Introduction: Bond Yields Fall Amid Growth Moderation and Looming Downside Risks

From 1 March to 15 May, most emerging East Asian markets witnessed a decline in yields on 10-year local currency (LCY) government bonds in line with the moderation of global economic growth and recent monetary decisions from major central banks.[1] The United States (US) Federal Reserve, the European Central Bank (ECB), and the Bank of Japan (BOJ) all recently indicated that they will maintain their current policy rates for the rest of 2019. As a result, 10-year government bond yields fell in all major advanced economies and select European markets. In many markets, the yield curve flattened on the back of a global growth slowdown and looming downside risks (**Table A**).

In emerging East Asia, the largest drop in the 10-year government bond yield was observed in the Philippines, where it fell 39 basis points (bps) on the back of a 25-bps policy rate cut on 9 May. The Philippines

Table A: Changes in Global Financial Conditions

	2-Year Government Bond (bps)	10-Year Government Bond (bps)	5-Year Credit Default Swap Spread (bps)	Equity Index (%)	FX Rate (%)
Major Advanced Economies					
United States	(39)	(38)	–	1.7	–
United Kingdom	(9)	(23)	(4.7)	2.7	(2.7)
Japan	(1)	(4)	2.6	(3.9)	2.1
Germany	(14)	(28)	0.04	4.3	(1.4)
Emerging East Asia					
China, People's Rep. of	20	12	(0.2)	(1.8)	(2.5)
Hong Kong, China	20	(21)	–	(1.9)	(0.01)
Indonesia	5	18	6	(8.0)	(2.4)
Korea, Rep. of	(12)	(13)	5	(4.7)	(5.4)
Malaysia	(15)	(5)	2	(5.3)	(2.4)
Philippines	(0.9)	(39)	(3)	(0.9)	(1.2)
Singapore	(7)	(12)	–	(0.1)	(1.0)
Thailand	10	(8)	(7)	(1.2)	0.9
Viet Nam	24	3	(7)	(0.4)	(0.5)
Select European Markets					
Greece	(22)	(16)	(46)	1.4	(1.4)
Ireland	(9)	(32)	(6)	0.7	(1.4)
Italy	14	(10)	14	0.8	(1.4)
Portugal	(9)	(34)	(6)	(2.0)	(1.4)
Spain	(11)	(33)	(3)	(1.0)	(1.4)

( ) = negative, – = not available, bps = basis points, FX = foreign exchange.
Notes:
1. Data reflect changes between 1 March 2019 and 15 May 2019.
2. A positive (negative) value for the FX rate indicates the appreciation (depreciation) of the local currency against the United States dollar.
Sources: Bloomberg LP and Institute of International Finance.

[1] Emerging East Asia comprises the People's Republic of China; Hong Kong, China; Indonesia; the Republic of Korea; Malaysia; the Philippines; Singapore; Thailand; and Viet Nam.

also experienced easing inflation during the review period and received a ratings upgrade of one notch to BBB+ from S&P Global. In Malaysia, the 10-year bond yield fell 5 bps and the 2-year bond yield fell 15 bps following a 25-bps rate cut on 7 May. In both Singapore and Hong Kong, China, the 10-year bond yield fell in tandem with declining US bond yields. Meanwhile, the People's Republic of China (PRC), Indonesia, and Viet Nam bucked the downward trend.

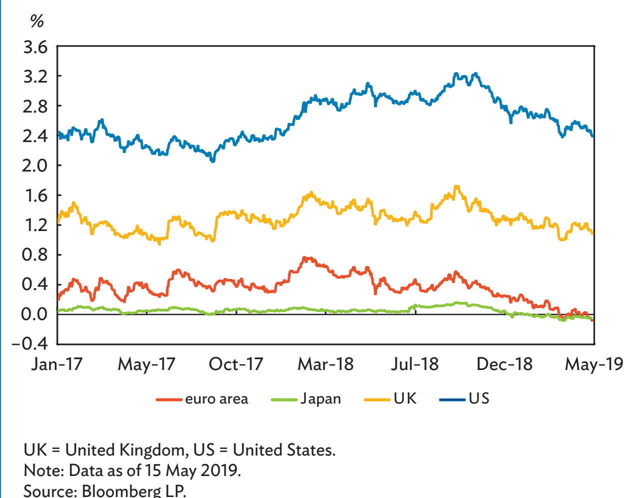
Despite moderating economic growth and a reduction in the reserve requirement ratio in January, the PRC's 2-year and 10-year bond yields rose 20 bps and 12 bps, respectively, from 1 March to 15 May on the back of stronger-than-expected economic growth. In Q1 2019, the PRC's gross domestic product (GDP) expanded 6.4% y-o-y, the same growth rate as in the fourth quarter (Q4) of 2018. Markets were anticipating another reserve requirement ratio cut in April, which did not materialize as the People's Bank of China focused on fine-tuning its liquidity measures rather than increasing aggregate liquidity.

In Indonesia, the 2-year and 10-year bond yields rose 5 bps and 18 bps, respectively, during the review period amid uncertainties in global and domestic economic conditions, and in financial markets. The continuing trade conflict between the PRC and the US, and expected wider-than-projected current account deficit weighed on investor sentiments and contributed to the investor pullback from the Indonesian market. During its 15–16 May meeting, Bank Indonesia left its policy rate unchanged as it sought to maintain financial stability.

In Viet Nam, while the 10-year bond yield rose marginally by 3 bps from 1 March to 15 May, the 2-year bond yield rose 24 bps, influenced by higher deposit interest rates and rising inflation expectations following increases in the prices of electricity and gasoline in March and April.

Between 1 March and 15 May, major advanced economies witnessed declines in their 2-year and 10-year government bond yields. Yields on 10-year government bonds dropped more than yields on 2-year government bonds in Germany, Japan, and the United Kingdom. The flattening yield curve implies a moderation of global economic growth (**Figure A**).

Figure A: 10-Year Government Bond Yields in Major Advanced Economies (% per annum)



UK = United Kingdom, US = United States.
Note: Data as of 15 May 2019.
Source: Bloomberg LP.

