

## Chapter 1. Trust and financial markets

*This chapter considers trust in financial markets by exploring factors that contribute to public trust in markets, post-crisis developments that have contributed to help ameliorate the loss in public trust provoked by the financial crisis, and potential risks to the financial sector that could erode trust in the future. The chapter considers developments in sovereign, corporate and bank debt markets, and the potential for unexpected losses from high leverage in less benign macro and market conditions. It also explores the growth and benefits of market-based finance, and considers whether structural features of certain products could contribute to market risks and amplification of stress in less liquid fixed-income markets.*

## 1.1. Framing the importance of trust in financial markets

### 1.1.1. Public trust in markets

The introduction to the Business and Finance Outlook has highlighted the importance of public trust in institutions and participants in market economies to support sustainable and inclusive growth. Financial markets across OECD countries and many other jurisdictions are essential to facilitate efficient allocation of capital to the real economy, either directly or through intermediaries. For savers, financial markets provide higher long-term risk-adjusted returns than bank deposits, allowing for the accumulation of wealth. For governments, companies, and households, issuance of capital provides an efficient alternative to bank borrowing that underpins short-term working capital needs and long-term fixed investment in infrastructure and business expansion. **As financial markets are the primary mechanism to intermediate between investors and economic actors, public trust in markets is vital to its role to effectively and efficiently convert savings into productive economic growth, and in turn to reward capital providers with long-term returns commensurate with risks.**

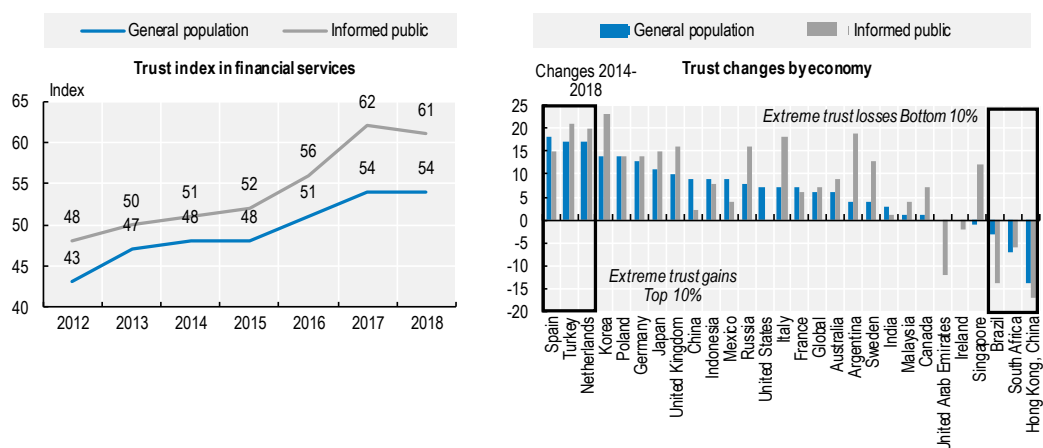
As well, the behaviour of institutions and participants in markets is critically important to maintaining society's trust in markets, and forms a distinct component of investor confidence.<sup>1</sup> In this regard, public trust in markets is broader than investor optimism in the delivery of adequate risk-adjusted returns, as it extends to the public's expectation that markets will serve sustainable economic growth and contribute to the well-being of society (economic, ethical and otherwise) in various forms.

**Thus, sound oversight and regulation of markets and market participants, and of the stability of the financial system, are key factors in maintaining trust in markets, because they help ensure an appropriate balance of risk and returns for efficient functioning and sustainable flows between investors and consumers of capital.** In addition, the transparency and integrity of markets is important to ensure fairness across myriad participants. As such, shocks that expose macrofinancial imbalances, excesses in risk taking, malfunctioning of financial innovations, and ineffective oversight often contribute to a sharp deterioration of trust in the financial system. Moreover, shocks in markets that erode the sustainability and inclusiveness of economic growth, can compound distrust in the financial system.

For these reasons, **the Global Financial Crisis caused public trust in financial markets to decline sharply amid the heavy market losses on both traditional and complex financial products.** In response, from policy makers engaged in efforts to craft a coordinated global policy response across affected countries by providing a liquidity backstop for the financial system, highly accommodative monetary policies across OECD countries, recapitalisation of core banks and other large financial institutions, and targeted central bank programmes to restore intermediation through markets. Over the post-crisis period, improving market conditions and the continuation of efforts to address the faultiness of the crisis through regulatory reforms have gradually improved public trust. Nevertheless, by some measures it remains fairly low, which calls for policy makers' attention.

To the extent that surveys showing rising trust from low levels is indicative of public sentiment, trust in financial services has increased in most of the surveyed countries over the past several years (Figure 1.1; Edelman, 2018). This raises a question as to the extent trust is merely rising on market buoyancy and liquidity resulting from highly accommodative monetary policy, and the extent to which public trust could withstand the materialisation of major risks, particularly in areas that were meant to have been addressed by the post-crisis regulatory reforms.

Figure 1.1. Public trust in financial services, 2012-2018



Source: 2018 Edelman Trust Barometer, OECD calculations.

### 1.1.2. Conceptual framework for assessing how trust could impact markets and economic growth

In order to better assess trust and markets, a working definition has been developed to evaluate the elements of trust related to investors, market intermediaries, and the public.

**Framework.** A conceptual framework for assessing how trust could impact markets must balance the perspectives of the individual investor and the public at large. In this regard the concept of trust in the markets differs from aspects of investor confidence related to conditions that maximise short-term returns based on assessment of economic and business fundamentals.

For the individual investor, trust may take several forms, including:

- predictability of behaviours (based on historical experience) from markets that are efficient, open, stable and sound, and result in returns commensurate with risks;
- confidence that the rules and oversight of market interactions support the soundness, fairness and integrity of markets;<sup>2</sup> and,
- that, both within and beyond the established rules, market participants' behaviours will be ethical in serving the interests of customers.

