The Credit Cycle

Valentina Flamini, Pierluigi Bologna, Fabio Di Vittorio and Rasool Zandvakil

INTRODUCTION

Credit is key to healthy and sustainable economic growth. However, high aggregate credit growth can make highly leveraged banks and financial firms more vulnerable to shocks and lead to systemic financial crises. Monitoring the course of credit and financial cycles plays a vital role in identifying aggregate credit risk buildup through the economic cycle, and—as was seen in the previous chapter—policymakers must calibrate macroprudential policies accordingly. With financial markets in Central America, Panama, and the Dominican Republic still relatively shallow and dominated by banks, attention to the credit cycle and its effect on economic growth is also an important task.

The countercyclical capital buffer proposed by the Basel Committee on Banking Supervision (BCBS) in 2010 is designed to protect the banking sector from risks associated with excessive aggregate credit growth. The buffer may also help counterweigh the procyclicality of the financial system by leaning against the buildup phase of the credit cycle. In downturns, the release of the buffer should help reduce the risk of regulatory capital requirements squeezing the supply of credit to the real economy. The buffer ensures that capital requirements are adjusted according to the macro-financial environment in which banks operate.

Studies have shown that the credit-to-GDP gap (the gap between the private sector credit-to-GDP ratio and its estimated trend) can be a powerful predictor of banking crises.[1] Given that the credit gap has early warning power, the BCBS recommends its use as a reference indicator to set the countercyclical capital buffer, and has identified thresholds that prompt extra vigilance. However, reliably estimating the credit-to-GDP gap is not a trivial task, particularly in developing economies where financial deepening is typically underway and available credit time series tend to be short and/or subject to important structural breaks.

This chapter, in reviewing financial and credit developments in CAPDR countries, estimates the credit-to-GDP gap for each country. Regional credit cycles are compared, and the benefits of the countercyclical capital buffer as a tool to increase banks' risk resilience is also discussed.

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[1]See, for example, Lund-Jensen (2012) and Drehmann and Juselius (2014).

FINANCIAL MARKETS AND CREDIT IN CAPDR

Credit-to-GDP ratios are low in most countries in the region, and banks continue to dominate the financial landscape, providing more than 90 percent of credit to the private sector with wide intermediation spreads. Bank credit-to-GDP ratios range from about 40 percent in the Dominican Republic to about 80 percent in Costa Rica, with Nicaragua, El Salvador, Guatemala, and Honduras in the middle range (Figure 14.1). Panama is an outlier, with a larger and deeper financial system and lower bank concentration.

Most CAPDR countries have experienced a prolonged increase in their credit-to-GDP ratios in recent years, suggesting that financial deepening is ongoing. Over the past decade, the bank credit-to-GDP ratio has increased by about 50 percent in Costa Rica and the Dominican Republic (although in the latter it remains below the peak it reached just before the 2003 financial crisis) followed by 30 percent in Nicaragua, 20 percent in Honduras, and 10 percent in Guatemala, while remaining broadly constant in Panama and El Salvador. However, financial deepening has not always implied financial inclusion, especially for households, and the financial development does not always appear fully aligned with macroeconomic fundamentals. In particular, *lower* financial development than implied by fundamentals reflects a contraction of credit supply following the 2003 crisis in the Dominican Republic (Ramírez de León 2012), and high bank concentration and weak collateral frameworks in Costa Rica and Nicaragua. On the other hand, *positive* gaps in Panama, Honduras, Guatemala, and El Salvador capture scant investment opportunities and underdeveloped stock markets that lack adequate legal and contractual infrastructure (IMF 2016b).

Banks are well capitalized, with good credit quality and a solid deposit base, but the high dollarization of both assets and liabilities creates vulnerabilities. Banking systems have capital ratios comfortably above minimum requirements, and nonperforming loans (NPLs) are low—ranging from about 1 percent of loans in Nicaragua to about 2.5 percent in Honduras and Guatemala—and typically overprovisioned. Credit is mostly financed by costumer deposits, which on average account for 80 percent of total (non-interbank) loans. Panama and El Salvador are officially dollarized, with dollarization particularly high in Nicaragua (97 percent of bank assets and 74 percent of liabilities). Dollarization in the rest of the region averages about 30 percent of assets and liabilities, and is high in Costa Rica and Guatemala, exposing them to exchange rate and rollover risks. The high share of credit in foreign currency granted to borrowers without natural hedges (as high as 70 percent in Costa Rica and Nicaragua) compounds these exposures with credit risk in case of sustained exchange rate depreciations.
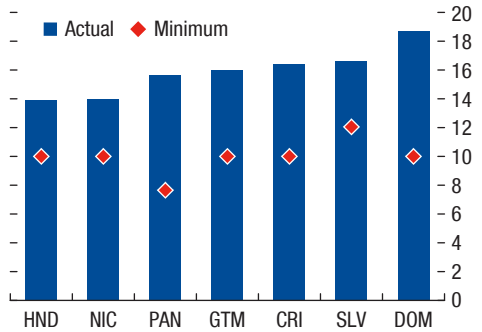
Financial links in the region have increased considerably since the early 2000s, driven by strengthened economic ties. The past decade has seen a rapid expansion of financial conglomerates with cross-border operations in the region, as domestic financial institutions became regional financial conglomerates with complex structures, although their presence varies significantly (from over 90 percent of total banking assets in El Salvador to negligible presence in the Dominican
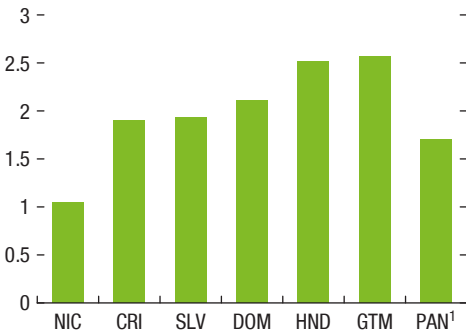
Figure 14.1. Selected Banking Sector Indicators
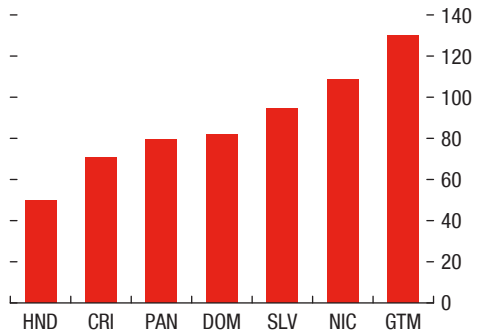
1. Total Bank Credit
(Percent of GDP)

