1991q3	14.24	11.90	13.22	12.56	10.38	11.76	11.58	9.85	10.99	8.30	7.35	7.70	7.19	6.46	6.78
GB 2007q3	10.86	8.97	10.03	9.74	4.43	6.33	3.02	2.75	2.86	0.91	-0.87	0.05	-0.63	-1.39	-0.92
IE 2008q3	58.12	48.63	53.20	49.16	36.33	41.89	42.11	34.17	37.55	26.85	20.25	23.86	16.16	9.10	12.59
JP 1992q4	5.05	0.58	2.46	9.93	5.09	7.12	13.51	10.22	11.77	12.89	10.53	12.08	13.41	10.75	12.01
MX 1994q4	19.55	17.62	18.30	19.92	17.94	19.00	20.18	15.49	17.50	15.96	12.97	14.18	13.37	12.61	13.01
NL 2008q3	22.86	13.04	19.50	13.53	8.20	9.98	16.77	9.82	12.94	14.32	12.99	13.56	12.13	10.57	11.25
NO 1990q4	14.74	8.84	13.20	25.26	16.03	20.09	25.96	25.05	25.43	27.82	24.71	26.38	28.88	17.26	24.34
SE 1991q3	18.75	7.26	12.17	20.79	17.02	19.47	21.15	13.38	17.49	15.37	5.52	8.52	11.39	6.15	7.52
US 2007q3	11.93	11.11	11.52	10.15	8.46	9.20	8.26	6.93	7.72	8.35	7.32	7.79	9.83	8.47	9.25
Group specific															
Mean	19.57	14.21	17.07	19.01	13.76	16.09	18.06	14.18	16.03	14.53	11.20	12.68	12.41	8.89	10.65
Min	5.05	0.58	2.46	9.74	4.43	6.33	3.02	2.75	2.86	0.91	-0.87	0.05	-0.63	-1.39	-0.92
Max	58.12	48.63	53.20	49.16	36.33	41.89	42.11	34.17	37.55	27.82	24.71	26.38	28.88	17.26	24.34
Other domestic crises															
AU 1989q4	11.20	9.58	10.38	10.75	9.16	10.05	8.87	8.57	8.71	9.00	6.36	7.35	5.81	3.16	4.47
DK 1987q4	38.56	20.46	28.21	26.40	13.68	19.79	5.52	-0.74	2.63	6.30	-1.92	2.09	-8.13	-12.06	-10.05
ES 1993q4	4.63	1.76	3.31	3.66	1.02	2.51	4.01	1.78	3.23	4.61	2.79	3.46	3.62	1.50	2.69
FR 1994q1	0.14	-1.23	-0.45	4.48	2.75	3.80	6.19	5.57	5.81	7.83	4.64	5.76	5.08	2.76	3.76
GB 1990q2	19.77	17.96	19.07	17.78	16.02	17.05	14.92	13.95	14.29	13.57	10.88	12.36	10.14	9.48	9.74
IT 1992q3	14.47	12.29	13.46	14.11	10.76	12.50	12.12	8.91	11.15	9.51	5.71	7.87	6.06	3.42	4.99
NZ 1987q1	11.79	2.10	6.12	5.63	1.43	3.94	2.29	-3.60	0.08	1.22	-1.33	-0.28	2.26	-1.30	0.19
US 1988q4	8.69	8.05	8.39	10.99	9.80	10.23	9.39	7.20	8.23	5.55	3.23	4.39	1.14	-1.09	-0.06
ZA 1989q4	2.11	0.86	1.45	1.47	-0.97	0.02	-0.22	-2.83	-1.83	4.19	0.22	2.56	5.54	4.55	5.12
Group specific															
Mean	12.37	7.98	9.99	10.58	7.07	8.88	7.01	4.31	5.81	6.87	3.40	5.06	3.50	1.16	2.32
Min	0.14	-1.23	-0.45	1.47	-0.97	0.02	-0.22	-3.60	-1.83	1.22	-1.92	-0.28	-8.13	-12.06	-10.05
Max	38.56	20.46	28.21	26.40	16.02	19.79	14.92	13.95	14.29	13.57	10.88	12.36	10.14	9.48	9.74
High impact crises and other domestic crises															
Mean	15.97	11.10	13.53	14.80	10.42	12.48	12.53	9.25	10.92	10.70	7.30	8.87	7.96	5.02	6.48
Min	0.14	-1.23	-0.45	1.47	-0.97	0.02	-0.22	-3.60	-1.83	0.91	-1.92	-0.28	-8.13	-12.06	-10.05
Max	58.12	48.63	53.20	49.16	36.33	41.89	42.11	34.17	37.55	27.82	24.71	26.38	28.88	17.26	24.34
International crises															
BE 2008q3	12.72	8.51	10.22	7.17	2.53	4.00	1.75	-6.11	-2.11	-6.13	-7.86	-7.06	-5.64	-7.91	-6.52
CH 2007q4	3.09	-0.05	1.21	-0.20	-4.57	-1.89	-3.32	-7.69	-4.77	-7.87	-11.53	-9.36	-13.02	-16.25	-14.01
DE 2007q3	-8.49	-13.32	-11.18	-6.85	-8.27	-7.61	-6.74	-7.84	-7.36	-2.22	-5.87	-3.97	0.62	-1.50	-0.36
FR 2008q3	12.32	10.60	11.30	10.44	6.32	7.79	5.76	2.60	4.38	3.70	1.43	2.44	1.60	0.10	0.55
JP 2008q3	-4.91	-7.21	-6.34	-6.94	-9.11	-7.79	-8.16	-11.35	-9.63	-14.11	-16.17	-14.85	-13.60	-15.92	-14.88
KR 1997q3	13.10	8.81	11.01	8.77	6.81	7.48	10.13	7.04	8.14	9.08	5.01	6.71	5.69	3.12	4.63
Group specific															
Mean	4.64	1.22	2.70	2.07	-1.05	0.33	-0.10	-3.89	-1.89	-2.92	-5.83	-4.35	-4.06	-6.39	-5.10
Min	-8.49	-13.32	-11.18	-6.94	-9.11	-7.79	-8.16	-11.35	-9.63	-14.11	-16.17	-14.85	-13.60	-16.25	-14.88
Max	13.10	10.60	11.30	10.44	6.81	7.79	10.13	7.04	8.14	9.08	5.01	6.71	5.69	3.12	4.63
High impact crises, other domestic crises and international crises															
Mean	13.14	8.63	10.82	11.61	7.55	9.45	9.38	5.96	7.72	7.29	4.02	5.57	4.95	2.17	3.59
Min	-8.49	-13.32	-11.18	-6.94	-9.11	-7.79	-8.16	-11.35	-9.63	-14.11	-16.17	-14.85	-13.60	-16.25	-14.88
Max	58.12	48.63	53.20	49.16	36.33	41.89	42.11	34.17	37.55	27.82	24.71	26.38	28.88	17.26	24.34