The public at large also has a fundamental trust relationship with the markets that is distinct from market participants.<sup>3</sup> Public trust is built on the premise that markets serve a purpose that is beneficial to societies, directly in terms of supporting sustainable economic growth, and also indirectly through positive spillovers to other stakeholders. In addition, trust can be further strengthened when behaviours of markets are aligned with broader societal values, such as those related to environmental, social and governance objectives (see Chapter 2). In this respect, trust is built on mutually reinforcing behaviours that markets contribute to sustainable economic growth in its broadest sense to support societal wellbeing. When this relationship breaks down, such as when market crises impose losses that are borne by taxpayers, or when deflating asset bubbles contribute to widespread losses, public trust can be eroded by market failures. To varying degrees, there are societal

expectations that market participants should behave in a manner that does not compromise broader societal values.

Furthermore, the integrity of markets, through governance and conduct, help keep them sound and fair in the eyes of market participants. For this reason, the public expects that egregious losses would not be imposed on portions of society due to malfunctioning markets, such as through types of investment products. As well, market participants expect that market innovations through products, services, and technologies – once their adoption reaches a material level – are properly regulated in a manner proportional to potential risks, and with adequate protections and financial education for financial consumers.

**Scope of assessment.** With these elements of trust in mind, the next sections of the chapter consider developments in the post crisis era relative to three areas of the markets that have experienced substantial developments. They include:

- **Global markets’ intermediation of sovereign and corporate debt (section 2)**, which has contributed to the growth of sovereign and corporate debt to unprecedented levels through the fixed-income markets.
- **Growth of market-based finance (section 3)**, resulting from very strong growth in investment funds and some forms of securitisation.
- **Innovations in financial technologies (section 4)** has great promise to increase the availability of products, improve cost efficiencies, and transaction speed, and enhance transparency and security through blockchain.<sup>4</sup>

These three developments have occurred in both advanced and emerging markets across the world, although the extent varies across countries. When normalisation of monetary policies occur in OECD economies, it will contribute to a repricing of traded debt across global markets. Debt held in market-based vehicles, from funds to securitisations, have yet to be tested by a sharp change in market pricing and shifting investor demands, which could uncover structural fragilities. As well, while innovative financial technologies continue to bring benefits to financial consumers through cost and operational efficiencies, in some ways they could contribute to disruptive changes or amplify risks during periods of market stress. These sections explore how risks, if not addressed, could cause market disruptions and unpredictable distributions of loss that could erode public trust in markets. The final section offers policy considerations to address aspects of the markets where potential risks could undermine trust.

## 1.2. Rising debt in fixed-income markets

This section considers the rise of sovereign, corporate and contingent convertible bank debt through fixed-income markets across advanced and emerging market economies in the post-crisis era. It assesses factors that contributed to the rise of debt, benefits of market access at low financing costs, and potential risks that could undermine public trust in financial markets and related policies.

### *1.2.1. Sovereign debt markets*

In the decade following the crisis, outstanding debt in sovereign debt markets has grown considerably, and now stands at historically high levels in many advanced and emerging market economies. The post-crisis strategy pursued by many governments to increase fiscal deficits to boost stimulus contributed to a rise of global sovereign debt from 62% of GDP in 2008 to a peak of 83% in 2017 (Figure 1.2).

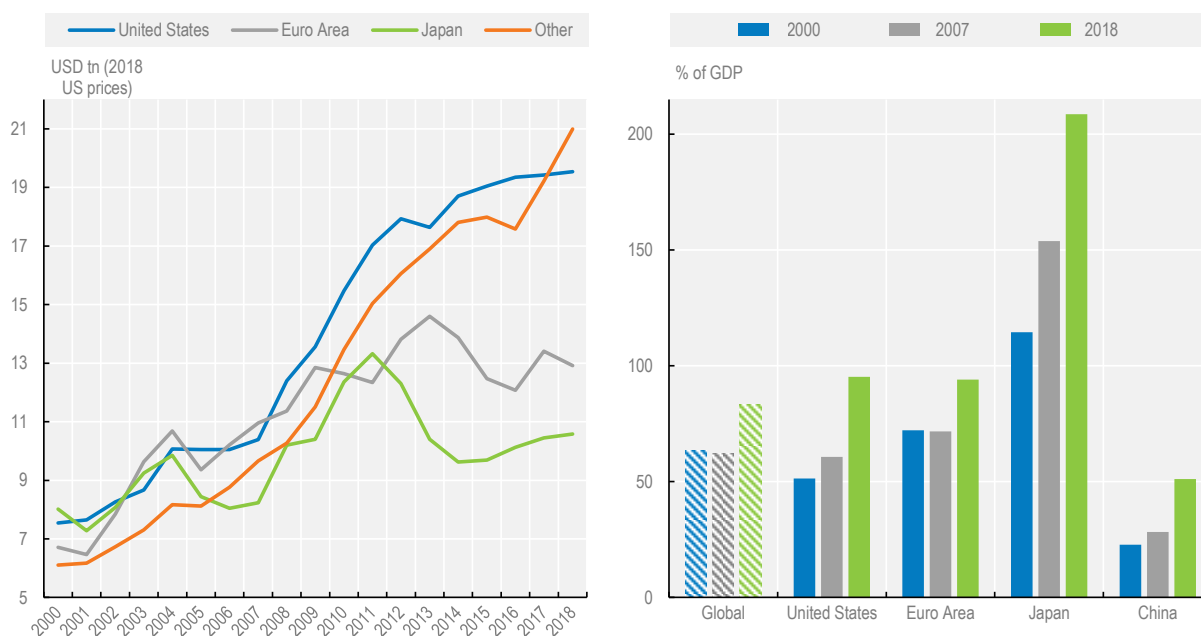
The rise in sovereign debt in many countries marked a coordinated global response to the global financial crisis and, subsequently, the European crisis. Fiscal stimulus in nearly all OECD countries was pursued through discretionary measures in response to the crisis, to prevent the downturn from gathering momentum and to support a sustainable economic recovery (OECD, 2009).