Legend: CRI, SLV, GTM, HND, NIC, DOM, PAN
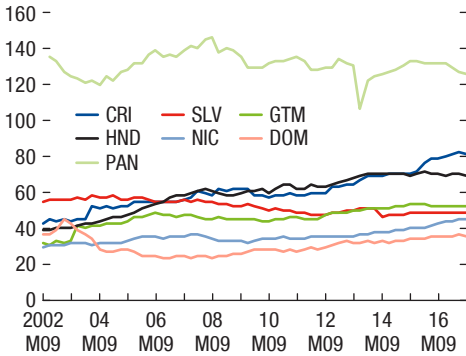
2. Regulatory Capital
(Percent of Risk-Weighted Assets, 2017:Q3)

Legend: ■ Actual   ◆ Minimum

(HND, NIC, PAN, GTM, CRI, SLV, DOM)

3. Nonperforming Loans
(Percent of Total Loans, 2017:Q3)

(NIC, CRI, SLV, DOM, HND, GTM, PAN[1])

4. Consumer Deposits to Total (Non-Interbank) Loans
(Percent, 2017:Q3)

(HND, CRI, PAN, DOM, SLV, NIC, GTM)

5. Foreign Currency Loans to Total Loans
(Percent, 2017:Q3)

Legend: ▲ Unhedged borrowers

(DOM, HND, CRI, GTM, NIC)
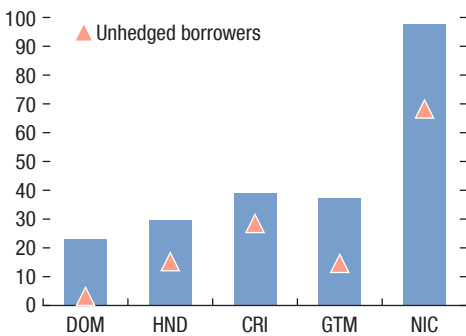
6. Foreign Currency Liabilities to Total Liabilities
(Percent, 2017:Q3)

(DOM, GTM, HND, CRI, NIC)
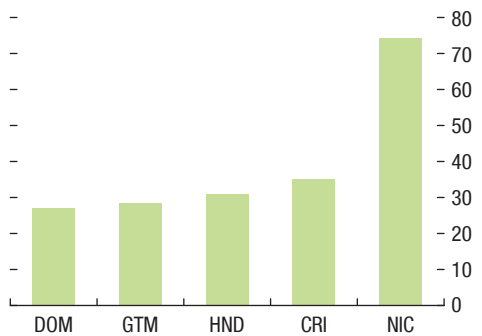
Sources: Secretaría Ejecutiva del Consejo Monetario Centroamericano; Haver Analytics; and IMF, *International Financial Statistics.*
Note: CRI = Costa Rica; DOM = Dominican Republic; GTM = Guatemala; HND = Honduras; PAN = Panama;
NIC = Nicaragua; SLV = El Salvador.
[1] Data provided by the country desk.

Republic). While regional financial integration could foster diversification of domestic financial systems, it also increases the risk of potential cross-border spillovers. Policy coordination and consolidated supervision of cross-border operations are critical for maintaining regional financial stability (See IMF 2016a for a detailed overview of financial integration in Latin America).

ESTIMATING THE CREDIT CYCLE

The credit cycle is estimated as the deviation of the credit-to-GDP ratio from its long-term trend. The methodology used in this chapter is based on the one-sided backward-looking HP filter, in accordance with BCBS's guidance (see Annex 14.1 for more details on the HP filter methodology).

Credit in this context is defined as aggregate credit extended to households and nonfinancial private businesses from banks and nonbanks. This measure includes all credit extended to the private nonfinancial sector through nonbanks, corporate bond markets, and foreign intermediaries or investors. This indicator has proven better than narrower definitions of credit in signaling future banking crises. However, since there is a clear trade-off between length and coverage of the alternative credit series, aggregate quarterly data on credit extended by banks (including offshore banks and adding cooperatives and other financial institutions) is considered. Corporate bonds are not included due to inadequate data availability.

Possible drawbacks related to this methodology apply to CAPDR, as to other emerging economies. The main ones are issues regarding the length of the available data (as noted above) and the presence of structural breaks in the time series. Besides ongoing financial deepening in CAPDR, shifts in exchange rate policies have introduced structural breaks into the credit series, given the region's strong credit dollarization. Using such credit gap measures may hinder the beneficial financial deepening undergone by many emerging market economies (Reserve Bank of India 2013), because it essentially penalizes fast growth rates of credit-to-GDP, which could be a structurally desirable and positive outcome. This also induces a reverse problem: a sustained period of high growth, in credit-to-GDP ratio translates to a faster trend growth estimate, which would bias downward the estimates of the credit-to-GDP gap and hence make the countercyclical capital buffer never binding. BCBS (2010) and BCBS (2011) recognize these issues and the limited information in the one-sided HP filtered credit gap and recommend using additional variables to guide the decision regarding countercyclical capital buffer rates.

Other signals of financial risk buildup recommended by the BCBS include measures of excessive credit growth, lenient credit risk pricing, and measures of high leverage. In contrast to the credit gap, however, there are no specific definitional or numerical recommendations for these measures by the BCBS:

- *Excessive credit growth:* credit growth rates at sectoral level, such as household and construction, and persistently large current account deficits.

- *Credit mispricing:* low risk premiums for risky assets (low credit spreads), high equity valuations, high housing price growth rates, or price-to-rent ratios.

- *High leverage/risk buildup:* high leverage ratios in the banking sector, high leverage ratios in the corporate sector, high loan-to-value ratios or debt-service-to-income ratios in the household sector.