Economic Outlook

Global economic growth has decelerated since the second half of 2018 and will continue to moderate in 2019 before picking up somewhat in 2020, according to the International Monetary Fund's *World Economic Outlook April 2019*. The world economy is projected to grow by 3.3% in 2019, down from estimated growth of 3.6% in 2018, before rebounding to 3.6% in 2020. Relative to its January 2019 forecasts, the International Monetary Fund cut its global growth forecasts by 0.2% for 2019 and left its global growth forecasts for 2020 unchanged. Relative to its October 2018 forecasts, the global growth forecasts for 2019 and 2020 were reduced by 0.4% and 0.1%, respectively. World trade volume growth is expected to follow the trajectory of global growth, falling from an estimated 3.8% in 2018 to 3.4% in 2019 before recovering to 3.9% in 2020.

Upside risks are outweighed by downside risks, of which trade tensions between the PRC and the US remained the biggest. The temporary ceasefire in effect since December, as well as growing optimism in recent weeks that the two sides were nearing a more permanent settlement, was disrupted by the escalation of tariffs by both sides in May and June. On 10 May, the US more than doubled its tariffs on USD200 billion worth of Chinese imports from 10% to 25%. The PRC immediately

responded by imposing tariffs on USD60 billion worth of US imports on 1 June.

Separate but related factors negatively impacting growth include worsening global business confidence, which were especially evident in vulnerable emerging markets. In particular, Argentina and Turkey, two countries that suffered severe financial stress in the middle of 2018 but subsequently rebounded in the fourth quarter of 2018, have come under heavy renewed pressures in recent months. The fact that the US Federal Reserve has not raised interest rates this year will benefit global financial stability. On the other hand, heightened uncertainty about monetary and other economic policy in the US and elsewhere may become an additional destabilizing factor.

The growth of advanced economies, especially the US, is slowing. The robust cyclical upswing that the US economy enjoyed over the last 2 years is losing steam even as many key economic indicators, especially job market indicators, remain healthy. US economic growth is expected to moderate from an estimated 2.9% in 2018 to 2.3% in 2019 and further to 1.9% in 2020. As a group, the advanced economies grew by an estimated 2.2% in 2018, with the growth rate projected to decline to 1.8% in 2019 and 1.7% in 2020. The corresponding figures for emerging markets and developing economies are 4.5%, 4.4%, and 4.8% for 2018, 2019, and 2020, respectively. Since growth in advanced economies and the PRC is projected to slow in 2020, the projected modest pick-up in global growth in 2020 is expected to be led by emerging markets outside the PRC.

The *World Economic Outlook April 2019* forecasts consumer price inflation in advanced economies to drop from 2.0% in 2018 to 1.6% in 2019 before rising to 2.1% in 2020. In emerging markets and developing economies, consumer price inflation was estimated at 4.8% in 2018 and projected to be 4.9%, and 4.7% in 2019 and 2020, respectively. Global oil prices declined toward the end of 2018 due to a mix of supply-side factors such as record-high US crude production and weakening global growth. Although prices have recovered somewhat in 2019, a mix of relatively low oil and commodity prices and softening global demand for oil will help subdue inflationary pressures in both advanced economies and emerging markets.

Despite the reignition of the simmering trade conflict between the PRC and the US, developing Asia is forecast to grow at a healthy clip in 2019 and 2020.[2] According to the Asian Development Bank's *Asian Development Outlook 2019* released in April 2019, the region's economy is projected to expand 5.7% in 2019 and 5.6% in 2020, down from an estimated 5.9% in 2018. The estimated 2018 and forecasted 2019 growth figures are marginally lower than the December 2018 forecasts of 6.0% and 5.8%, respectively. Strong domestic demand—in terms of both consumption and investment—is supporting the growth of emerging East Asian economies in the face of less benign external conditions. Growth in the PRC, which is at the center of the trade dispute with the US, is forecast to moderate from an estimated 6.6% in 2018 to 6.3% in 2019 and 6.1% in 2020. The corresponding growth figures for the 10 members of the Association of Southeast Asian Nations are 5.1%, 4.9%, and 5.0% for 2018, 2019, and 2020, respectively. Growth in the Republic of Korea is projected to decelerate modestly from an estimated 2.7% in 2018 to 2.5% in both 2019 and 2020. The corresponding growth figures for Hong Kong, China are 3.0%, 2.5%, and 2.5% for 2018, 2019, and 2020, respectively. According to the *Asian Development Outlook 2019*, developing Asia's estimated consumer price inflation in 2018 was 2.5%; it is projected to remain unchanged in both 2019 and 2020.

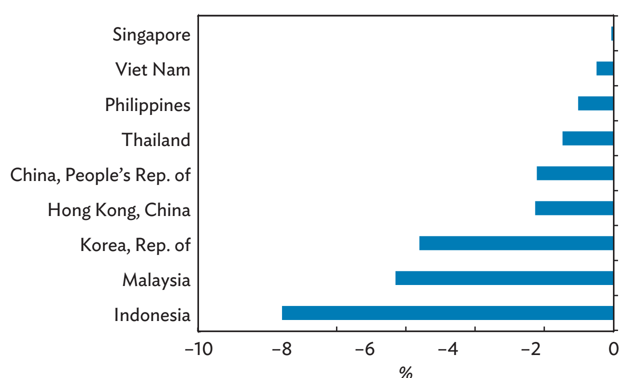
At its 19–20 March and 30 April–1 May meetings, the Federal Reserve noted the continued expansion of the US economy amid the slight moderation of a few economic indicators. Consistent with the Federal Reserve's assessment, preliminary data showed US GDP grew at an annual rate of 3.1% in Q1 2019 based on second estimate, up from 2.2% in Q4 2018. Nonfarm payrolls continued to be strong, with 263,000 jobs added in April, up from 189,000 in March. Amid looming uncertainties about the global economy, the Federal Reserve in March downgraded its GDP growth forecast for 2019 to 2.1% from its earlier December forecast of 2.3%. The growth forecast for 2020 was also reduced to 1.9% from 2.0%, while the forecast for 2021 remained unchanged. The Federal Reserve decided to take a

[2] Developing Asia comprises the 45 regional developing member economies of the Asian Development Bank. See https://www.adb.org/sites/default/files/publication/216421/ado-supplement-dec-2016.pdf.

patient approach in deciding when to adjust its policy rates. It suggested that there would be no additional adjustments in 2019 and that the pace of its balance sheet reduction program would be slowed before ending in September. Meanwhile, US inflation remained weak, with the Personal Consumption Expenditure Index, excluding food and energy prices, falling from 1.7% in February to 1.6% in March.