There is ample evidence of the positive effects of such stimulus, in concert with monetary policy accommodation, to stabilise economic and financial market conditions, and even to support improved corporate profitability.<sup>5</sup>

At the same time, possible longer-term concerns were raised over the negative consequences of high debt through sovereign debt markets (Freedman et al., 2010); Auerbach et al., (2017). Evidence at the time showed that adverse reactions in financial markets are likely in response to higher government debt and that such reactions may depend on the initial budget situation (OECD, 2009).

While debt-to-GDP has recently stabilised in at least some OECD countries due to moderate economic growth, the nominal debt level remains at an all-time peak of USD 64 trillion. The key risk of very high sovereign debt is that repayments could become unsustainable, either due to resource or political constraints. However, even where debt is high but sustainable from the issuer's perspective, investor perceptions of risk could drive market costs much higher in the case that large amounts of maturing debt needs to be refinanced.<sup>6</sup> In turn, this could raise the price of debt across all domestic issuers, including local governments, corporates, and households.

**Figure 1.2. Sovereign outstanding debt for selected economies, 2000-2018**



*Note:* The financial instruments covered comprise currency and deposits (which are mostly zero in the case of credit to the private non-financial sector), loans and debt securities. The sum of these three instruments is defined here as "core debt". For the government sector, core debt generally represents the bulk of total debt. Debt data for 63 countries are used in this chart. Outstanding amounts are presented in 2018 USD adjusted by US Consumer Price Index.

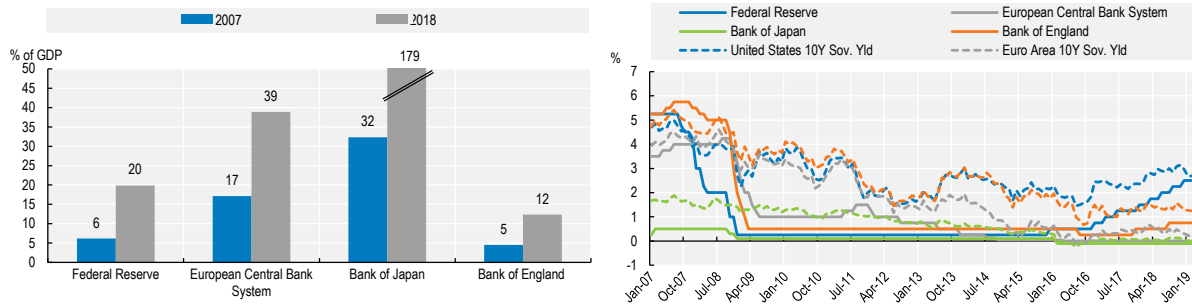
*Source:* Bank of International Settlements, Credit to the non-financial sector database, OECD calculations.

Prior periods of rising sovereign debt and deficit spending have increased the market cost of credit to compensate for additional risks and, at very high levels of debt and deficits, can lead to a loss of investor confidence and very high risk premia across fixed income markets. These phenomena can be seen clearly in the Latin American debt crisis, European peripheral sovereign-banking crisis earlier this decade, and several Asian countries during the Asian financial crisis (Reinhart and Rogoff, 2008), when these developments have morphed into more widespread market concerns.

The growth of sovereign debt in the post-crisis era has been met with uncommon circumstances in that central bank policies – including unprecedented purchases of over USD 12 trillion of sovereign debt and other assets – have contributed to historically low yields (Figure 1.3). For the first time in modern finance, sovereigns are being compensated by investors to issue debt: by year end 2016, USD 12 trillion in debt – 15% of the Barclays' Global Aggregate Bond Index – was trading at negative yields (PIMCO, 2018). In turn the combination of very low interest rates and historically low to negative bond yields have created conditions such that growing vulnerabilities from indebtedness may not be adequately priced by market participants that were indirectly competing with central banks to purchase debt instruments.

Moreover, the global reduction of yield for much of the post-crisis period has had a similar effect on the entire market – by design – to bring down yields across the risk curve (Figure 1.3), and to reduce the credit and equity risk premia. The policy motivation was to facilitate conditions that support ample financing for capital investment, business expansion, and economic growth. These factors may have contributed to the uptick in public trust in at least some OECD countries, as the public experienced renewed benefits from well-coordinated and effective stimulus measures.

**Figure 1.3. Major central banks total balance sheet and interest rates, 2007-2018**



Source: Refinitiv, OECD calculations.

High levels of sovereign debt to GDP, while contributing to needed post-crisis fiscal stimulus in many countries, has in at least some OECD countries governments are not currently taking long-term actions that counteract the increases in debts (Beqiraj, et. al., 2018). This can complicate the path of debt sustainability in less benign rate and credit conditions. While certain countries have room to continue to provide fiscal stimulus in a low-rate environment, others may face more tenuous debt dynamics.<sup>7</sup>