Note: Red: Gap> 10, Orange 6<Gap<10, Blue 2<Gap<6. Years are reported with respect to the beginning of the crisis, e.g. year -1 are the four quarters preceding the crisis. Systemic banking crises are separated into 3 classes: (a) Very severe crises, (b) other crises, which were driven by domestic factors, and (c) crises, which were driven by international exposures. The classification is based on the background provided in Laeven and Valencia (2008) and Reinhart and Rogoff (2008), as well as a small degree of judgement.
Source: National data, IMF, BIS calculations.

Table 2C.2: The annual average credit to GDP gap

Year	AR	AU	BE	BR	CA	CH	CN	DE	ES	FR	GB	HK	ID	IN	IT	JP	KR	MX	NL	RU	SA[1]	SE	SG	TR	US	ZA
1970			-2.43																						0.73	
1971			-3.03																-0.69						-1.02	
1972			-3.81																-0.48						-1.01	
1973			-3.65													5.59			1.42						-0.18	
1974		0.22	-5.51					-2.24		-0.54						0.50			2.96						1.25	
1975		-0.35	-5.18					-2.82		-2.32						-2.57			2.42						-1.50	
1976		-0.80	-4.18					-2.65		-1.37	-7.31					-2.24			1.99						-4.14	0.55
1977		0.04	-1.92					-2.21		-6.08	-6.84					-4.00			4.63						-3.08	-0.15
1978		1.17	-0.30					-1.18		-8.54	-5.53								8.51						-2.11	-0.34
1979		1.26	0.87		5.95			0.58		-8.97	-3.56					-3.91			10.61						-0.16	
1980		1.63	-0.37		5.73	4.58		1.06	-1.39	-8.33	-3.08				-3.76	-3.08	10.39	-0.03	9.05						0.93	-4.15
1981		2.09	-1.54		5.05	4.07		2.83	-0.86	-7.29	-1.21				-2.35	-3.02	9.38	1.87	5.96						-1.60	0.68
1982		1.56	-4.43		4.72	-0.44		2.03	-0.21	-7.46	3.99				-2.49	0.07	10.05	2.29	1.89			6.03			1.51	2.86
1983		1.38	-6.01		-2.27	0.11		2.02	-0.44	-6.53	6.00				-0.94	2.88	8.73	1.37	-0.85			3.33			-0.14	3.85
1984		1.63	-7.68		-4.87	-1.36		1.76	-5.15	-5.45	8.13				1.70	5.16	4.80	4.27	-4.27			1.54			0.83	5.20
1985		5.27	-8.68		-4.05	-0.40		1.50	-6.77	-4.64	9.71				3.00	5.97	5.78	6.68	-5.86			0.09			5.49	4.79
1986		7.97	-7.61		0.03	-1.40		-0.08	-8.08	-3.26	11.50				2.90	7.12	2.58	6.71	-5.37			7.11	-5.25		9.07	1.45
1987		8.78	-3.79		1.52	2.90		-1.44	-4.99	0.53	13.95				4.49	10.98	1.02	6.31	-3.57			6.07	-8.53		9.65	-2.01
1988		10.56	-0.73		3.50	3.63		-1.95	-0.44	2.21	16.34				6.18	11.88	-3.34	6.75	-3.29			14.43	-13.93		8.29	0.79
1989		10.11	2.93		6.68	6.68		-2.18	3.14	3.76	18.57				9.55	12.07	0.04	11.14	-2.59			18.88	-12.26			1.23
1990			3.58		11.16	5.20		-2.23	2.75	5.76	19.77	7.79			12.22	11.04	4.37	12.92	-3.49			17.57	-8.73			
1991			4.98		11.45	1.15		-2.46	3.70	5.81					12.97	5.90	2.75	14.81	-4.75			7.65	-7.87			
1992		-1.59	4.87		9.31	-1.20		-1.04	2.75	3.80	5.04	2.07			13.53	1.59	3.52	18.58	-5.26				-6.82		-5.12	-1.07
1993		-4.84	5.01		5.12	-4.42		1.59	2.88	-0.45	0.19	-1.10					5.64	18.51	-4.27			-10.29	-6.85		-7.95	-2.75
1994		-4.28	1.24		2.10	-6.19		3.79			-5.38	0.19			7.83		8.27	18.44	-2.43			-18.46	-6.85		-8.83	-2.60
1995		-2.42	-0.74		-0.46	-6.05		4.32			-6.51	2.28			4.90	-5.24	7.11		-0.46			-24.10	-0.74		-6.02	0.01
1996		0.18	-0.11		0.02	-5.52		6.38	-0.43	-8.92	-6.28	5.06			0.72	-6.55	6.88		2.68			-21.42	1.94		-4.64	1.94
1997		2.12	0.61		1.78	-8.65		8.10	2.68	-8.99	-6.61	14.46			0.51	-9.23	12.26	1.71	6.20			-15.14	4.80		-4.10	2.91
1998		3.61	-0.13		5.34	-8.69		9.19	7.14	-8.82	-7.40	8.84			0.89	-7.00		1.22	9.84			-7.16	5.39	-3.29	-0.62	5.20
1999		5.37	4.14		0.41	-6.75		10.56	11.64	-7.20	-7.03	-1.85			3.65	-6.08	3.20	-2.19	14.11			-7.24	9.15	-3.23	2.14	5.15
2000		6.78	1.47		-4.27	-10.38		10.00	14.99	-2.98	-3.29	-9.82			6.82	-7.98	-9.83	-3.97	17.62		-2.20	-5.45	-1.13	-2.14	3.97	1.98
2001		5.64	-2.03		-2.82	-13.85	-0.19	6.34	15.23	0.12	-1.40	-14.08	-16.59		7.41	-10.55	-14.14	-4.46	14.70		-0.11	2.52	5.21		7.46	0.34
2002		5.70	-4.91		-2.65	-16.80	1.03	1.15	15.14	-0.16	-1.16	-15.25	-11.21		6.22	-12.44	-8.41	-4.87	12.03		0.75	0.53	1.85		8.73	-1.63
2003		8.67	-5.90		-4.44	-12.83	0.69	-1.98	15.48	-0.45	-0.45	-14.54	-3.82		5.64	-14.62	-9.69	-4.72	10.86		-0.64	-1.25	-0.82	-2.68	8.82	1.15
2004	-7.34	10.89	-7.30	4.43	-4.07	-8.40	-2.59	-6.06	19.58	1.29	1.74	-12.31	3.35		4.23	-15.37	-18.90	-4.46	12.40	3.54	2.87	-1.24	-5.81	0.32	7.61	0.04
2005	-4.17	12.78	-5.89	5.97	-2.38	-3.99	-4.57	-7.84	27.86	3.24	3.77	-8.64	6.93		5.48	-12.16	-18.08	-2.75	14.31	2.78	4.31	6.56	-13.04	3.27	8.25	4.19
2006	-1.41	14.46	1.82	7.89	-0.27	-0.66	-3.25	-8.60	36.17	5.95	8.74	-11.79	5.75		7.25	-8.77	9.74	-0.59	9.74	4.21	1.66	13.17	-16.12	7.09	10.45	9.98
2007	0.53	17.00	7.20	10.50	1.99	1.51	-3.05	-12.50	42.04	9.93	10.57	-2.40	6.82	3.14	8.52	-7.15	3.05	1.66	14.17	8.06	4.08	18.71	-13.54	7.57	11.64	12.44
2008	1.23	11.88	11.34	13.91	3.32		-3.43		42.90	11.99		0.79	8.80	3.30	8.53	-5.95	14.67	1.32	22.05	8.06	3.63	25.58	-3.87	9.71		11.71
2009	1.88	3.84	14.63		8.57		4.07		49.66			-2.23	7.95	1.26	6.78		16.64	2.48				32.18	3.19	8.60		5.71