In both the euro area and Japan, economic growth is expected to moderate amid global risks that are tilted toward the downside. GDP in the euro area grew 1.2% y-o-y in Q1 2019, the same rate as in Q4 2018 and lower than the 2.2% y-o-y and 1.6% y-o-y growth rates in the second and third quarters of 2018, respectively. In March, the ECB revised its forecast for 2019 GDP growth to 1.1%, down from its December 2018 forecast of 1.7%. For 2020, the ECB slightly downgraded its GDP forecast from 1.7% to 1.6%. The ECB left its monetary policies unchanged at its 7 March and 10 April meetings, further clarifying the euro area's monetary stance by noting that it expects policy rates to remain unchanged during the rest of 2019. At its 24 January meeting, the ECB had indicated that policy rates were expected to remain unchanged through the middle of 2019. Similarly, in March the BOJ downgraded its economic growth forecasts for fiscal years 2018 and 2019 to 0.6% and 0.8%, respectively, from its December 2018 forecasts of 0.9% for both years. At its 25 April monetary policy meeting, the BOJ stated that its interest rate targets are expected to remain unchanged until at least the second quarter of 2020.

Figure B: Changes in Equity Indexes in Emerging East Asia

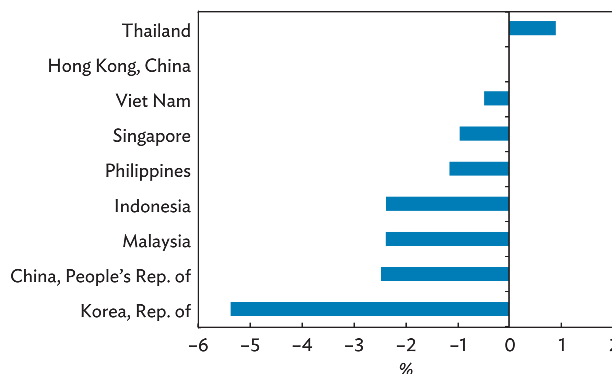


Note: Changes between 1 March 2019 and 15 May 2019.
Source: Bloomberg LP.

The recent reignition of the PRC–US trade conflict and slowing growth in most of emerging East Asia's major trade partners have exerted downward pressure on regional equity markets and currencies (**Figures B and C**). In tandem with the region's bond market performance, emerging East Asian equity indexes collectively declined from 1 March to 15 May. Indonesia experienced the largest decline, with its equities dipping 8.0% due to heavy foreign selling. Nearly all emerging East Asian currencies depreciated during the review period on slowing world economic growth and looming downside risks. The only exception was the Thai baht, which appreciated 0.9% against the US dollar on the back of a strong current account surplus. Given the close economic linkages of most of the region's economies with both the PRC and the US, the failure of the two sides to reach an agreement was bound to have an adverse effect on regional currencies. The future evolution of the PRC–US relationship is likely to continue to influence the trajectory of Asian asset prices, including bond yields, equities, and exchange rates.

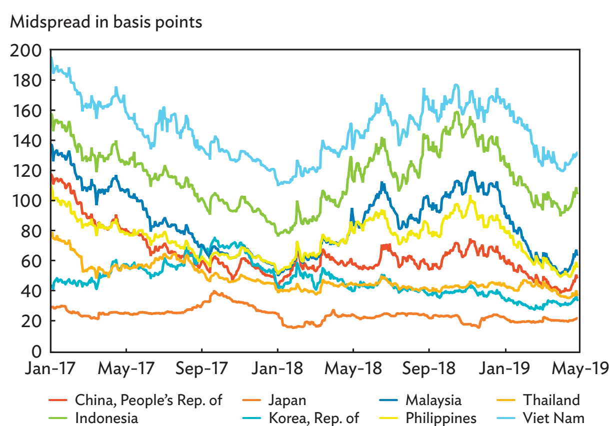
The reescalation of PRC–US trade tensions in early May contributed to a sharp deterioration of major sentiment indicators such as credit default swap spreads (**Figure D**), the volatility index and emerging market bond index (**Figure E**), and emerging market sovereign stripped spreads (**Figure F**). Indicators of

Figure C: Changes in Month-End Spot Exchange Rates vs. the United States Dollar



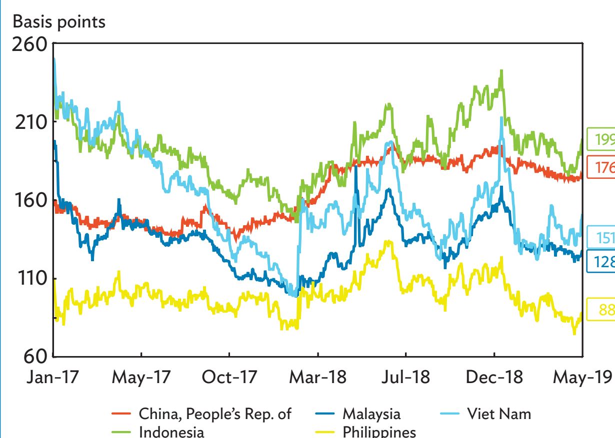
Notes:
1. Changes between 1 March 2019 and 15 May 2019.
2. A positive (negative) value for the foreign exchange rate indicates the appreciation (depreciation) of the local currency against the United States dollar.
3. Data for Hong Kong, China is not visible in the chart due to its small value (−0.01).
Source: Bloomberg LP.

Figure D: Credit Default Swap Spreads in Select Asian Markets (senior 5-year)



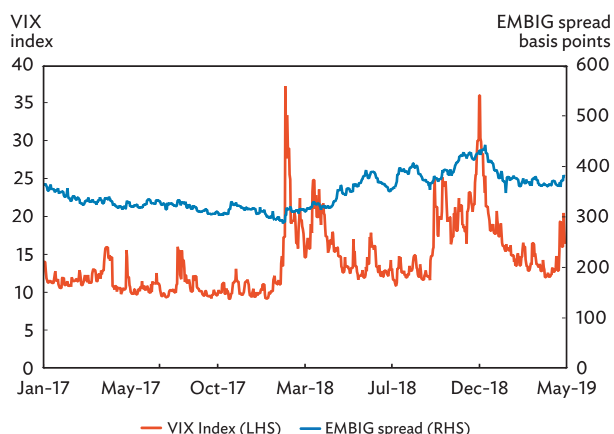
Notes:
1. Based on United States dollar-denominated sovereign bonds.
2. Data as of 15 May 2019.
Source: Bloomberg LP.