Since the usual credit gap measure is inconsistent with sustained fast credit growth, a normalized indicator is considered in this chapter to reflect ongoing financial deepening in the region. The standard credit-to-GDP gap proposed by the BCBS is based on studies of countries with large financial deepening, mostly with credit-to-GDP ratios above 100 percent. For countries with less financial deepening such as in CAPDR, which has credit-to-GDP ratios averaging 65 percent, the standard credit gap might not be the best measure to capture the evolution of the credit cycle. As an alternative, a percentage deviation of the credit gap relative to the trend of the credit-to-GDP ratio is proposed.[2] Hence the normalized credit gap is defined as:

$$\widehat{(CreditGap)}_t = \frac{CTG_t - Trend_t}{Trend_t}$$

Where Do CAPDR Countries Stand in the Credit Cycle?

Credit in CAPDR countries is recovering after the large contraction during the global financial crisis. Figure 14.2 shows credit cycles for CAPDR countries since the early 1990s. Several experienced credit booms between 2003 and 2007, followed by a severe credit crunch during the global financial crisis.

CAPDR credit cycles are compared by constructing measures based on business cycles literature. Following Mink and others (2012) and Samarina and others (2017) the focus is on two dimensions of credit cycles: (1) correlation (synchronicity) to compare the direction of credit gaps in the countries' credit cycles, and (2) dispersion (similarity) to compare the magnitude of the credit gaps of the countries' credit cycles.

The *country synchronicity index* assumes value 1 if the credit cycle moves in the same direction as the CAPDR credit cycle, defined as the median credit gap for all CAPDR countries, and –1 otherwise (see Annex 14.2 for the formulas of the indexes presented in this section).

The *CAPDR synchronicity index* is defined on the interval [0,1]. It assumes value 1 when all countries' credit cycles move in the same direction as the

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[2]The motivation for the alternative measure can be better understood by going through an example. Consider two countries with different financial deepening: country A with a credit-to-GDP ratio of 30 percent and a trend value of 20 percent, and country B with a credit-to-GDP ratio of 110 percent and a trend value of 100 percent. Following the BCBS standard approach, both countries have a credit gap of 10 percentage points. However, for country A to reach a credit-to-GDP ratio of 30 percent, credit must grow about 50 percent faster than GDP, while in country B credit has to grow only about 10 percent faster than GDP. If one thinks that a constant fraction of the new credit extended above the trend value (10 percentage points in the case of country B) is excessive and increases systemic vulnerability, the increase in capital and loss-absorbing capacity in country A should be about five times larger than that of country B. Using the percentage deviation of credit gap from the trend avoids this issue.

Figure 14.2. Central America: Credit Cycle by Country

1. Costa Rica

2. Dominican Republic

3. El Salvador

4. Guatemala

5. Honduras

6. Nicaragua
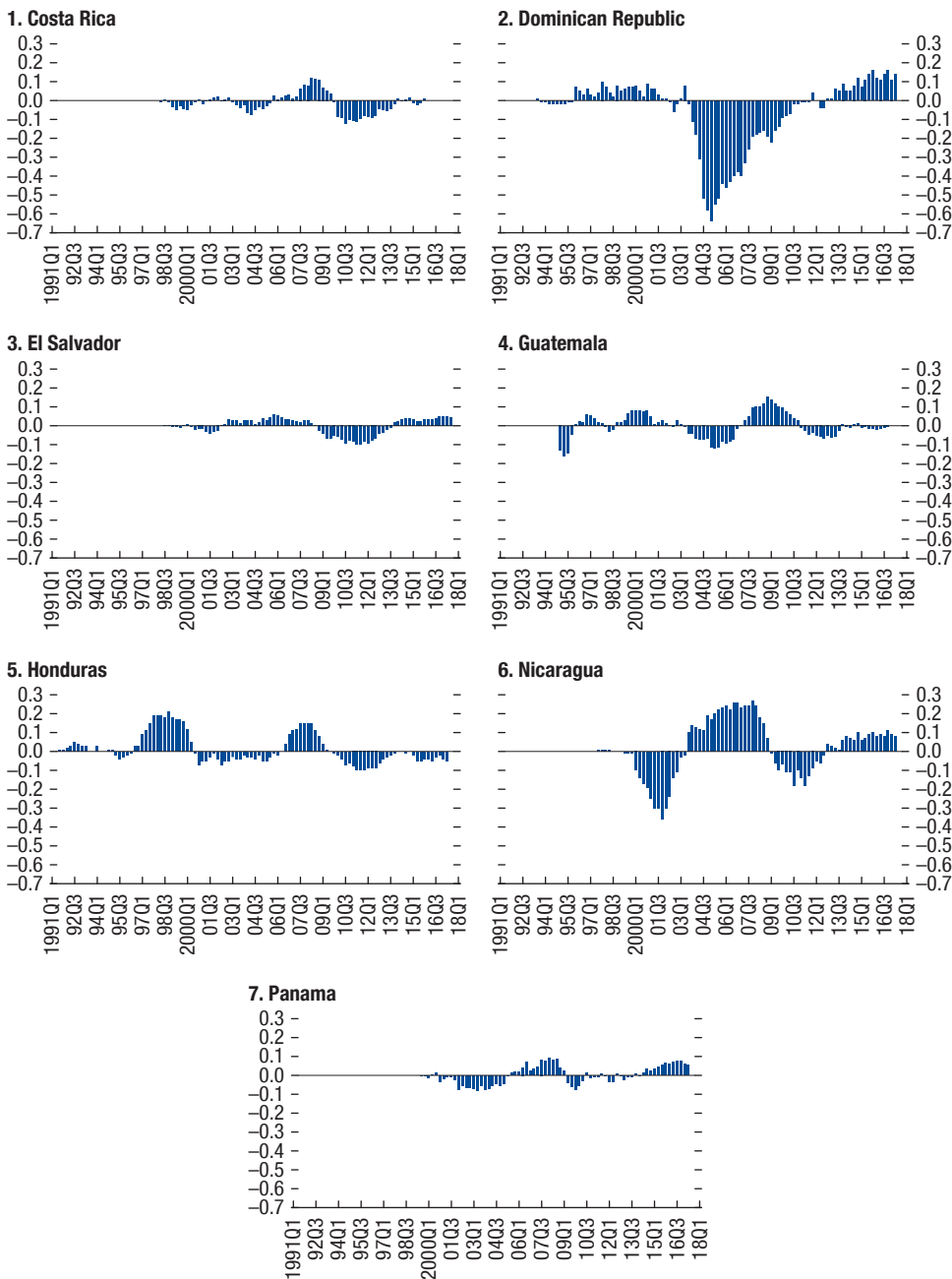
7. Panama

Sources: IMF, *International Financial Statistics*, and country authorities.
Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the
Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala,
Honduras, and Nicaragua.