Note: Red: Gap> 10, Orange 6<Gap<10, Blue 2<Gap<6. Systemic banking crises are indicated by gaps in a data series or empty series in 2008\2009, as the first 8 quarters after and the quarter of the crisis are not considered. Data are annual averages of quarterly credit to GDP gaps. Averages around crises times may be based on less than 4 quarters. The gap are deviations from the credit to GDP ratio from its long term trend, calculated by a one-sided HP filter using a smoothing factor $\lambda=400,000$. [1] Data for Saudi Arabia are only available annually. The gap is calculated by a one-sided HP filter using a smoothing factor lambda of 1,600.
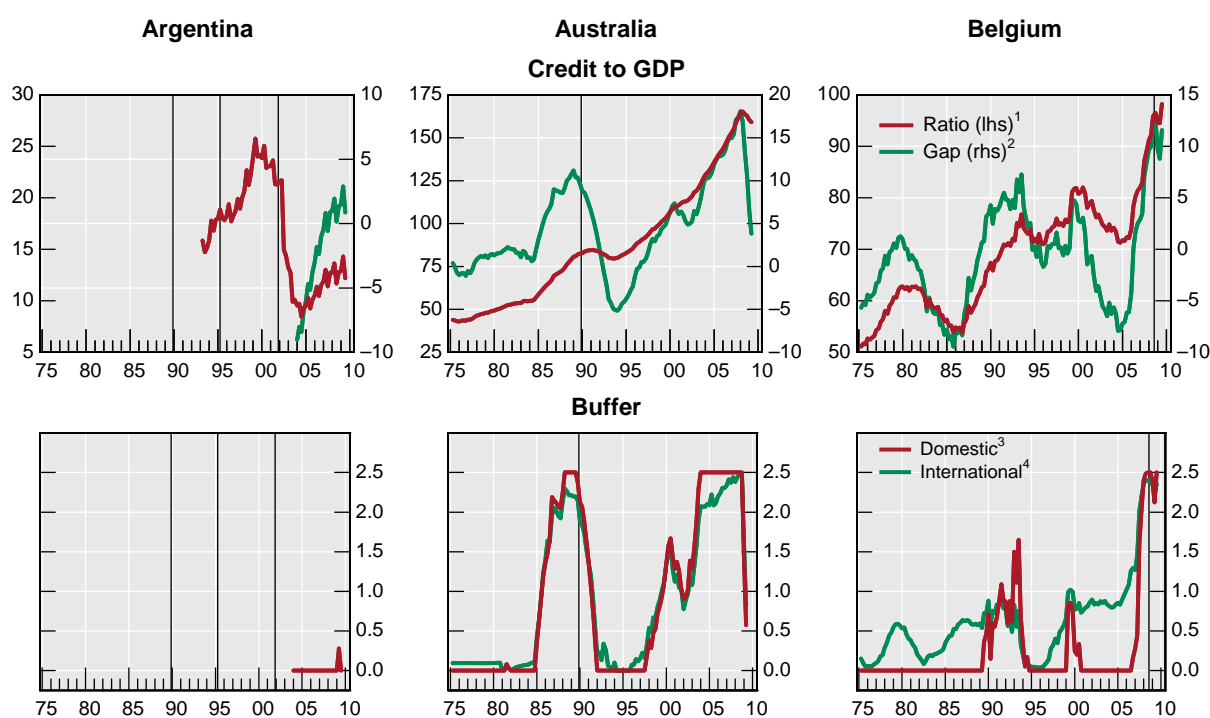
Source: National data, IMF, BIS calculations.