Figure F: JP Morgan Emerging Markets Bond Index Sovereign Stripped Spreads



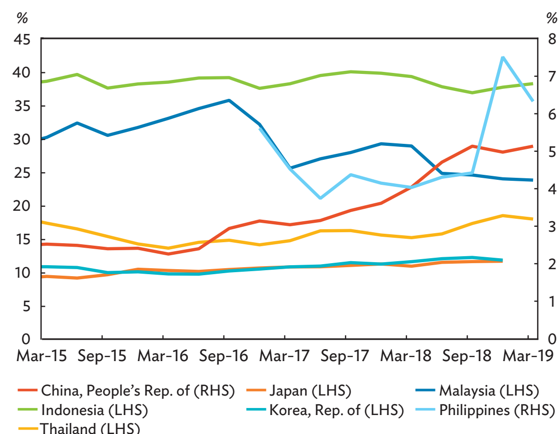
Notes:
1. Based on United States dollar-denominated sovereign bonds.
2. Data as of 15 May 2019.
Source: Bloomberg LP.

Figure E: United States Equity Volatility and Emerging Market Sovereign Bond Spread



EMBIG = Emerging Markets Bond Index Global, LHS = left-hand side, RHS = right-hand side, VIX = Chicago Board Options Exchange Volatility Index.
Note: Data as of 15 May 2019.
Source: Bloomberg LP.

Figure G: Foreign Holdings of Local Currency Government Bonds in Select Asian Markets (% of total)



LHS = left-hand side, RHS = right-hand side.
Note: Data as of end-March 2019 except for Japan and the Republic of Korea (end-December 2018).
Source: *AsianBondsOnline*.

negative sentiments—such as credit default swap spreads, volatility, and emerging market sovereign stripped spreads—increased sharply since early May, reversing the declining trend during earlier months of this year. One major source of improved risk sentiment over the entire review period was the more accommodative monetary policy of the Federal Reserve.

The improved market sentiments witnessed earlier in the year were reflected in foreign holdings of LCY government bonds in emerging East Asian markets (**Figure G**). Relatively stable capital flows were recorded in regional bond markets in Q1 2019. In the PRC, the share of foreign holdings rose slightly to 5.1% at the end of March from 5.0% at the end of December. Global investors were attracted by rising bond prices following

the People's Bank of China's reserve requirement ratio cut in January. In Indonesia, the foreign holdings' share rose to 38.3% at the end of March from 37.7% at the end of December, driven by investors' risk-on approach as they sought Indonesia's relatively high interest rates. However, capital outflows were experienced in Indonesia in April due to a wider-than-expected current account deficit. In Thailand, foreign holdings declined to 18.0% at the end of March from 18.5% at the end of December as a result of political uncertainties relating to the general election. Continuous monitoring of the changes in foreign holdings can reveal the dynamics of foreign investment in the region as well as shifts in market sentiments.

Despite the global slowdown, emerging East Asian bond markets continued to develop amid increased regional cooperation. For example, the Asian Bond Markets Initiative has bolstered regional corporate bond markets via the ASEAN+3 Multi-Currency Bond Issuance Framework. The fourth corporate bond under this framework was successfully issued in Singapore by CJ Logistics Asia Pte. Ltd. on 26 March. The bond issuance worth SGD70 million carried a maturity of 5 years and was guaranteed by the Credit Guarantee and Investment Facility (**Table B**).

Globally, green bonds have emerged as an innovative solution to financing sustainable development. **Box 1** reviews efforts to develop green bond markets in emerging East Asia as they gain traction. In addition, new technologies, such as distributed ledger technology, are continuing to shape the global financial landscape. The challenges facing distributed ledger technology and its potential applications in the financial sector are discussed in **Box 2**.

Risks to Emerging East Asian Bond Markets

It was earlier noted that downside risks to global growth prospects outweigh upside risks. In this section, we take a closer look at the salient risks that may affect the region's short-term growth outlook. Global trade tensions continue to pose by far the single-biggest risk to global economic growth and financial stability. Hopes were raised on 2 December 2018 when the two economic giants agreed to a temporary truce. According to the terms of the ceasefire, the PRC and the US would refrain from imposing new tariffs or increasing existing tariffs on the other party for 90 days until 1 March 2019. The temporary ceasefire was meant to provide some breathing space and give the two sides time to work with each other toward a deal. The US promised not to impose tariffs on an additional USD267 billion worth of Chinese goods. The truce also stipulated that the PRC commit to importing more agricultural and energy products from the US. The December ceasefire prevented the escalation of tariffs and other protectionist measures, and thus fulfilled its central objective.

While the truce was strictly temporary, and financial markets were fully aware of its temporary nature, it provided the basis for some optimism about the prospects for resolving the conflict through negotiations. Furthermore, there were indications that the two sides were nearing a settlement that would resolve their outstanding key differences. Therefore, when senior Chinese officials visited Washington, DC to meet with their American counterparts on 8–9 May, there was widespread optimism about a deal. However, optimism turned to disappointment when the two sides failed to

Table B: Bonds Issued under the ASEAN+3 Multi-Currency Bond Issuance Framework

No.	Issuer	Sector	Currency and Amount	Tenure	Issuance Date
1	Mizuho Bank, Ltd.	Financials (banking)	THB3 billion	3 years	28 Sep 2015
2	Hattha Kaksekar Limited	Financials (consumer finance)	KHR120 billion	3 years	14 Nov 2018
3	AEON Credit Services (Philippines) Inc.	Financials (consumer finance)	PHP900 million	3 years	16 Nov 2018
			PHP100 million	5 years	16 Nov 2018
4	CJ Logistics Asia Pte. Ltd.	Logistics	SGD70 million	5 years	26 Mar 2019

ASEAN = Association of Southeast Asian Nations, KHR = Cambodian riel, PHP = Philippine peso, SGD = Singapore dollar, THB = Thailand baht.
Source: Asian Bond Markets Initiative.