CAPDR credit cycle (perfect synchronization) and 0 when only half of the countries' credit cycles move in the same direction.

The *country similarity index* is defined as the difference in credit cycle amplitude between country i and the CAPDR credit gap. The index is defined on the interval [1-n, 1], with 1 corresponding to the case of identical amplitude and synchronization of each country credit cycle.

The CAPDR regionwide *similarity index* is defined on the interval [0,1]. Higher values indicate that the amplitudes of the countries' credit cycles nearly match the CAPDR cycle (see Annex 14.2 for index formulas).

The credit cycles of CAPDR countries are somewhat heterogeneous. The analysis focuses on synchronicity and similarity of national credit cycles with respect to the CAPDR regional cycle. Table 14.1 shows averages of the synchronicity and similarity indexes over 1998–2017. Most of the countries' credit cycles move in the same direction as the CAPDR reference cycle most of the time, since the average synchronicity index is above 0.5 for most of the countries. However, notable exceptions are observed. The credit cycle of the Dominican Republic is out of step with the regional cycle since recovery from crisis in 2003 prevented credit accumulation in the run-up to the global financial crisis, and monetary policy measures aimed at influencing credit dynamics in response to idiosyncratic shocks. Moreover, the credit cycles of Guatemala and, to a lesser extent, Costa Rica are less synchronized with the CAPDR region. In contrast, El Salvador's credit cycle is the most synchronized with the regional credit cycle, followed by Honduras, Nicaragua, and Panama (which have synchronicity indexes slightly above 0.5). The credit cycles of CAPDR countries could also be compared with regard to the amplitude of the credit gaps (similarity). According to this index, Panama's credit cycle is the most "similar" to the region reference cycle, while the Dominican Republic's is the most dissimilar. Moreover, notwithstanding the high synchronization of Nicaragua's credit cycle with reference to the CAPDR credit cycle, the amplitude of its credit gaps is significantly larger than the regional average (Table 14.1).

The synchronicity and similarity indexes of the CAPDR credit cycle are countercyclical. Synchronicity has increased during contractionary phases and declined during booms over the past 20 years (Figure 14.3). The regionwide credit cycle was more synchronized in 1998, in 2007/08, and again in 2011 and 2012. After a significant drop in 1999, synchronicity slowly increased in the early 2000s, reaching a maximum of 0.94 during the global financial crisis. Similarly, the amplitude of the countries' credit gaps, measured by the similarity index, increased from the late 1990s and reached its peak during the years of the global financial crisis. Exposure of CAPDR countries to a common external shock, such as the global financial crisis, drives this result.

Early Warning Power of the Credit-to-GDP Gap

Assessing the early warning properties of the credit-to-GDP gap is necessary to evaluate the potential usefulness of this indicator to inform macroprudential policy decisions on the countercyclical capital buffer. As CAPDR countries other

TABLE 14.1.

| Central America: Synchronicity and Similarity of Credit Cycles		
Country	Synchronicity	Similarity
Costa Rica	0.46	0.53
Dom. Republic	0.22	−0.64
El Salvador	0.76	0.60
Guatemala	0.39	0.46
Honduras	0.53	0.13
Nicaragua	0.53	−0.37
Panama	0.53	0.71
CAPDR average	0.50	0.20

Source: Authors' estimates.
Note: The table reports averages of individual country and CAPDR-wide synchronicity and similarity indexes over the period 1998–2017. The country synchronicity index lies between a maximum of 1, when the country's credit cycle has always moved in the same direction as the CAPDR credit cycle over the reference period, and a minimum of −1 when the country's credit cycle has always moved in the opposite direction. Positive (negative) values of the index indicate that the country's credit cycles have moved more often in the same (opposite) direction as the regional credit cycle over the reference period. The similarity index is defined over the interval [1-n, 1], where n is the number of countries in the CAPDR region. It is 1 in case of identical amplitude of the country's credit cycle with respect to the CAPDR credit cycle. Negative values indicate larger differences in the amplitude of the country's credit cycle with respect to that of its region over the reference period (the deviation of the country's credit gap from the region's credit gap exceeds the average credit gap of all countries).
For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

than the Dominican Republic have not experienced a banking crisis in recent decades, the annual change in the NPL ratio is used as a measure of financial distress against which to assess the early warning properties of the credit gap. This is not a limitation. Countercyclical capital buffers should be large whenever systemic risk is high, irrespective of whether a crisis materializes. This makes it even more appropriate to use a continuous risk measure such as the change in NPL, instead of a binary crisis variable, to assess the properties of the credit gap.

The power of the indicator is evaluated at 1- and 2-year horizons through a simple regression on quarterly data, first using the credit gap as the only regressor and then augmenting the model with additional macro variables: yearly GDP growth rate, consumer price inflation, and annual change in the current account balance-to-GDP ratio.[3] The time sample varies by country depending on data availability.

The results using a simple univariate model indicate that the credit-to-GDP gap is a powerful predictor of financial distress in CAPDR countries. This result, consistent with empirical evidence from countries outside the region, is confirmed for Costa Rica, the Dominican Republic, Guatemala, and Honduras at both 1- and 2-year horizons, and for El Salvador and Nicaragua at the 2-year horizon, and for Panama at the 1-year horizon (Table 14.2). The results show that the credit-to-GDP gap has its maximum predictive power for the 2-year horizon for all countries

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[3]The regressions here aim at exploring the early warning power of the credit-to-GDP gap and are not meant to provide a full assessment of the determinants of NPL growth. For this reason, they do not include some regressors included in the literature on the determinants of NPL (see, among others, Ghosh (2015) for a study of NPL determinants).