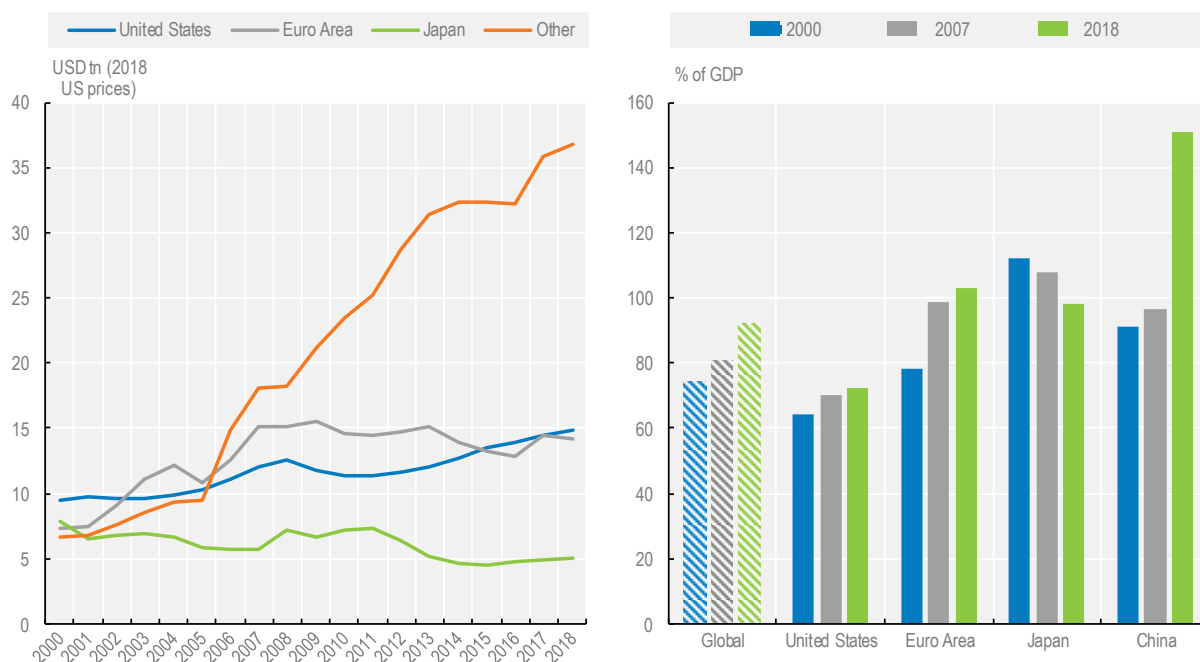
These factors raise concerns about the impact of very accommodative monetary and fiscal policies on the level of debt, and the influence of exuberant pricing of market assets on the sustainability of current valuations and, in turn, the wealth effect. To the extent that abrupt

changes in policy and underlying conditions contribute to sharp market repricing, it could have effects on the public's trust in the efficacy of post-crisis financial policies.

### 1.2.2. Corporate debt

Accommodative monetary policies and increasingly benign credit conditions were meant to create favourable financing conditions for corporate issuers, thereby allowing businesses to reinvest excess cash flows into productive businesses. However, these policies also incentivised businesses to take on additional corporate debt and restructure balance sheets to engineer higher returns to equity. As a result, corporate debt has grown 30% over the past decade to USD 70 trillion in 2018, rising from 81 to 92% of GDP in 2018 (Figure 1.4).

**Figure 1.4. Non-Financial corporate outstanding debt for selected economies, 2000-2018**



*Note:* The financial instruments covered comprise currency and deposits (which are mostly zero in the case of credit to the private non-financial sector), loans and debt securities. The sum of these three instruments is defined here as "core debt". Debt data for 63 countries are used in this chart. Outstanding amounts are presented in 2018 USD adjusted by US Consumer Price Index.

*Source:* Bank of International Settlements, Credit to the non-financial sector database, OECD calculations.

This growth has been accompanied by improved earnings and risk-adjusted returns on equity in many corporate sectors<sup>8</sup>, in part due to lower debt financing costs that improve earnings per share. Certainly, solid returns to debt and equity from 2012 to 2018, and in turn improving corporate sector employment in many parts of OECD would be expected to restore an element of trust to the role of financial markets to contribute to inclusive economic growth.

Yet, a closer look indicates fragilities in the sustainability of debt, the use of debt proceeds, amid weak corporate productivity. The high level of corporate debt has occurred through very high issuance of corporate bonds and loans through market-based intermediation. During this period, corporate bond markets have more than doubled since 2007, rising to



nearly USD 12 trillion, and USD 1.5 trillion of this amount was issued by speculative grade corporates (Çelik et al., 2019). Of the remaining, nearly USD 2.5 trillion of US corporate issuance is of BBB quality, which is prone to downgrade to non-investment grade rating amid deteriorating credit conditions, and may no longer be held by a portion of institutional investors. As well, the leveraged loan market (by which non-investment grade and highly leveraged corporates issue higher-yielding loans to investors) has more than doubled and by some estimates is more than USD 2.3 trillion in 2018 (Patalano and Roulet, 2019). Issuer leverage in the market, a sign of credit risk, has peaked such that deals with more than 6x debt to equity now represent a quarter of all issuance (Guggenheim Investments, 2018).

#### **Box 1.1. Market integrity – quality of financial information**

One key element of public trust in markets is the quality and relevance of financial information provided to market participants. Participants in financial markets rely on high-quality financial information of companies in order to make informed investment decisions and for asset managers to comply with fiduciary duties toward their clients. The trust in financial statements of corporate issuers is critical for the financial markets to interpret and respond to financial information in an efficient manner. This credibility is of the utmost importance when investor confidence is challenged by unforeseen market conditions and contagion.

Market integrity issues were brought to the forefront of concerns during the early 2000s, when Enron defaulted, and subsequent defaults of telecoms companies uncovered similarly faulty audits that contributed to hundreds of billions of dollars in investor losses through defaults and severe declines in telecoms stock valuations. The US Congress responded to the corporate corruption and fraud elements of the telecom meltdown by passing the Sarbanes-Oxley Act of 2002.

In certain jurisdictions, concerns over audit quality and fee structure are again under consideration. In 2018, the UK Competition and Markets Authority was called to review the UK financial reporting authority's conduct related to the review of the Big Four Accounting firms. In late 2018, the UK Competition and Markets Authority issued several recommendations to address these concerns by, among other issues, improving auditor independence, recommending an operational split between the Big Four's audit and non-audit businesses, to ensure maximum focus on audit quality.