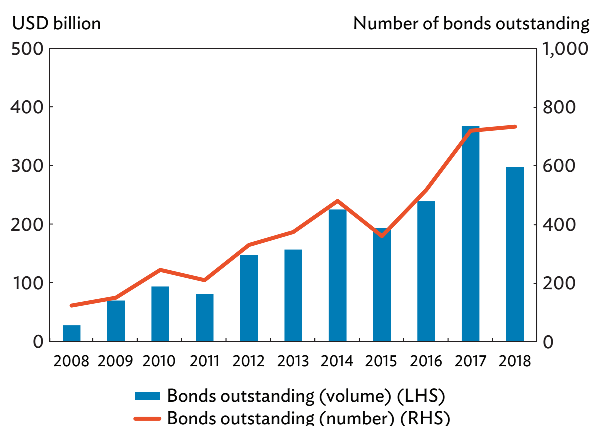
Box 1: Singing the Blues but Seeing Green

Following 2017's stellar double-digit returns, 2018 was many investors' annus horribilis. In the fixed-income market, the JP Morgan Asia Credit Index Composite, which tracks United States (US) dollar-denominated bonds issued in Asia, fell 4.5% between 1 January and 20 December. Spreads on Asian investment-grade bonds widened from 48 basis points (bps) to 206 bps during the same period, while Asian high-yield bond spreads jumped from 164 bps to 620 bps, according to Nikko Asset Management.

The strength of the US dollar was relentless throughout the year. The weakness in emerging market currencies spared no one. In Asia, central banks acted swiftly by raising interest rates multiple times. The hardest-hit currencies included the Indian rupee and the Indonesian rupiah. Interestingly, the Thai baht was the least affected. Even so, the Bank of Thailand raised its policy rate by 25 bps in December 2018, the first increase in more than 7 years.

Activity in Asian capital markets reflected many of the challenges of 2018. The total amount of outstanding US dollar bonds was USD298.3 billion at the end of December, according to Refinitiv figures, down 18.8% from USD367.8 billion a year earlier (**Figure B1**). Although they continue to account for the lion share of activity, issuance from firms in the People's Republic of China dipped to USD146.5 billion from USD186.7 billion between 2017 and 2018, a decline of 21.5%. The drop was more pronounced in the high-yield bond market—a space dominated by Chinese property companies—as high-yield issuance plunged 43.6% year-on-year to USD19.0 billion from USD33.7 billion as of November 2018.

Figure B1: Volume and Number of US Dollar Bonds Outstanding



LHS = left-hand side, RHS = right-hand side, US = United States, USD = United States dollar.
Source: Refinitiv.

Local currency (LCY) bond markets served as a buffer against volatility in the offshore market as total LCY issuance picked up in 2018 by nearly 5% to USD1.4 trillion. This was a recovery from the year-on-year decline in issuance in 2017. The continued strong performance of LCY bond markets reinforces the important role they now play in Asian financial markets. During a period of considerable volatility, as occurred in 2018, firms were still able to access markets to meet their financing needs.

The challenging market environment, has not dampened efforts to further develop Asia's bond markets. An emerging trend in 2018 was the rise of bonds linked to sustainable finance. While Asia has become a center for green bonds in the past few years, led by the People's Republic of China, the region is adding to its diversity.

In Indonesia, innovative models of financing are helping to fight deforestation and improve the working conditions of farmers and rural communities. One example is a unique lending platform offered by Indonesia's Tropical Landscape Finance Facility (TLFF). TLFF provides long-term finance to individual projects and companies that focus on green growth and improve rural livelihoods. Put together, the loans are securitized and turned into a medium-term note program, where bonds are sold to investors in a range of tranches, allowing small green projects access to investor pools that typically back large deals only. The projects under the program have to meet certain sustainability criteria.

TLFF's first deal in February 2018 was a USD95 million senior secured note. The bond's proceeds are financing a sustainable natural rubber plantation on heavily degraded land in Jambi and East Kalimantan in Indonesia. The project incorporates extensive social and environmental objectives and safeguards confirmed by Vigeo Eiris, an environmental, social, and governance research agent. Planted areas will serve as a buffer zone to protect a threatened national park from encroachment.

Indonesia is the world's second-largest producer of natural rubber. Supported by an amortizing loan partially guaranteed by the United States Agency for International Development, the deal represented the first sustainability project bond in Asia and the first project bond for a rubber plantation.

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Box 1: Singing the Blues but Seeing Green *continued*

In October 2018, the Korea Housing Finance Corporation successfully priced the first-ever social covered bond offering in Asia, which was also the first EUR-denominated covered bond deal out of the Republic of Korea. The net proceeds from the deal will be used exclusively to purchase the company's mortgage loans that were directed to support low- and moderate-income individuals. The proceeds will also help improve the structure of the Republic of Korea's mortgage loan market in accordance with Korea Housing Finance Corporation's social bond framework.

New World China Land joined the green bandwagon as it issued its inaugural green bond in November 2018, which amounted to USD310 million. The company will use the proceeds to finance two certified environmental projects in the Guangdong–Hong Kong–Macau Greater Bay Area.

In May, Korea Water Resources Corporation priced Asia's first-ever water bond amounting to USD300 million. The fund-raising was designed to finance (or refinance) projects contributing to climate change adaptation, improved accessibility of sustainable water management systems, and the development of renewable energy sources.

In Singapore, Olam International completed the first sustainability club loan in Asia for USD500 million. The facility links the interest rate on the loan to achieving clear sustainability targets, with Olam International committed to meeting targets for a comprehensive range of environmental, social, and governance metrics.

These new bond issuances in 2018 suggest a broadening of investment choices in green and sustainable finance in the region. That the capital markets have become the venue of innovation in sustainable finance reflects a growing focus among local corporates on not just funding objectives, but also on meeting the broader environmental and social needs of the region.

Source: Contributed by Daniel Yu of The Asset.

reach any agreement. The announcements of both parties suggested that there were deep-seated disagreements that still separated the two sides and reduced the likelihood of a settlement. In particular, the two sides remained far apart on the key item of structural issues, which refer to the large role of the state in the Chinese economy; the protection of intellectual property; access of foreign firms to the Chinese market; and other issues related to the structure of the Chinese economy.