Figure 14.3. Central America: Credit Cycle, Synchronicity and Similarity
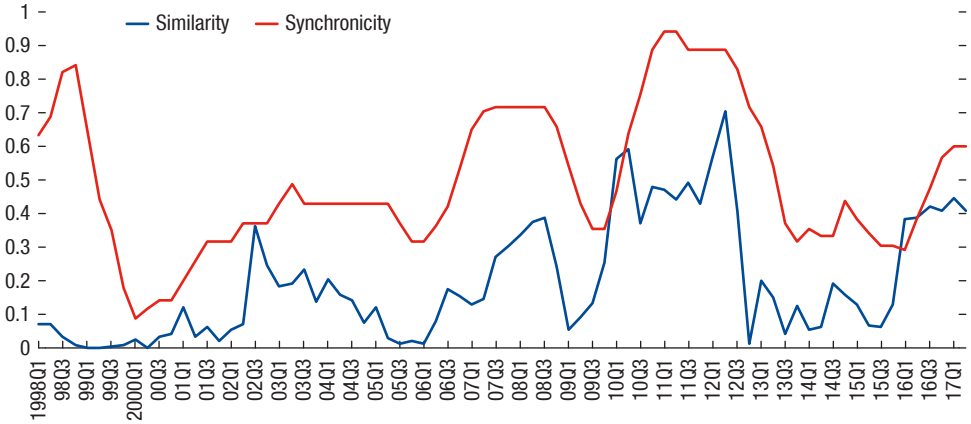
Source: Authors' estimates.
Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. The chart reports averages of individual country and CAPDR-wide synchronicity and similarity indexes over the period 1998–2017. The country synchronicity index lies between a maximum of 1, when the country's credit cycle has always moved in the same direction as the CAPDR credit cycle over the reference period, and a minimum of –1 when the country's credit cycle has always moved in the opposite direction. Positive (negative) values of the index indicate that the country's credit cycles have moved more often in the same (opposite) direction as the regional credit cycle over the reference period. The similarity index is defined over the interval [1–n, 1], where n is the number of countries in the CAPDR region. It is 1 in case of identical amplitude of the country's credit cycle with respect to the CAPDR credit cycle. Negative values indicate larger differences in the amplitude of the country's credit cycle with respect to that of its region over the reference period (the deviation of the country's credit gap from the region's credit gap exceeds the average credit gap of all countries).

except Panama, even though for Honduras only in economic terms (as the 2-year prediction is slightly less significant than the 1-year prediction). The augmented model broadly confirms the role of the credit-to-GDP gap. The gap retains its significance for most countries in the sample—and still with a higher significance for the 2-year prediction horizon. Two exceptions are Guatemala and Honduras, where the credit gap loses its significance when macroeconomic variables are added.

The augmented model confirms the significance of the credit gap (with the noted exceptions of Guatemala and Honduras) and indicates that GDP growth and inflation could also contribute to an explanation of NPL changes for most of the countries (Annex 14.3). In particular, GDP growth is significant for the 2-year horizon for Costa Rica, the Dominican Republic, Honduras, El Salvador, and marginally for Nicaragua. For El Salvador significance is observed also for the 1-year horizon. Inflation is significant for Costa Rica (in the 2-year horizon estimation), El Salvador (in the 1- and 2-year horizon estimations) and Honduras (in the 1-year horizon estimation). In the case of Costa Rica also the change in the current-account-to-GDP ratio is significant in the 8-quarter-ahead estimation. In the case of Guatemala alone none of the variables is significant.

TABLE 14.2.

Central America: Early Warning Properties of the Credit Gap
(Summary of Results)

	Costa Rica		Dominican Republic		Guatemala		El Salvador		Honduras		Nicaragua		Panama	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Variables	Δ4 NPL	Δ8 NPL	Δ4 NPL	Δ8 NPL	Δ4 NPL	Δ8 NPL	Δ4 NPL	Δ8 NPL	Δ4 NPL	Δ8 NPL	Δ4 NPL	Δ8 NPL	Δ4 NPL	Δ8 NPL
Credit gap	0.0265***	0.0380***	2.294*	5.350***	0.0208**	0.0360**	3.993	9.685**	4.912***	5.898**	0.00564	0.0217***	0.0140*	−0.00458
	(0.00761)	(0.00895)	(1.203)	(1.664)	(0.0102)	(0.0137)	(4.619)	(4.842)	(1.766)	(2.490)	(0.00544)	(0.00759)	(0.00810)	(0.0126)
Constant	−8.87e−05	−0.000169	0.189	0.467	−0.00463***	−0.00886***	0.128	−0.0658	−0.0929	−0.139	−0.000337	−0.000764	0.00108	−0.00123
	(0.000444)	(0.000541)	(0.278)	(0.393)	(0.000688)	(0.000956)	(0.196)	(0.208)	(0.137)	(0.200)	(0.000819)	(0.00116)	(0.000797)	(0.00131)
Observations	60	56	64	60	56	52	75	71	39	35	78	74	53	51
R-squared	0.173	0.250	0.055	0.151	0.071	0.122	0.010	0.055	0.173	0.145	0.014	0.102	0.056	0.003

Source: Authors' estimates.

Note: NPLs = non-performing loans; the credit gap is the difference between the credit-to-GDP ratio and its estimated long-run trend.

For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The results are however not fully consistent across countries, which makes their economic interpretation complicated and suggests the need for further analysis. GDP growth has a positive sign for the 2-year forecast horizon for Costa Rica, the Dominican Republic, and Honduras, but it has a negative sign for both the 1- and the 2-year horizons for El Salvador and for the 2-year horizon for Nicaragua (although only marginally). Inflation is positive for El Salvador (for both the 1- and 2-year estimation horizons) and for Honduras (for the 1-year horizon) but it is negative for Costa Rica (for the 2-year horizon). The positive sign of GDP growth over the 2-year horizon (the most robust result across CAPDR) could be interpreted as an indication that higher economic activity could be symptomatic of a slowdown 2 years ahead, which could in turn imply a deterioration in the creditworthiness of economic agents. The positive sign of inflation rate offers the same interpretation: overheating economic activity signaling a forthcoming slowdown and hence an increase in NPLs. Under this reasoning, the interpretation of the negative sign of inflation for Costa Rica and of GDP for El Salvador becomes problematic. However, it is also worth noting that, if taken in isolation, a negative sign of GDP growth would seem the most intuitive result; an economic slowdown leading to higher NPL 1 and 2 years into the future.