Also, in 2017, the monitoring group comprising IOSCO, FSB, et. al., released a consultation paper, "Strengthening the Governance and Oversight of the International Audit-Related Standard-Setting Boards in the Public Interest", that highlights concerns about the current international auditing and ethics standard-setting model. The consultation paper notes that there may be an adverse effect on stakeholder confidence in the standards as a result of a perception of undue influence on the standard-setting process by the accounting and auditing professions, through their funding and direct staffing of standard-setting boards. The monitoring group has received feedback from the public consultation of its paper, which it summarised publicly, and IFAC has put forth viewpoints based on an independent review of the responses to the monitoring group's consultation. The Monitoring Group has the benefit of this feedback and IFAC is reviewing identified operational areas with IAASB and IESBA leadership and other stakeholders to determine the actions they would agree can be taken now to improve the efficiency and effectiveness of the operations of the two boards in the public interest.



The issuance reflects a deepening of capital markets in many countries, particularly those that are facilitating a shift away from bank-dominated finance. However, high-yield bond and leveraged loan yields, which peaked at 22% and 16% respectively during the crisis, have fallen to below 5% amid investors' reach for yield. Monetary policy, by design, indirectly supported the compression of corporate bond spreads in North America and Asia, and also directly did so in the euro area following the ECB's corporate bond purchasing programme.

To what extent do these market risks outweigh the benefit of additional low-cost financing to corporates for capital investment? During this period, many corporations engaged aggressively to boost returns to equity holders through share buybacks and dividends rather than in capital expenditures (OECD, 2015), which may have contributed to tepid corporate sector growth despite the public-sector stimulus.

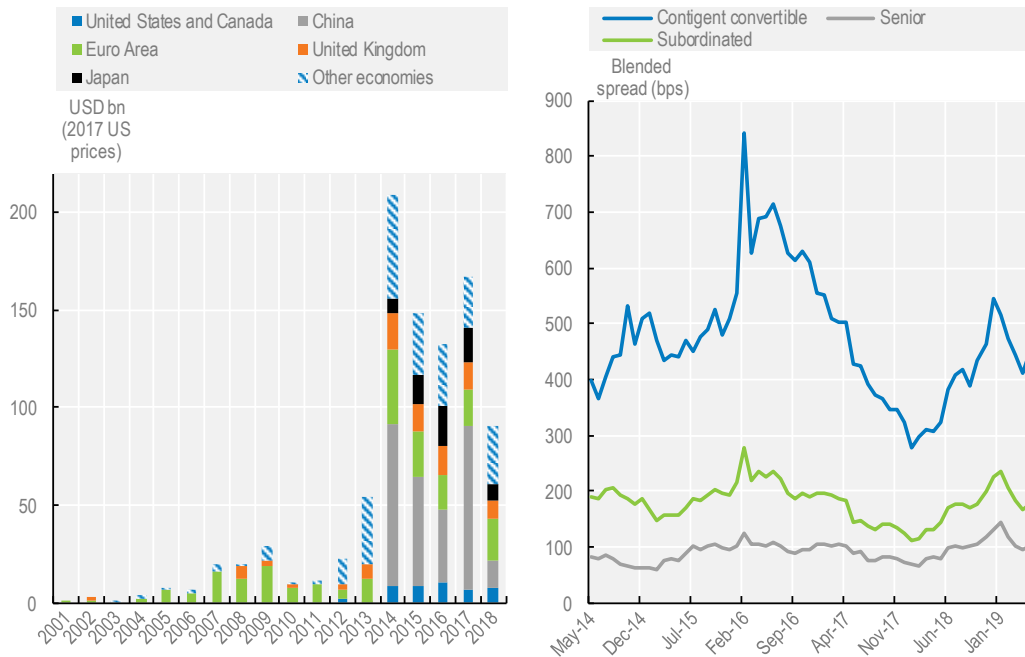
Moreover, there is ample evidence that growth of corporate productivity in many OECD countries slowed during this period until 2017, due to sluggish capital investment to GDP relative to its contribution in the prior recovery in the 2000s (OECD, 2015); OECD, 2018a). These observations suggest that while monetary policy was successful in propping up asset prices to allow for cheaper financing and investor wealth effect, it did not contribute fundamentally to fostering capex-driven growth and greater productivity, which are important elements of medium-term debt sustainability.<sup>9</sup>

### *1.2.3. Bank contingent-convertible bonds*

In addition to corporate bonds, the market for bank contingent convertible or "CoCo" bonds experienced notable growth. These bonds were permitted by regulators in the post-crisis period to help banks raise debt that could be converted to equity in the event banks experience losses that erode regulatory capital buffers. The purpose of the convertible debt is to help ensure that banks considered too big to fail do not impose losses to taxpayers. In addition, the explicit guidance by authorities to limit inter-bank holding of loss-absorbing debt helps ensure that the contingent losses would be widely distributed across market participants to limit concentrations of loss in systemically-important entities. At the same time, the bail-in regimes and conversion of loss-absorbing capital creates uncertainty which could, under some circumstances, result in market contagion as losses are imposed on institutional and retail holders.

The market for contingent convertible bonds has risen substantially, as annual issuance has risen from under USD 25 billion in 2008 to an average of USD 150 billion of issuance since 2014, contributing to an approximated outstanding of greater than USD 500 billion (Figure 1.5).<sup>10</sup> European banks and, more recently, Chinese banks have issued most heavily into the market.

Initially, CoCo bonds faced several challenges in generating investor demand. First, the convertible nature of the bonds complicates valuation of their bond and equity-like structures. Second, the contingent element of the bonds depends in part on the regulatory treatment, and the bonds may be required to convert to equity due to banks' failure to pass supervisory stress tests, rather than actual losses. Due to these features, the bonds are generally considered to have low liquidity, and have experienced wide price fluctuations during periods of market stress, in comparison to non-convertible bonds of corporates and banks. To this end, there is evidence of recent contagion in the European CoCo bond market, which has exceeded USD 150 billion, as application of bail-in has given rise to uncertainty over the consistency of treatment (Bologna et al., 2018).