Section 3: Historical performance of the guide

To illustrate the predictive qualities of the credit-to-GDP indicator variable, this section provides charts of the credit-to-GDP ratio, the Gap, the resulting buffer guide-add on and the date of banking crises in BCBS member jurisdictions. The buffer guide-add on is shown for both for banks with purely domestic exposures and a hypothetical bank whose share of domestic and cross boarder lending is based on aggregate exposures for the particular country. Country weights in this case are based on the BIS international banking statistics and fixed at 2006q4 weights.

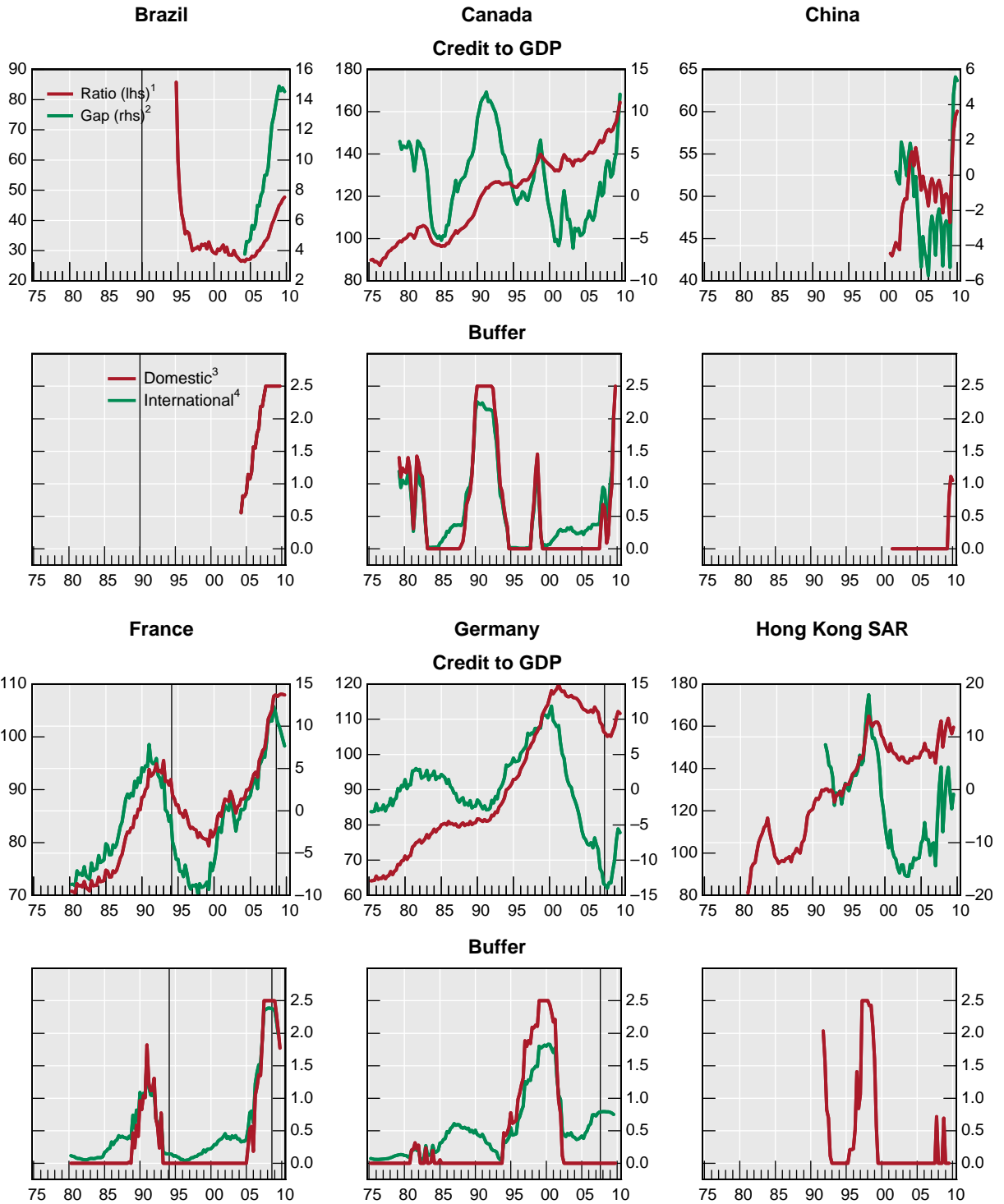Graph A3.1

Historical performance of the guide

Note: The vertical lines indicate the starting period of system-wide banking distress.

[1] Broad credit to GDP ratio, in per cent.   [2] Deviations of the credit-to-GDP ratio from its long term trend, calculated by a one-sided HP filter using a smoothing factor λ=400,000, in percentage points.   [3] Buffer guide add-on for banks with purely domestic exposures, in percent of risk weighted assets.   [4] Buffer guide add-on for a hypothetical bank whose share of domestic and cross boarder lending is based on aggregate exposures for the particular country, in percent of risk weighted assets.