The failure to reach a deal ruptured the temporary ceasefire and immediately reignited the trade conflict between the PRC and the US. On 10 May, the US raised tariffs to 25% on USD200 billion worth of Chinese imports. The US had previously imposed 10% tariffs on those goods on 17 September 2018. Furthermore, the US government announced that it was looking into the possibility of imposing tariffs on an additional USD300 billion worth of Chinese goods. If the additional tariffs were imposed, then virtually all Chinese imports into the US would be subject to tariffs. The PRC immediately hit back with retaliatory tariffs on US imports when on 1 June it imposed tariffs of 5%–25% on USD60 billion worth of US goods, including a wide range of agricultural products. Reflecting the dismay of investors, stock markets on both sides of the Pacific fell sharply at the news of the reescalation. Worryingly, neither side showed much sign of trying to accommodate the other to reach a mutually beneficial outcome. As such, without a dramatic turn of events, the chances of a speedy solution to the conflict seem limited.

The revival of the PRC–US trade conflict comes at an inopportune point in the global business cycle. As noted earlier, the world economy is approaching the end of a 2-year cyclical upswing and, as a result, global growth has started to moderate. Slower global growth in and of itself represents another downside risk to global financial stability even though the moderation is relatively modest. The ongoing trade conflict between the world's two largest economies exacerbates this risk from slowing global growth by adversely affecting business confidence, as evidenced by the negative reaction of global financial markets. Emerging East Asian economies depend heavily on trade with the PRC and the US for their growth. This suggests that any further intensification of the dispute could inflict tangible damage on the growth and stability of the PRC's neighbors. One particular concern is that the PRC's growth, which has been moderating due to structural factors as well as policies to rein in credit growth, will decelerate more sharply than expected as a result of the ongoing trade conflict. In this scenario, the

Box 2: Significant Challenges Ahead for Distributed Ledger Technology

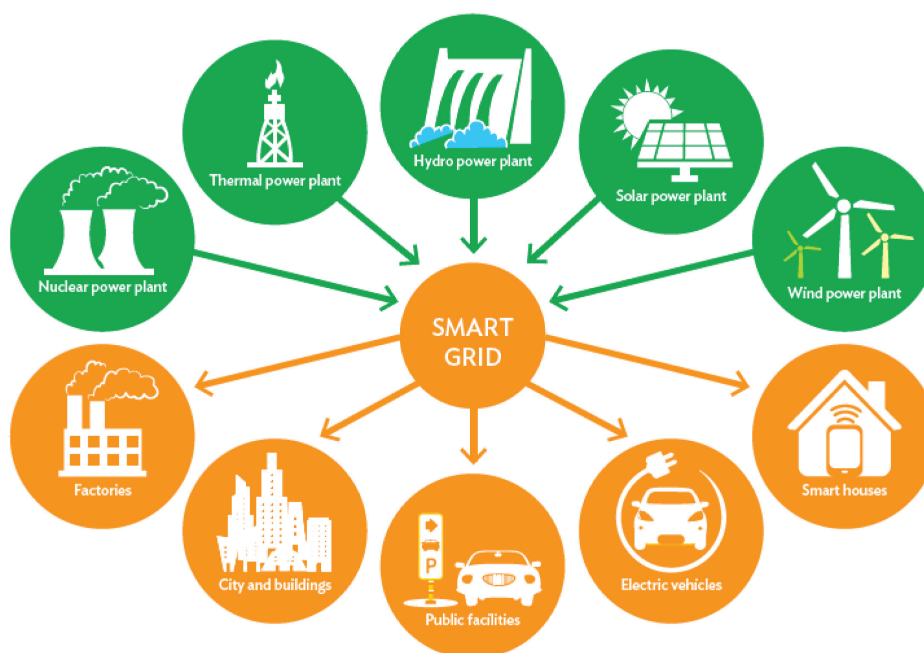
As highlighted in the November 2018 issue of the *Asia Bond Monitor*, distributed ledger technology (DLT) can revolutionize the financial sector. For example, inefficient back-office infrastructure is giving way to DLT-based clearing and settlement. DLT is expected to drastically reduce the time needed for operations such as exchanging cash for securities. DLT can benefit many financial markets in developing economies, including remittances, emergency aid delivery, microcredit, and trade finance, to name a few.

DLT also has far-reaching implications for other sectors such as smart energy. Sensors and meters of various kinds can be integrated with DLTs, making energy one of the most active areas of DLT experimentation (**Figure B2**). In regions where sunlight is plentiful but centralized electricity production or distribution is inadequate, smart transactive microgrids let community members contribute to local renewable energy production by installing solar panels on their rooftops. Participants sell energy to others in the microgrid when they produce more than they consume and purchase energy when their production falls short. Using DLTs to connect microgrids enables participants to instantly compensate one another for their energy purchases and sales. This eliminates the need for periodic meter checks and billing after the fact.

In addition, DLTs can facilitate financing for such projects. For example, one startup company allows investors to purchase solar cells and lease them to schools and businesses in developing economies. The company then collects monthly rental fees out of the proceeds from electricity generation and automatically distributes them back to investors, who can opt to be paid in either fiat or virtual currency. A project that created a solar cryptocurrency is attempting to create worldwide markets for renewable energy, incentivizing local production by allowing producers to trade with one another over a distributed ledger. Crypto tokens backed by clean energy could one day become integrated into the global carbon-trading system, a key mechanism for reducing carbon emissions under the United Nations Framework Convention on Climate Change. More broadly, DLT can help provide guarantees of origin and renewable energy certificates, which are crucial to the implementation of green finance and carbon-trading systems.

At a broader level, the key benefits from DLT include improved transparency and accountability, reduced transaction and monitoring costs, real-time data collection and analysis, and the expanded participation of vulnerable

Figure B2: Smart Grid System



Source: ADB staff illustration.

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Box 2: Significant Challenges Ahead for Distributed Ledger Technology *continued*

populations currently excluded from or underserved by finance. However, DLT deployment faces significant challenges.

Regulatory hurdles risk blocking innovation. For example, to counter money laundering and terror financing, international regulatory regimes require that all businesses offering money services perform know-your-customer checks on their clients. Meanwhile, many unbanked people do not have government-issued identification, and regulators may be reluctant to accept alternative methods of establishing identity, including those based on DLT itself.

This creates legal uncertainty and liability risk for DLT-based remittance providers and threatens to leave out the unbanked. Development projects should strive to work with local and international regulators to identify risk-based approaches to managing these concerns that would allow innovation to flourish while protecting legitimate public interests. One such approach would be a test-and-learn regulatory sandbox in which regulators and companies test and fine-tune new solutions, or adopt the regulatory approaches of other economies, before they are implemented on a wider scale.