As an additional exercise, the credit gap is replaced with 2-year credit growth, and its role is tested as a predictor of the change in NPL (Annex 14.3). Computing 2-year growth amounts to smoothing the credit dynamics series in a way that is not conceptually different from using the HP filter with a high value of the lambda parameter (as the one used in this chapter). In the univariate specification the results are very robust across the CAPDR and for the two estimation windows, as are those of the credit-to-GDP gap. This confirms the important role of credit variables in the financial cycle. As for the credit gap, credit growth retains its significance in the multivariate augmented specification for most cases. The results for the other variables broadly follow those obtained using the credit gap.

Panel estimates confirm that the credit gap is a powerful predictor of systemic vulnerabilities in the region. Consistent with the country-specific evidence, panel regression results show the credit-to-GDP gap is highly significant both at the 1- and 2-year horizons and retains its significance in the augmented model. Inflation is also a significant predictor of the change in NPL 1 year ahead with positive sign, while it loses significance 2 years ahead—as does GDP growth in both horizons. In contrast to country-specific regressions, credit growth is not a significant predictor of changes in NPLs, either alone or in the augmented model. These results hold when running the model with either fixed or random effects (see Annex 14.3 for random effects estimates).

ACTIVATION OF THE COUNTERCYCLICAL CAPITAL BUFFER

The countercyclical capital buffers is calibrated based on the estimated credit cycle, following the Basel III framework. The Basel Committee (BCBS 2010, 2011) selected the credit gap as the main indicator for setting the buffer, mainly

TABLE 14.3.

Central America: Early Warning Properties of the Credit Gap
(Panel Estimates—Fixed Effects)

Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		0.0105		0.0217	0.000634	0.00233		
		(0.0281)		(0.0394)	(0.0116)	(0.0179)		
GDP growth					−0.359	0.907	−0.477	0.658
					(0.577)	(0.916)	(0.574)	(0.910)
CPI inflation					3.210***	2.532	2.707***	1.445
					(0.990)	(1.608)	(1.005)	(1.649)
CA/GDP					−5.34e−05	−0.000187	−4.74e−05	−0.000178
					(0.000184)	(0.000290)	(0.000183)	(0.000287)
Credit gap	1.471***		3.109***				0.775**	1.383**
	(0.466)		(0.588)				(0.354)	(0.570)
Constant	0.0245	−0.00185	−0.00131	−0.00240	−0.214***	−0.415***	−0.180***	−0.331***
	(0.0531)	(0.0523)	(0.0676)	(0.0754)	(0.0643)	(0.106)	(0.0657)	(0.110)
Observations	425	436	399	410	329	302	330	303
R-squared	0.023	0.000	0.067	0.001	0.037	0.026	0.052	0.045
Number of country_code	7	7	7	7	7	7	7	7

Source: Authors' estimates.
Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.
For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.
Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

because of its out-of-sample forecasting power in predicting banking crises across a large sample of countries. Subsequent researchers have largely confirmed its properties for advanced economies, while some have questioned its performance for developing economies. According to the Basel III guidelines, the buffer varies between zero and 2.5 percent of risk-weighted assets: authorities should increase the rate when risks associated with excessive credit growth build-up, and lower it when risks materialize, sustaining the flow of credit to households and corporations and containing the risk of systemic deleverage. Authorities are expected to apply judgment in the setting of the buffer in their jurisdiction by using the best information available to gauge the buildup of system-wide risk.

Countercyclical capital buffers based on the estimated credit-to-GDP gap would have been activated during the run-up to the global financial crisis and released during the crisis in most countries. Signs of financial distress were clear around the time of the crisis. Setting buffer rates according to BCBS thresholds that are based on the estimated credit-to-GDP gap would have activated the buffer in a timely manner for all countries in the years before it happened (Figure 14.3). In Costa Rica, Guatemala, Honduras, and Nicaragua the buffer would have reached its 2.5 percent peak at different stages of the global financial crisis and would have been released thereafter, although the accumulation phase started as early as 2003 in Nicaragua. In Panama and El Salvador, the buffer would have also steadily increased and peaked during the crisis but it would not have reached its maximum and would have been released almost immediately, suggesting a less steep and protracted credit accumulation. The Dominican Republic would have seen no activation ahead of the crisis as the system was still recovering from the 2003 banking crisis. The buffers, however, would have built up during the run-up to the 2003 crisis and peaked in 1997, although the suggested pattern is somehow less stable than in other countries. The countercyclical capital buffer would have also been activated during the expansive credit cycles of the late 1990s in Guatemala and Honduras.

Some countries are now undergoing an expansionary credit cycle. The Dominican Republic, El Salvador, Nicaragua, and Panama have experienced this since 2013–14, as bestowed by the continued accumulation of the simulated buffer in Figure 14.4. The countercyclical capital buffer would have already reached its 2.5 percent maximum in the Dominican Republic and Nicaragua, while El Salvador and Panama continued having some slack. However, in Nicaragua the simulated countercyclical capital buffer accumulation is not as smooth as during the global financial crisis.

The credit gap is a powerful predictor of financial distress and should be the lead indicator in policy decisions. However, instability in some instances of countercyclical capital buffer accumulation based on the credit gap, as well as the Basel proposed calibration, suggests that decisions about the optimal calibration and timing of capital-based macroprudential instruments should be complemented by policymakers' judgment also based on other macroeconomic variables to avoid creating excessive volatility in bank capitalization and lending.