Sources: National data; BIS calculation.
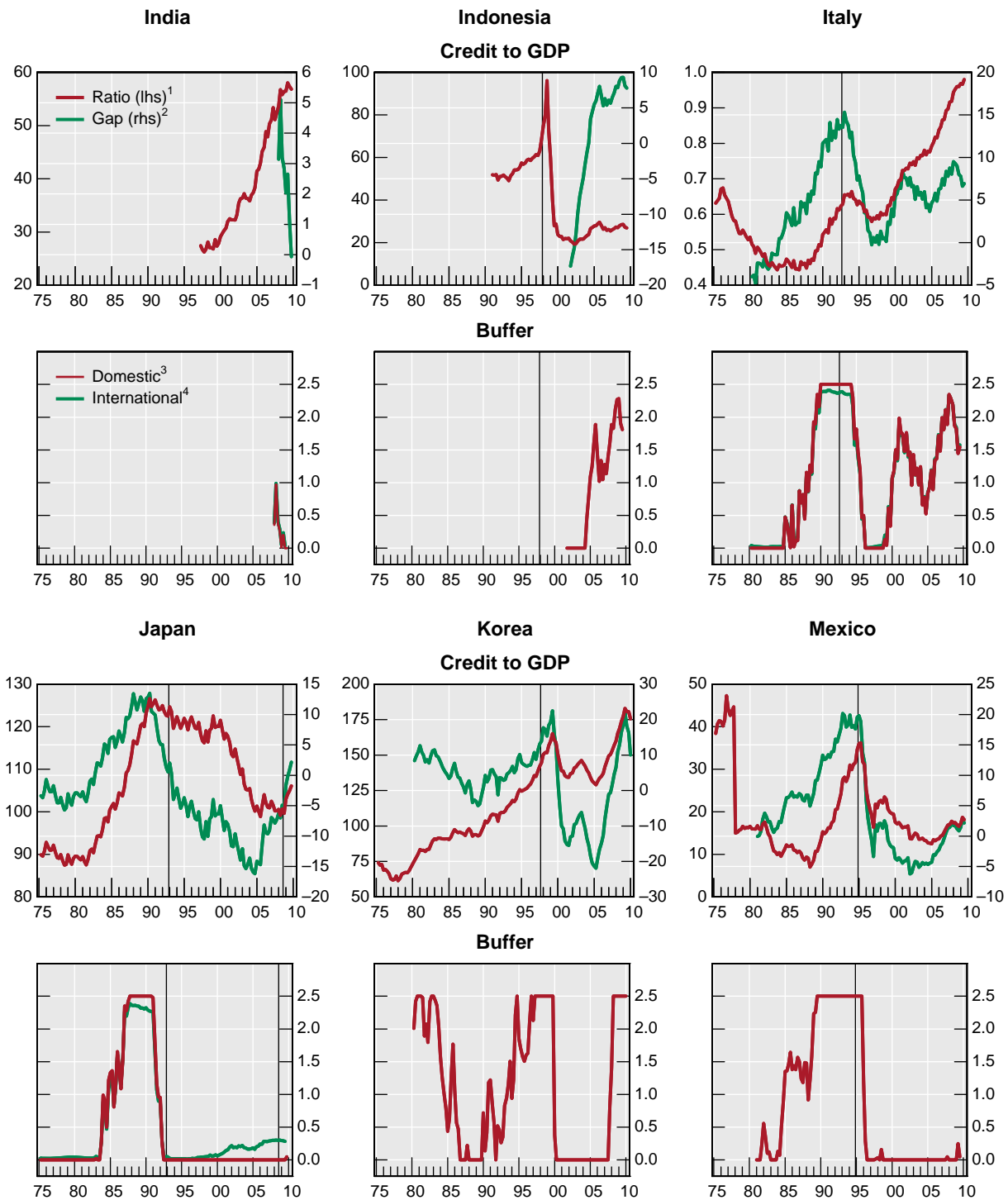
Graph A3.1

Historical performance of the guide (cont.)

Brazil

Credit to GDP

Ratio (lhs)[1]
Gap (rhs)[2]

Buffer

Domestic[3]
International[4]