DLT applications are not a panacea and may introduce distortions or have unforeseen drawbacks. For example, microcredit programs typically cope with the absence of collateral by relying on informal social relationships within the receiving community to achieve high repayment rates. The introduction of DLT could crowd out such informal enforcement mechanisms and end up causing more harm than good. In addition, as a technical matter, the issuance and tracking of microloans on a distributed ledger involves the execution of a series of smart contracts that interact with one another on-chain, self-executing in response to the occurrence of predetermined conditions. While sound in theory, this approach raises questions about what happens when a smart contract does not execute as expected in the real world. Who is liable? For answers, development lenders wishing to use DLT-based microcredit mechanisms must ensure the formulation of robust regulatory frameworks to support them.

As is common in the delivery of development initiatives, many challenges to DLT crop up in the last mile. Over 400 million Asians still live without electricity. Where internet connectivity is deficient and brownouts are frequent, communications networks and even the electricity supply are unable to meet the requirements of many DLTs. Less resource-intensive DLT designs, such as directed acyclic graph tangles or private permissioned ledgers, can render connectivity problems less acute but still require both electricity and at least periodic connectivity. The ideal of public distributed ledgers girdling the globe may thus prove difficult to realize in many developing economies, at least until local infrastructure and DLT transactional efficiencies improve. This highlights the importance of continued development lending to the energy sector for building and upgrading infrastructure—with an additional focus on its ability to support the introduction of DLT and other advanced technologies.

Many problems in the last mile arise from attempts to connect a new DLT platform to existing arrangements. For example, funds remitted through a DLT platform require conversion into fiat money or another form that recipients can readily use. Significant investments are necessary to equip and train local merchants with technologies for DLT-based payment acceptance.

An even greater challenge is coordination across sectors that operate in separate silos. To fully leverage DLT and the automated nature of smart contracts, for example, a trade finance platform would have to involve not only banks, but the whole chain of stakeholders, including shipping agents, freight forwarders, ports, insurance companies, and customs authorities. Major hurdles still exist that can only be overcome through international efforts and cooperation. One such initiative is Digital Standards in Trade, through which the World Trade Symposium endeavors to compensate for a lack of common standards in the trade system by implementing fully digitized trade transactions seamlessly end-to-end worldwide, thereby creating a viable basis for DLT operations.

It must be made clear to policy makers and international development agencies alike that the benefits and potential of DLT systems cannot be realized without an enabling environment that they will have to help create through an array of available instruments, including public–private partnerships, innovative sandbox approaches, and international coordination. DLTs have enormous potential to make a difference in development. By assessing them carefully and investing in them strategically, domestic and international lenders can be instrumental in unleashing their full developmental impact throughout Asia and the Pacific. Finally, public support for DLT experimentation should weigh the underlying infrastructure requirements, especially electrification and connectivity, against prevailing conditions and buttress DLT initiatives with the appropriate investment in infrastructure and necessary adjustments to the institutional and regulatory environment.

Source: Contributed by B. Ferrarini of the Economic Research and Regional Cooperation Department.

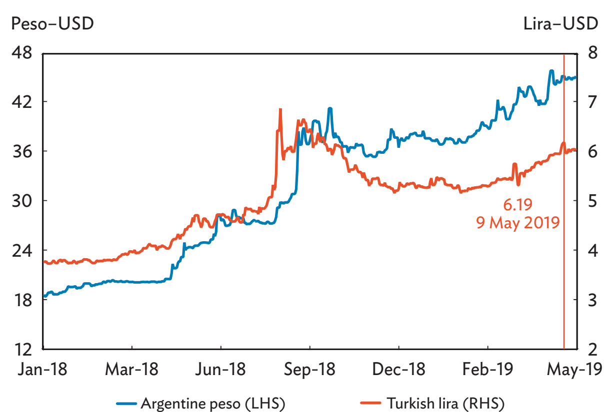
whole region will suffer negative spillover effects. The outsized economic role of the PRC in emerging East Asia means that the effects will be felt across the whole economy rather than just industries and firms that are directly impacted by the conflict.

Another major threat to global and regional stability is financial turbulence in vulnerable emerging markets. The Turkish lira and Argentine peso both stabilized in the fourth quarter (Q4) of 2018. Forceful interest rate hikes by Turkey's central bank halted the lira's sharp depreciation. In Argentina, the expansion and acceleration of an International Monetary Fund loan package and the government's commitment to fiscal consolidation arrested the peso's fall. However, both economies still suffer under substantial macroeconomic imbalances and remain vulnerable to shocks. Ominously, notwithstanding moderation in the pace of US interest rate hikes, both the lira and peso weakened in 2019 due to country-specific factors (**Figure H**). On 9 May 2019, the lira hit a 7-month low, due to a combination of political uncertainty associated with the ruling party's election losses, strained Turkey–US relations, and high inflation. The peso hit a record low in mid-May, despite tight monetary policy, due to higher-than-expected inflation and investor concerns related to upcoming elections in October. The two currencies clearly remain fragile and vulnerable to shocks.

The currencies of emerging markets as a whole have performed noticeably better than the Argentine peso and Turkish lira. However, the aggregate emerging market currency index is showing some signs of decline since late April 2019. One key driver of the recent weakness is the escalation of the PRC-US trade conflict despite widespread market expectations of a settlement. (**Figure I**). While there have been some variations across countries, the currencies of most emerging markets have remained relatively stable in 2019. This is especially true for the currencies of emerging Asian economies, which enjoy relatively strong fundamentals. Visibly improved stability was also evident for the Indian rupee and Indonesian rupiah, both of which depreciated substantially during the emerging market foreign exchange turbulence of 2018, after the central banks of both countries aggressively raised interest rates to restore investor confidence (**Figure J**).