**Figure 1.5. Bank's convertible bond issuance and blended-spread, 2001-2019**

*Note:* Only contingent convertible bonds issued by banks are included in the statistics (i.e., contingent convertible (write-down) and contingent convertible (conversion)). Issuance amounts are presented in 2017 USD adjusted by US Consumer Price Index. Three Bloomberg Barclays global bond banking indices are shown depending on the type of underlying bond, i.e. contingent convertible, senior or subordinated. Blended spread represents the difference between bond index yield versus US Treasuries.

*Source:* Refinitiv, OECD calculations.

The investor base of these forms of loss-absorbing bank capital has shifted from primarily long-term institutional investors to a greater retail base (Boermans and Wijnbergen, 2017). In particular open-ended investment funds have substantially increased holdings of CoCo debt. Recent evidence suggests that retail investment funds are now the largest holders of bank CoCo bonds, either as funds targeting higher-yielding bank exposures, or as investments within broad fund categories, whereas European household direct exposure to CoCos has declined sharply. Moreover, the primary investors in European funds with CoCo exposure are non-residents, which suggests they may be less knowledgeable of European banking conditions and regulatory treatment.

The key driver of the growing demand is that, amid investors' reach for yield, CoCo bond yields are well above 5%, which is higher than most other fixed-income products in Europe. In this regard, anecdotal evidence suggests that a number of fixed income funds are allowed to hold up to certain portion of such bonds, such as a 10% limit. Therefore, investors may be less aware of the specific CoCo exposure in their fixed-income portfolios.

In sum, while the reach for yield and strong performance of these bonds may have contributed to a growing sense of investor confidence in the CoCos as an asset class, the untested nature of the bail-in regimes in different parts of the world could eventually give rise to unexpected outcomes that could sharply alter perception of risks of these products.

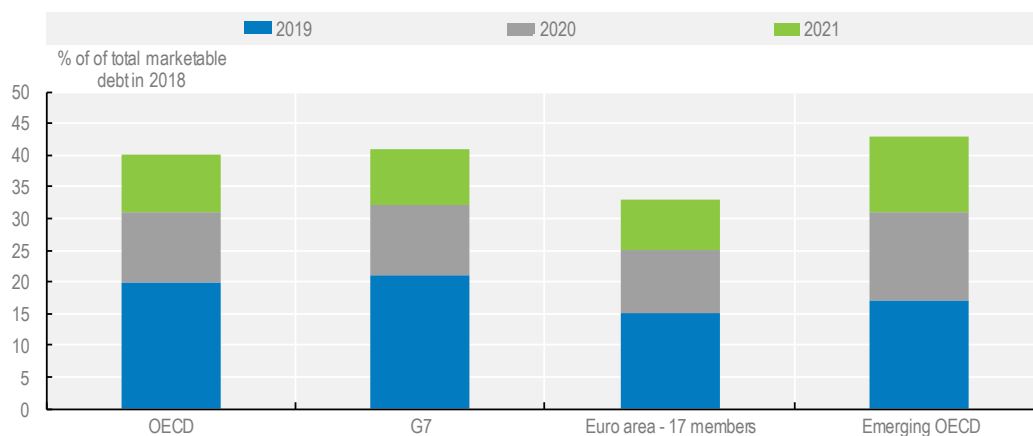
### 1.2.4. Debt outlook and implications for Trust

The outlook for debt markets is highly dependent on economic, credit and market conditions. Following years of very low rates and highly liquid primary market conditions, a sharp change in rates and repricing of market and credit risks would have substantial effects on market valuations and liquidity. In 2019, forecasts by the OECD indicate that growth among OECD countries is slowing after several years of synchronous growth. In addition, political uncertainty (e.g. political events such as Brexit) and trade tensions have contributed to eroding business confidence (OECD, 2019a). While the eventual normalisation of central bank rates would be expected to increase yields and financing costs, other factors – such as geopolitical uncertainties, a deterioration of credit conditions, and lack of competitiveness -- could give rise to much higher financing costs and spillovers to related markets, which would increase the liquidity risk premia. To the extent that buoyant markets and historically benign financing conditions contributed to the improved trust in finance in recent years, an abrupt reversal of these conditions due to economic or political factors could in turn erode public trust in these markets.

### Sovereign debt outlook and implications

In light of growing risks, many sovereign borrowers have taken the opportunity in this low-rate environment to extend their maturity schedule to reduce the amount of debt needing to be refinanced over the next several years (OECD, 2019b). Nevertheless, the amount of near-term maturing debt is relatively high for a number of OECD countries, on average approximately 40% of total debt outstanding (Figure 1.6).

**Figure 1.6. Cumulative percentage of sovereign debt maturing in the next 12, 24 and 36 months, 2019-2021**



*Note:* Cumulative percentage of debt maturing in the next 12, 24 and 36 months (i.e. in 2019, 2020 and 2021), as a percentage of total marketable debt stock (without cash) in 2018. Values of principal payments and marketable debt have been aggregated into a single currency by using fixed exchange rates, as of 1st December 2009, for all years. The Emerging OECD group is defined as Chile, Hungary, Mexico, Poland and Turkey.

*Source:* 2018 Survey on Central Government Marketable Debt and Borrowing; OECD Economic Outlook No. 104; Refinitiv, national authorities' websites and OECD calculations.