Canada

Credit to GDP

Buffer

China

France

Credit to GDP

Buffer

Germany

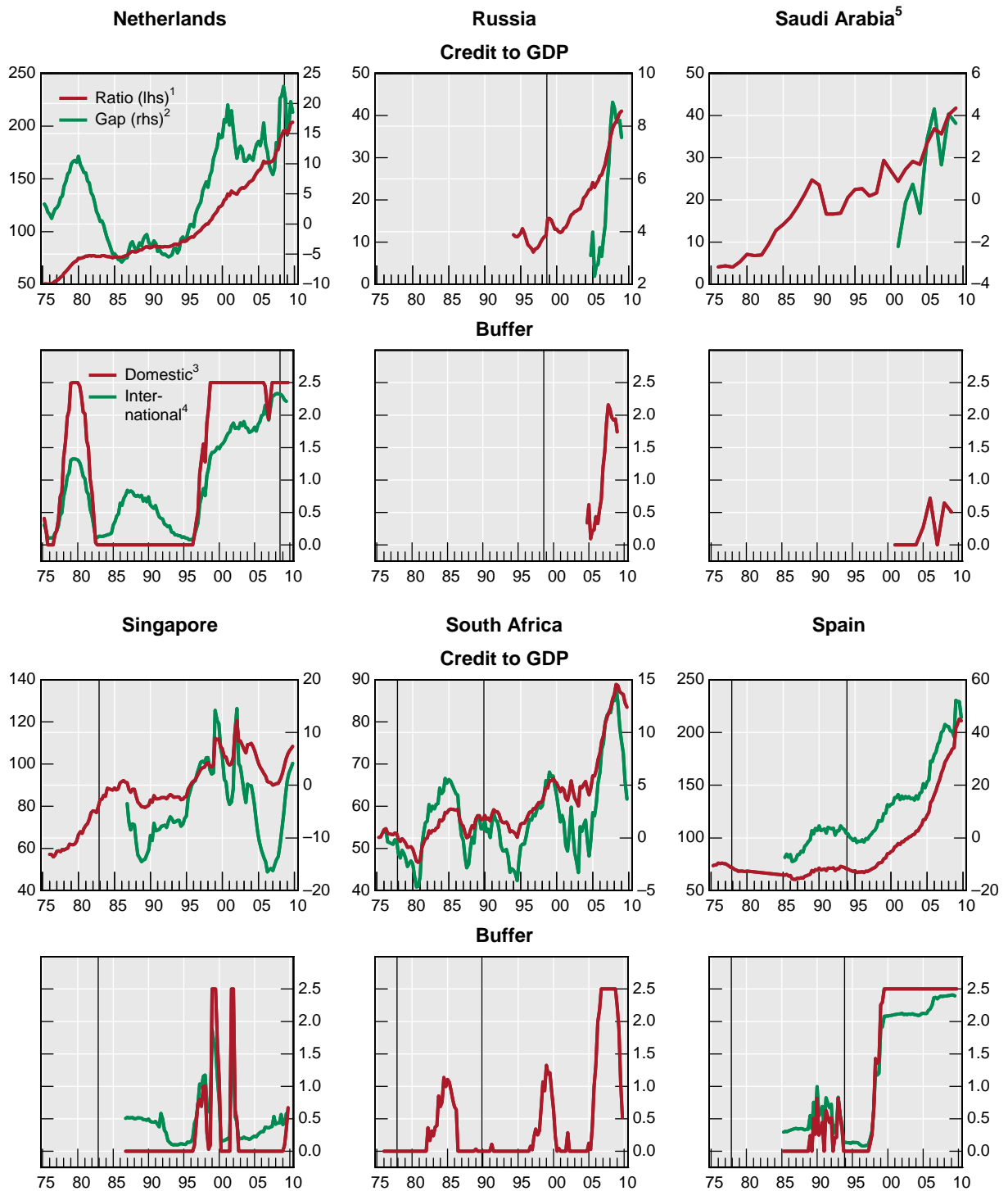**Credit to GDP**

Buffer

Hong Kong SAR

Note: The vertical lines indicate the starting period of system-wide banking distress.

[1] Broad credit to GDP ratio, in per cent. [2] Deviations of the credit-to-GDP ratio from its long term trend, calculated by a one-sided HP filter using a smoothing factor λ=400,000, in percentage points. [3] Buffer guide add-on for banks with purely domestic exposures, in percent of risk weighted assets. [4] Buffer guide add-on for a hypothetical bank whose share of domestic and cross boarder lending is based on aggregate exposures for the particular country, in percent of risk weighted assets.

Sources: National data; BIS calculation.

Graph A3.1

Historical performance of the guide (cont.)

India

Indonesia
Credit to GDP

Italy

Buffer

Japan

Korea
Credit to GDP

Mexico

Buffer

Note: The vertical lines indicate the starting period of system-wide banking distress.

[1] Broad credit to GDP ratio, in per cent. [2] Deviations of the credit-to-GDP ratio from its long term trend, calculated by a one-sided HP filter using a smoothing factor λ=400,000, in percentage points. [3] Buffer guide add-on for banks with purely domestic exposures, in percent of risk weighted assets. [4] Buffer guide add-on for a hypothetical bank whose share of domestic and cross boarder lending is based on aggregate exposures for the particular country, in percent of risk weighted assets.

Sources: National data; BIS calculation.

Graph A3.1

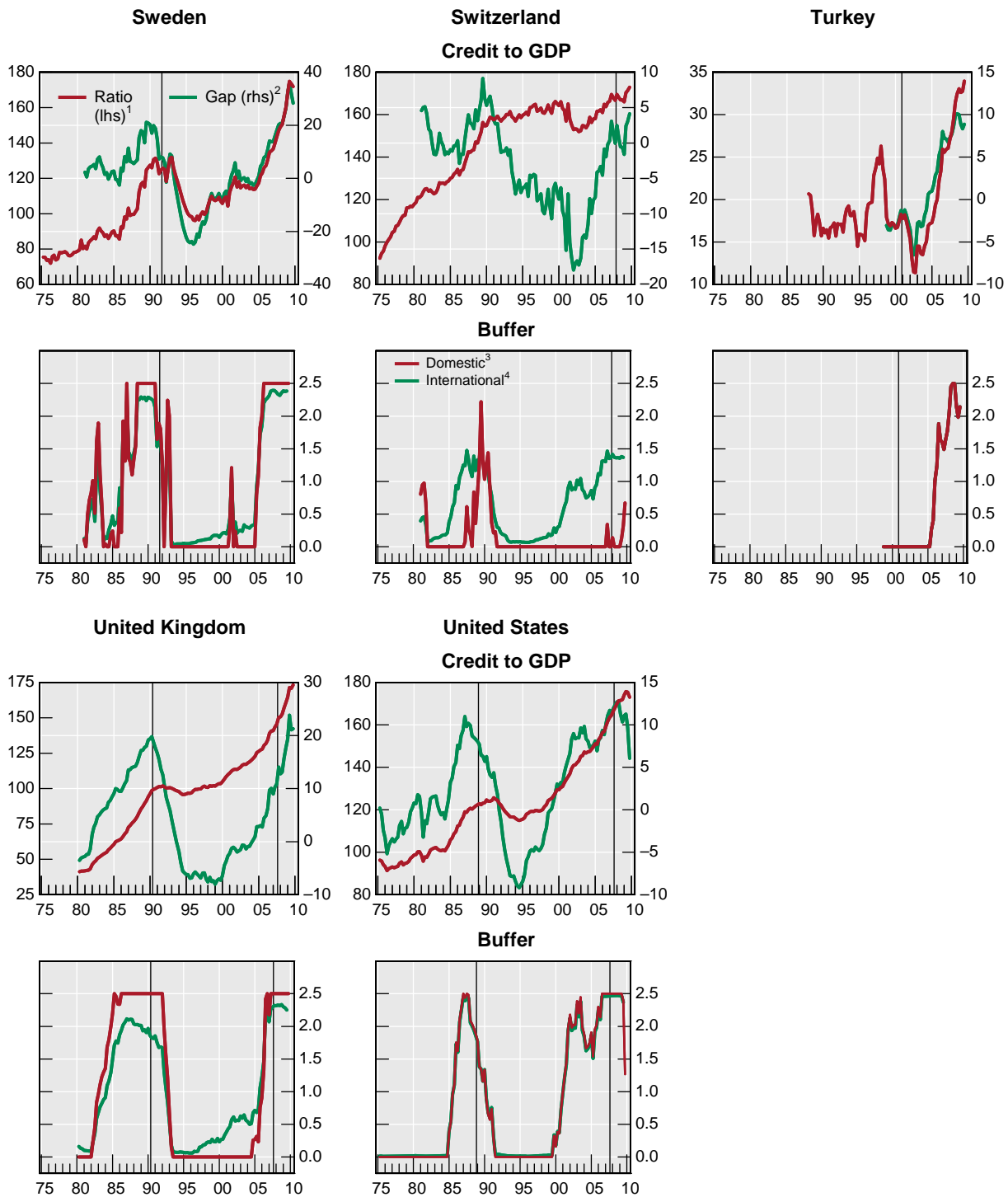## Historical performance of the guide (cont.)