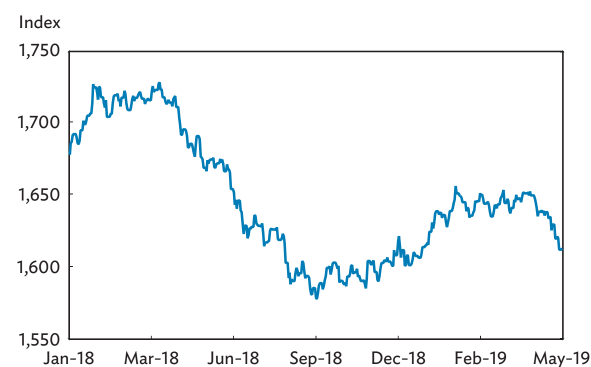
In light of uncertain global growth prospects and simmering global trend tensions, it is far too early to say that emerging market currencies are completely safe. While they have stabilized since Q4 2018, the currencies of emerging markets with weak fundamentals remain vulnerable. Such vulnerability is especially evident in the poor performances of the Argentine peso and Turkish lira in 2019. Severe instability in vulnerable markets can spill over and precipitate a generalized risk aversion toward emerging markets. Therefore, although emerging market exchange rates have gained a measure of stability since Q4 2018, the potential for volatility remains.

Figure H: Argentine Peso and Turkish Lira vs. the US Dollar



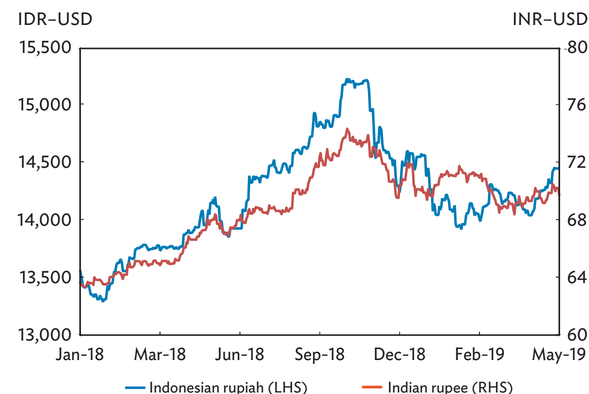
LHS = left-hand side, RHS = right-hand side, US = United States, USD = United States dollar.
Note: Local currency unit relative to the US dollar. Data are from 1 January 2018 to 20 May 2019.
Source: Bloomberg LP.

Figure I: MSCI Emerging Markets Currency Index



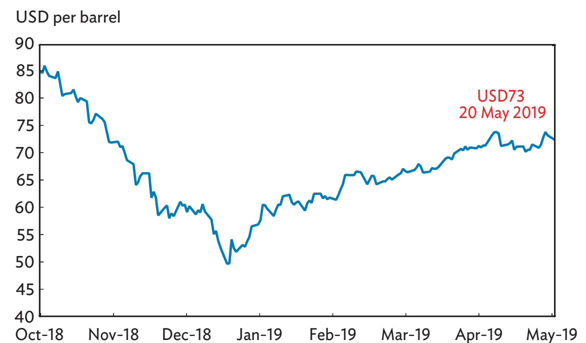
MSCI = Morgan Stanley Capital International.
Note: The MSCI Emerging Market Currency Index measures the total return of 25 emerging market currencies relative to the US dollar where the weight of each currency is equal to its country weight in the MSCI Emerging Markets Index. Data are from 1 January 2018 to 20 May 2019.
Source: Bloomberg LP.

Figure J: Indian Rupee and Indonesian Rupiah vs. the US Dollar



IDR = Indonesian rupiah, INR = Indian rupee, LHS = left-hand side, RHS = right-hand side, US = United States, USD = United States dollar.
Note: Local currency unit relative to the US dollar. Data are from 1 January 2018 to 20 May 2019.
Source: Bloomberg LP.

Figure K: Spot Price of Brent Crude Oil



USD = United States dollar.
Note: Data are from 1 October 2018 to 20 May 2019.
Sources: Bloomberg; World Bank. Commodity Price Data (Pink Sheet). http://www.worldbank.org (accessed 21 May 2019).

Volatile global oil prices are yet another source of uncertainty in a highly uncertain global economic environment. After hitting a 4-year peak of USD86 on 3 October 2018, the price of Brent crude oil fell to USD53 per barrel on 31 December before recovering to USD73 on 20 May (**Figure K**). The decline was due to a mix of supply-side factors—a temporary waiver on sanctions on Iranian oil exports to certain countries and record-high US output—and softening demand due to slowing global growth. The recovery since the beginning of 2019 was driven primarily by output cuts in oil-exporting countries. Going forward, the combustible mix of geopolitics and oil production is creating a lot of uncertainty over the global oil supply and the future trajectory of global oil prices. Political instability in Libya, where rival factions are seeking to unify a divided country, and Venezuela, where an increasingly unpopular government is under siege from political protest, is disrupting the production of two major exporters. Most significantly, the ongoing geopolitical confrontation between the US and Iran poses a nonnegligible tail risk of a major disruption that could seriously affect global production and thus trigger a sharp rise in prices. The magnitude of this risk was underlined by drone attacks on a major pipeline and other key energy infrastructure in Saudi Arabia on 14 May. The drone attacks, which were preceded by sabotage attacks that significantly damaged two oil tankers in the strategic Strait of Hormuz, immediately pushed global oil prices higher.

One significant positive factor that is conducive for financial stability in emerging markets is the pause in US interest rate hikes. The US Federal Reserve raised interest rates four times for a total of 100 basis points in 2018 but has not yet once raised interest rates in 2019. Nor do the financial markets foresee any hikes during the rest of 2019. The Federal Reserve's latest announcements seem to support market expectations. Above all, the slowdown in US growth suggests that the Federal Reserve is unlikely to tighten its monetary stance. Its interest rate hikes helped to destabilize emerging markets in 2018. Therefore, the likely absence of hikes in 2019 means that a significant source of instability will have been removed. There are other potential upside risks but these are mostly low-probability flip sides of downside risks. For example, if the PRC and the US manage to unexpectedly settle their differences and reach an agreement, that would provide a big boost to global business confidence and growth.

Overall, downside risks clearly outweigh upside risks in the current global financial and economic landscape. Global trade tensions, intensified by the failure of the PRC and US to reach a settlement in May and the ensuing reignition of their bilateral economic conflict, still pose the overarching threat to global growth and financial stability. Most worryingly, the two sides seem far apart and remain firmly entrenched in their own respective positions, clouding the prospects for a speedy resolution. Additional downside risks include slowing global growth momentum, financial turbulence in vulnerable emerging markets, and volatile global oil prices. Steady US interest rates provide some cause for optimism, but on balance the cause for optimism is limited.