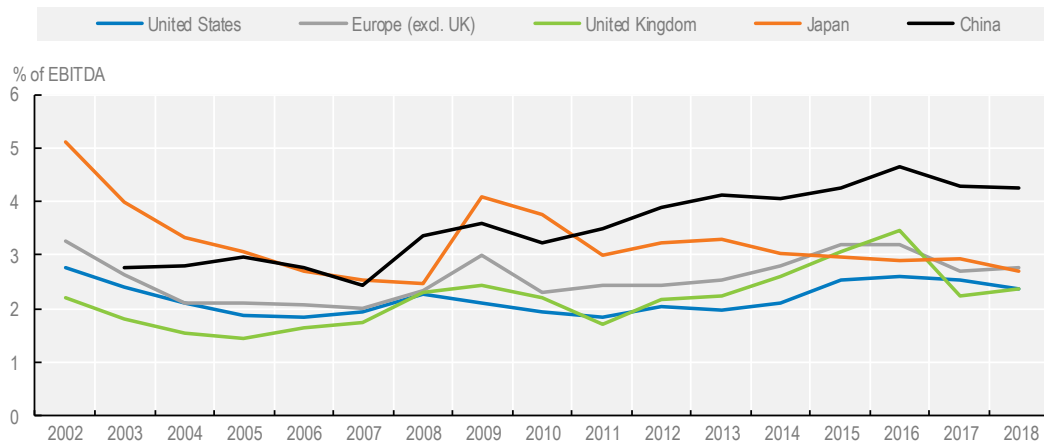
In a rising rate environment, the cost of new debt issuance will depend upon funding needs, the rate differential relative to debt maturing and the extent to which the debt was hedged by debt agencies. For a number of countries, a rollover of one-third of debt at even 200bps higher debt yields would stretch fiscal deficits due to higher interest costs.<sup>11</sup> Rising debt

vulnerability concerns in some countries could push credit risk premia on sovereign debt higher and trigger collateral downgrades, further contributing to market stress (Nickel and Tudyka, 2013); Taylor, 2018). While idiosyncratic defaults may impact investor confidence, they may not necessarily erode public trust in the debt markets unless such defaults expose faultlines that suggest widespread flaws in market behaviours and oversight that permitted a pervasive underassessment of risk. Particularly if the rising risk aversion is in response to policy decisions that are perceived to heighten market uncertainty, authorities' responses could have consequences for public trust. The extent to which public trust might be eroded would at least partly depend upon the extent to which unanticipated losses are distributed across market participants, and the extent to which any costs are indirectly socialised, such as from subsidising losses through bail-outs, or cutting the social safety net.

### *Corporate debt outlook and implications*

Corporate debt issuers that are highly levered would experience similar dynamics. Given elevated corporate debt to GDP and operating cash flows in many countries (Figure 1.7), the combination of rising rates and slower growth would erode the debt sustainability of a growing portion of leveraged issuers, and could contribute to a considerable rise in ratings downgrades and defaults. Such pressures and ratings movements, in turn, would cause investors to demand a higher credit risk premia, exacerbating debt financing costs.

**Figure 1.7. Non-financial companies' debt to EBITDA ratio for selected economies, 2002-2018**



*Note:* EBITDA represents income before interest, taxes, depreciation and amortisation. Total debt includes loans and short and long-term bonds. Financials companies listed in S&P 500, STOXX 600 and Thomson Reuters Japan and China equity indices are excluded. Annual consolidated financial statements are collected on an annual basis, at the firm level and in current USD. The current primary source of this information is Refinitiv and some data are extracted from Bloomberg. All variables are trimmed at the 1st and 99th percentile levels to reduce the effect of outliers.

*Source:* Refinitiv, OECD calculations.

This is particularly the case in advanced economy markets where leveraged lending is sizeable, such as the United States and the United Kingdom. Unlike high yield debt, which is mostly fixed-rate, leverage loans are floating rate, which means that debt costs rise both due to rising interest rates that cause loan payments to reset, as well as the credit risk premia. Moreover, there are concerns that the prominence of cov-lite loans will result in

much higher losses when issuers default, which would contribute to a more substantial repricing of risk relative to the financial crisis (Federal Reserve, 2019).

Rising corporate defaults and losses would erode the resilience of debtholders, including banks, finance companies, asset managers, insurance and pension funds. Depending on their risk management frameworks, these institutions would face pressures to reduce credit exposures through costly hedging or portfolio rebalancing to sell assets, which would further contribute to market liquidity costs. Also, given the substantial increase of BBB debt in the market, many institutions that have limits on non-investment grade debt would need to sell or hedge BBB debt in the event of downgrades to ratings below investment grade (Celik et al., 2019).

A moderate increase in yields, from credit spread widening and/or precautionary rate increases, could have significant impact on debt sustainability, particularly in large emerging market economies. A study by McKinsey Global Institute illustrates the consequences: in a simulation of a 200-basis-point rise in rates, the share of bonds at higher risk of default in Brazil, China, and India could rise to 30 to 40 percent. The share of bonds at higher risk of default in Brazil and India might rise to roughly 30% of total corporate bonds outstanding. China's share of corporate bonds at higher risk of default could rise to over 40 percent from 2017 levels. Should these outcomes occur, they will weigh heavily on EME banking sector asset quality, and banks' ability to intermediate credit to businesses and households (McKinsey, 2018b).

### ***Bank CoCos outlook and implications***

Bank CoCo bonds are now largely in the hands of retail and some institutional investors such as pension funds and insurers. While these bonds have delivered high yields in a low rate environment, their performance during market stress and deteriorating bank asset quality, and the extent of cross-border contagion to non-European investors, will have implications for investor trust in asset class.

For example, in Europe the regulatory authorities have powers to direct the conversion of CoCos to equity pursuant to the Bank Recovery and Resolution Directive (BRRD), which can then impose losses on holders. Under the BRRD framework, the national resolution authorities may also exclude specific liabilities from the application of the bail-in if there is a risk of widespread contagion. As these criteria can be broadly interpreted, the process and outcome on the CoCo investors' situation is unpredictable (Philippon and Salo, 2017).

Moreover, a portion of banks across OECD countries will continue to need to raise total loss-absorbing capital to meet regulatory requirements. Should the triggering of bail-in conversions of CoCos result in greater scrutiny of the bail-in mechanisms and widespread risk aversion due to heightened uncertainty, then trust in regulatory and market authorities regarding the fairness of loss distribution (e.g. to retail investors) may erode.