Netherlands	Russia	Saudi Arabia[5]

Credit to GDP

Buffer

Singapore	South Africa	Spain

Credit to GDP

Buffer

Note: The vertical lines indicate the starting period of system-wide banking distress.

[1] Broad credit to GDP ratio, in per cent.   [2] Deviations of the credit-to-GDP ratio from its long term trend, calculated by a one-sided HP filter using a smoothing factor λ=400,000, in percentage points.   [3] Buffer guide add-on for banks with purely domestic exposures, in percent of risk weighted assets.   [4] Buffer guide add-on for a hypothetical bank whose share of domestic and cross boarder lending is based on aggregate exposures for the particular country, in percent of risk weighted assets.   [5] Data for Saudi Arabia are only available annually. The gap is calculated by a one-sided HP filter using a smoothing factor lambda of 1,600.

Sources: National data; BIS calculation.

Graph A3.1

Historical performance of the guide (cont.)

Sweden

Switzerland

Turkey

Credit to GDP

Buffer

United Kingdom

United States

Credit to GDP

Buffer

Note: The vertical lines indicate the starting period of system-wide banking distress.

[1] Broad credit to GDP ratio, in per cent. [2] Deviations of the credit-to-GDP ratio from its long term trend, calculated by a one-sided HP filter using a smoothing factor λ=400,000, in percentage points. [3] Buffer guide add-on for banks with purely domestic exposures, in percent of risk weighted assets. [4] Buffer guide add-on for a hypothetical bank whose share of domestic and cross boarder lending is based on aggregate exposures for the particular country, in percent of risk weighted assets.

Sources: National data; BIS calculation.

Section 4: Performance of variables for signalling release of the buffer

To judge the performance of different indicator variables for the release phase, it is important to revisit the rationale for releasing the buffer. As set out in principles underpinning the role of judgment, the release guidance highlights that release should be contemplated in two scenarios. The first is when there are losses in the banking system that pose a risk to financial stability. In that case it makes sense to release the buffer in accordance with those losses so that this buffer is depleted first before banks begin depleting their normal capital conservation buffers. The second is when there are problems elsewhere in the financial system, which have the potential to disrupt the flow of credit that could undermine the performance of the real economy and generate additional losses in the banking system. In that case it could be important to release the buffer on a timely basis. It is therefore essential that variables guiding the release phase react sufficiently promptly.

Research indicated that macro variables may not be ideal indicator variables for signalling the release phase. While credit and GDP often contract around crises, this is not always the case. For example, during the recent crises real credit growth even increased initially in several countries, such as for example the United Kingdom and Spain. Equally, real GDP continued to grow for over a year after the recent crisis materialized in several countries like Germany, Switzerland, the United Kingdom and the United States. Indicators of credit conditions may, on the other hand, provide useful information to identify bad times. But they are survey based and therefore potentially vulnerable to manipulation.

Indicators of banking sector conditions provide mixed signals for the release phase. Aggregate profits capture the current crisis but not necessarily other episodes (Graph 4.1, upper panels).[10] Sometimes they even rise. Non-performing loans, on the other hand, seem to perform reasonable well. However, in some instance they grow too slowly and then remain high for quite some time.

Asset prices can be an important source of information. A key advantage is that they are available at a much higher frequency than quarterly macro data or information from bank balance sheets (which may only be available annually in some cases). Analysis under taken by the Bank for International Settlements shows that deviations of property and equity prices from trend can help to identify the build-up phase. However, these series would start releasing the buffer too early. Nevertheless, their past performance could be useful in helping authorities assess and explain the need to release the buffer after the financial system comes under stress.