In general, banks in the region are well capitalized and the countercyclical capital buffer requirement would have been non-binding in most cases (Figure 14.5). Based
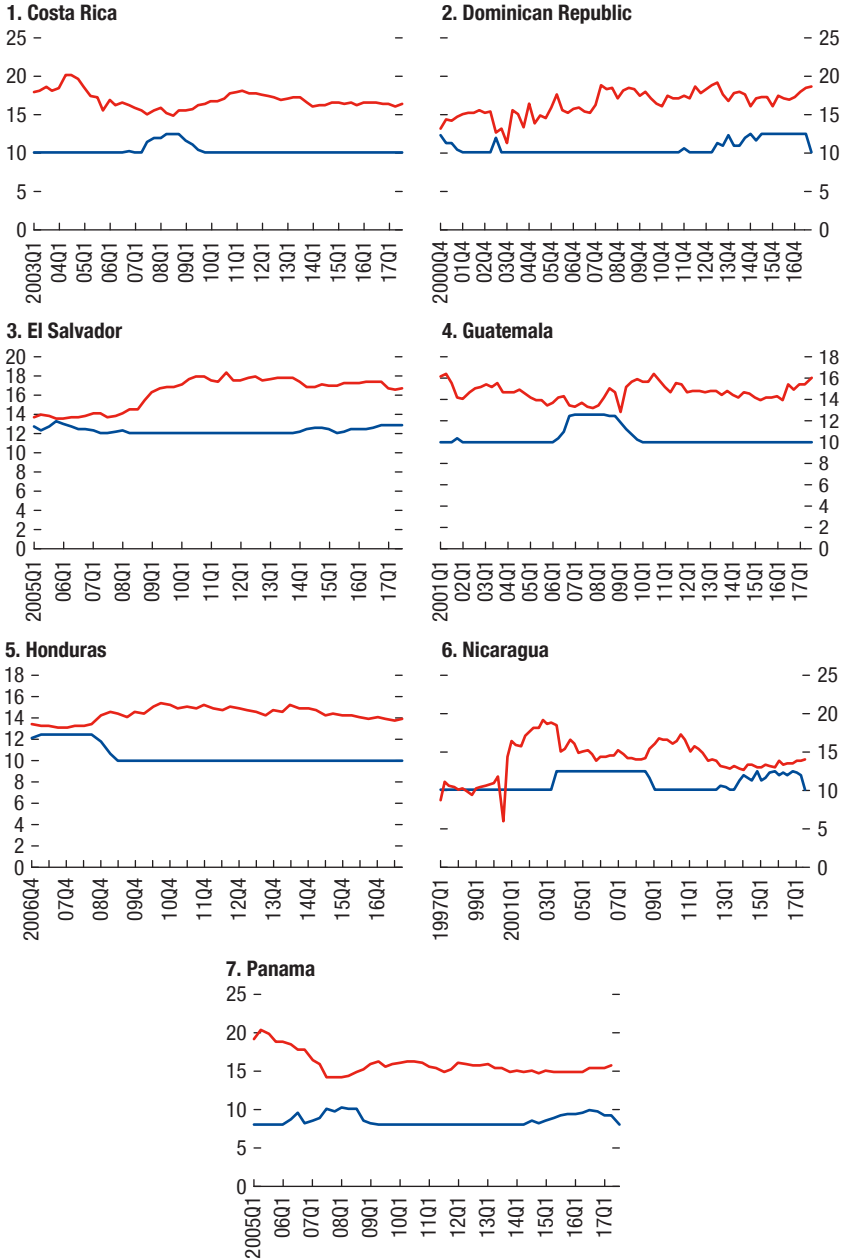
Figure 14.4. Central America: Activation of the Countercyclical Capital Buffer
(Percent of risk-weighted assets)
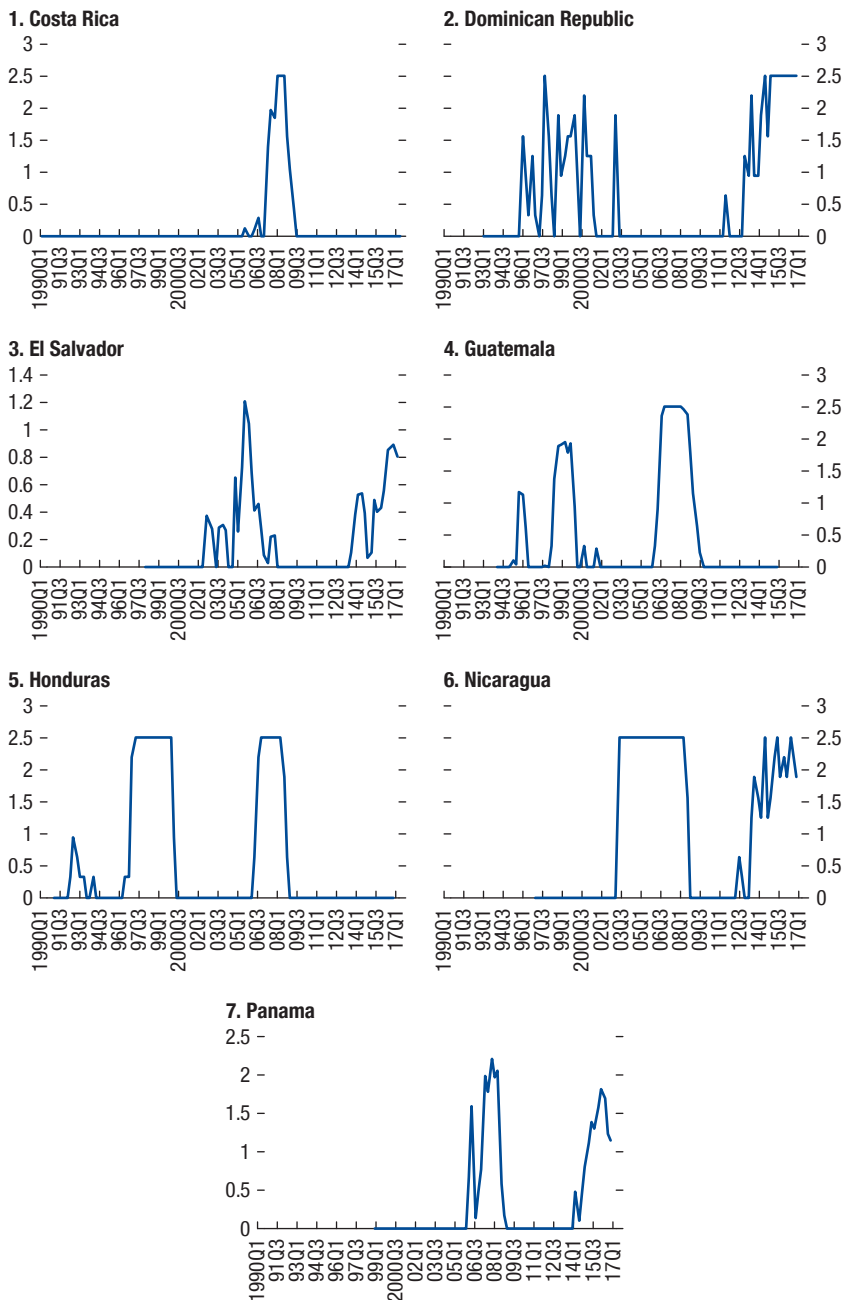
Source: IMF staff calculations.
Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