Spreads can be an alternative market based indicator. For the current crisis, CDS spreads and funding costs (eg 3 month interbank rates minus 3 month overnight index swaps) captured the onset of the recent crisis perfectly and no particularly wrong signals were issued beforehand. However, no other crises are covered, so the evidence is not robust enough to use these variables in a prescriptive fashion. Furthermore, only a few countries have CDS series available. The same is true for corporate credit spreads. For those countries where data are available, they show that corporate credit spreads increased rapidly during the recent crisis (Graph 4.1, middle panels). But, they also reached very high levels after the dot-com boom, even though no systemic banking crises materialized. More importantly, they did not indicate any particular vulnerability in the United States in the 1988 crisis. This is even more apparent from long run corporate bond spreads, which narrowed during the same
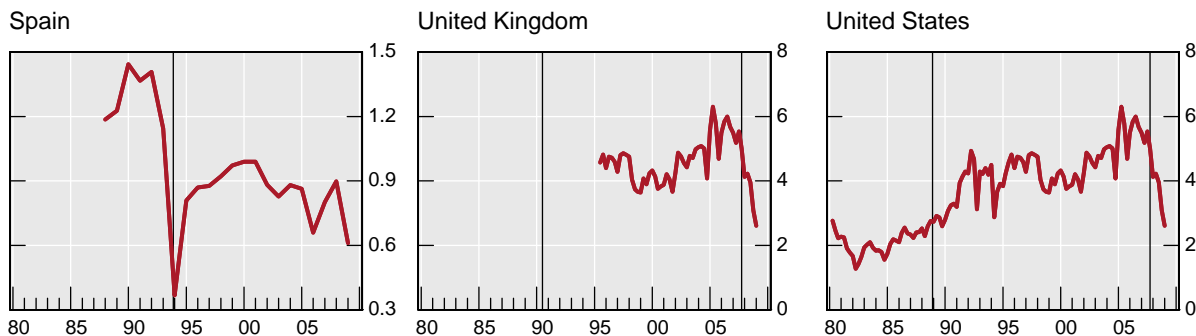
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[10]   The group used all the available information to derive its conclusions. Only a selection of countries and series are shown in Graphs 4.1 for illustrative purposes.

crisis. The historical evidence for the TED spreads is also ambiguous (Graph 4.1, lower panels). While it captures the current crisis well, it decreased during the crises in the 1980s and 90s in the United Kingdom and the United States.
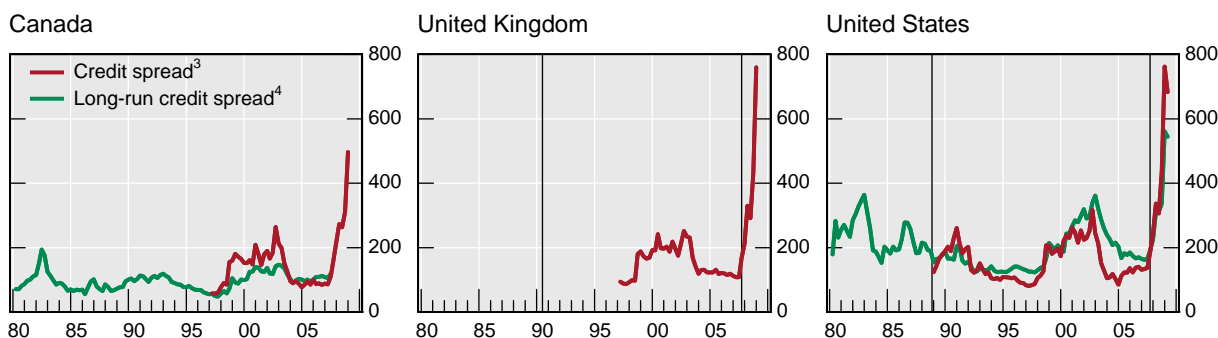
Graph 4.1

The performance of three possible indicator variables for the release phase
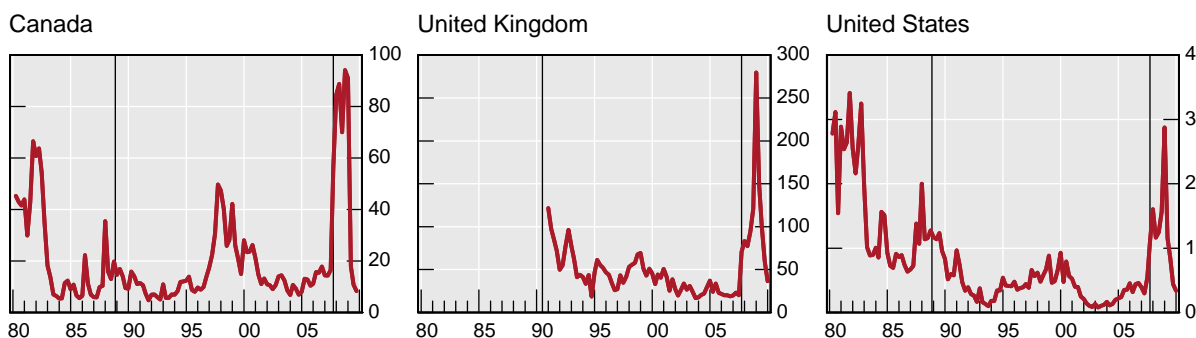
Profits before tax[1]

Spain | United Kingdom | United States

Credit spreads[2]

Canada | United Kingdom | United States

Credit spread[3]
Long-run credit spread[4]

TED spreads[2, 5]

Canada | United Kingdom | United States

Note: The vertical lines indicate the starting period of system-wide banking distress.

[1] As a percentage of total assets. [2] In basis points. [3] BBB medium term (7-10) years corporate bond spreads (Merrill Lynch). [4] Baa (20-30 years) corporate bond spreads for the US (Moody's) and the spread on long term corporate bonds (10+ years) for Canada (Scotia Capital Inc), in basis points. [5] Quarterly averages, based on 3-months maturity for the US and Canada and 6 months maturity for the UK, in basis points.

Sources: National data; Merrill Lynch; Moody's; Scotia Capital Inc; BIS calculation.

Guidance for national authorities operating the countercyclical capital buffer