Figure 14.5. Central America: System-wide CAR and Simulated Minimum Requirement
(Percent of risk-weighted assets)

1. Costa Rica

2. Dominican Republic

3. El Salvador

4. Guatemala

5. Honduras

6. Nicaragua

7. Panama

Source: IMF staff calculations.
Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. CAR = capital adequacy ratio.

on the simulated countercyclical capital buffer, a theoretical capital requirement can be established in each country as the minimum capital adequacy ratio (CAR) plus the countercyclical capital buffer. Results show that over the years for which cross-country comparable aggregate CAR data series are available, the countercyclical capital buffer would not have been binding for the system as whole in most cases. The main exception is Nicaragua, for which the aggregate CAR would have fallen below the minimum requirement plus the countercyclical capital buffer during the late 1990s. It is worth noting that countercyclical capital buffer policies are not ineffective when they are not binding for the whole banking system. There are two explanations. First, higher regulatory minimum requirements restrict the amount of capital subject to banks' voluntary decisions. Second, even when the system-wide CAR does not breach the aggregate capital requirement some banks might fail to meet the requirement, and therefore would need to increase their capital.

It should be noted that the countercyclical capital buffer is complementary to dynamic provisioning (covered in the previous chapter), which requires loan-loss provisioning to cover expected losses over an average economic cycle, whereas the countercyclical capital buffer covers unexpected losses. Banks are required to maintain funds for dynamic provisioning in addition to the minimum regulatory capital requirement. The additional provisions accumulated in the expansionary phase of the cycle can then be drawn down in the contractionary phase. Panama introduced dynamic provisioning in 2013 (with application starting in 2014). Costa Rica followed in 2016 and Nicaragua in 2017 (with a 3-year phased implementation).

CONCLUSIONS AND POLICY RECOMMENDATIONS

The credit cycle in CAPDR has been studied in this chapter using the credit-to-GDP gap. The analysis shows that since the 1990s, despite being free of significant systemic banking crises, most of the countries have experienced at least one credit cycle. The significant synchronicity of the credit cycles confirms the growth of financial links within the region.

The credit-to-GDP gap is a powerful early warning predictor of financial stress in CAPDR countries. Despite some notable data limitations, the analysis confirms the early warning power of the credit gap in CAPDR countries, in line with the evidence available in the literature for many economies.

A formal analytical framework to assess the applicability of the countercyclical capital buffer in CAPDR should be considered to improve banking system stability. The signaling power of the credit gap suggests that authorities could consider introducing the countercyclical capital buffer in their policy toolkit. It would be a useful policy instrument to strengthen the resilience of the banking system through the financial cycle and limit the procyclicality of lending.

Decisions on the countercyclical capital buffer should be based on a deep assessment of the credit developments. Although ideally the buffer should mainly be anchored to the credit-to-GDP gap, a word of caution is warranted. The performance of the credit-to-GDP gap for CAPDR is subject to caveats, mostly

related to existing data limitations. Authorities would need to complement the credit gap with additional analysis. An example would be the use of granular information on credit developments. Micro data can provide important insights into the outlook for financial stability. Whenever credit growth is strong, authorities can forensically analyze disaggregated loan data to identify which sectors and industries are borrowing: how much, why, and at what price.

Qualitative information and judgment should also be used to analyze changes in lending standards and credit conditions. Regular meetings between central banks and financial institutions to discuss different views on credit conditions are also helpful. Ultimately, policymakers need to make sure that any credit expansion is healthy, and understand the reasons behind any contraction in lending. Credit deepening must go hand in hand with measures that encourage healthy credit expansion, such as legal frameworks that help create, mobilize, and realize collateral, as well as effective insolvency proceedings.

REFERENCES

Basel Committee on Banking Supervision (BCBS), 2010, *Guidance for National Authorities Operating the Countercyclical Capital Buffer* (Switzerland: Bank for International Settlements).

BCBS, 2011, *Basel III: A global Regulatory Framework for More Resilient Banks and Banking Systems* (Switzerland: Bank for International Settlements).

Borio, C., and Philip Lowe, 2002, Assessing the Risk of Banking Crises, *Bank for International Settlements Quarerly Review*, (December).

Drehmann, M., and Mikael Juselius, 2014, Evaluating early warning indicators of banking crises: Satisfying policy requirements, *International Journal of Forecasting*, Elsevier, vol. 30(3), pp.759–780.

Ghosh, A., 2015, Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states, *Journal of Financial Stability,* Vol. 20, issue C, 93–104.

International Monetary Fund, 2016a, Financial Integration in Latin America, IMF Policy Paper: https://www.imf.org/external/np/pp/eng/2016/030416.pdf

International Monetary Fund, 2016b, Advancing Financial Development in Latin America and the Caribbean, IMF Working Paper WP/16/81: https://www.imf.org/external/pubs/ft/wp/2016/wp1681.pdf

Lund-Jensen, Kasper, Monitoring Systemic Risk Based on Dynamic Thresholds, 2012, *IMF Working Paper, 12/159*, IMF Working Paper 12/159.

Mink, M., J. Jacobs, and J. De Haan (2012). Measuring coherence of output gaps with an application to the euro area. Oxford Economic Papers 64 (2), 1–20.

Ramírez de León, F. A., 2012, Crédito al Sector Privado en Republica Dominicana (1997–2011): ¿Existe Evidencia de Racionamiento del Crédito? Serie de Estudios Economicos No. 7, Banco Central de la República Dominicana, Santo Domingo.

Reserve Bank of India, 2013, Implementation of Counter-cyclical Capital Buffer, (December).

Samarina, A., L. Zhang, and D. Bezemer (2017), Credit Cycle Coherence in the Eurozone: Was There a Euro Effect? Journal of International Money and Finance 77, 77–98.