### ***Implication for trust of rising debt***

Thus, a decade after excessive debt in the housing market contributed to the financial crisis, widespread stress in the sovereign, corporate credit, and bank CoCo markets could draw public scrutiny to the effectiveness of post-crisis reforms. Widespread losses on debt could give rise to a loss of investor trust in the post-crisis policies that promoted portfolio rebalancing and engineered a market-wide reach for yield. These effects could be particularly detrimental to trust in intermediaries, such as public pension funds and defined-contribution funds, as negative impacts to post-retirement benefits or increases in

mandatory contributions could raise societal concerns about the long-term viability of existing pension frameworks.<sup>12</sup>

Moreover, should much tighter financial conditions occur, it could lead to higher defaults of public and private companies, which would eventually have an impact on employment, and could dampen credit intermediation to SMEs more extensively, thereby slowing economic growth. Should this occur, at least some countries might be faced with rising fiscal costs and conditions that pin central bank policies toward the lower bound.

### 1.3. The rise of market-based finance

A second phenomenon in financial markets in the period since the Global Financial Crisis is the continued rise of non-bank financial intermediation and, in particular, market-based finance. Market-based finance can be described as financial intermediation by financial institutions, vehicles, and products that finance themselves from the markets rather than banks or other forms of direct institutional lending.

Investors may be attracted to market-based finance due to opportunity for higher risk-adjusted returns than bank deposits, and greater diversification of risk. Such intermediation, appropriately conducted, provides a valuable alternative to bank funding that supports real economic activity. Therefore, the investing public's trust in the efficiency and effectiveness of market-based finance to deliver superior risk adjusted returns, and the integrity and transparency of markets and traded products is particularly important. Moreover, public trust extends to faith that the oversight authorities are able to ensure that imbalances and excesses do not lead to financial stability risks that eventually cause widespread and deep losses.

Public trust is critical to the growth and stability of market-based finance because, unlike banks, these forms of intermediation do not benefit from established access to financial safety nets, such as deposit guarantees or central bank backstops, or from the scrutiny of bank supervision. Thus, where maturity and liquidity mismatches exist, they can become susceptible to runs. This phenomenon led to the amplification of risk within and across markets during the financial crisis, and contributed to a sharp erosion of market confidence. As the contagion spread back to the banking system and impeded the provision of credit to the real economy, public trust in the financial system deteriorated.

#### *1.3.1. The growth of investment funds and structured products*

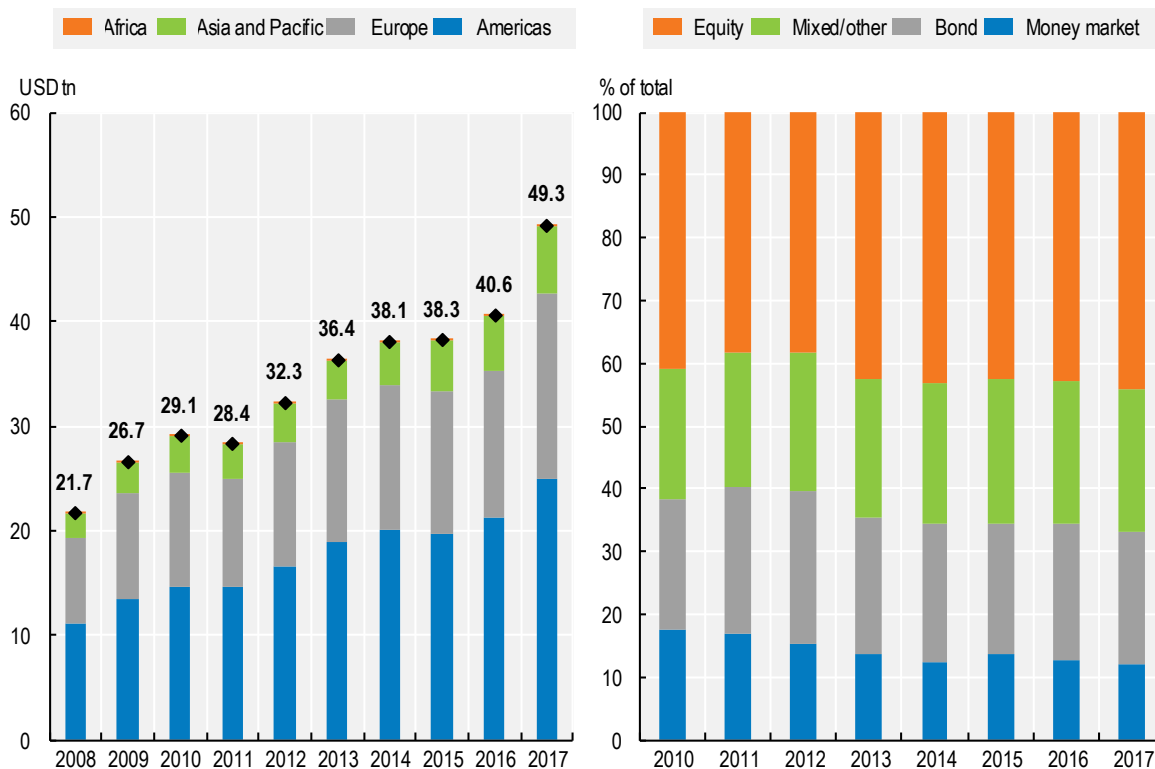
During the post crisis era, market-based financial systems stabilised as various forms of the so-called “toxic” products, such as subprime collateralised debt obligations (CDOs), declined. At the same time, other forms of market-based finance have grown and appear to have gained an element of trust. In particular, very strong growth of forms of asset management vehicles have occurred in part due to demand for transparency and efficient, loss-cost diversification of risk, which has contributed to passive investing through index funds and exchange traded funds (ETFs).

#### *The growth of investment funds to intermediate credit*

In the decade since the crisis, investors' reach for yield in a low-rate environment has contributed to the growth of a range of open-ended investment funds and exchange-traded investment funds that provide higher returns and risks than traditional money market funds. Innovations in the asset management industry, including passive funds and liquid alternatives, have contributed to a rise in open-ended investment funds' assets under

management to USD 50 trillion (Figure 1.8). The growth has brought benefits in terms of financial inclusion and greater access to capital from lower-rated corporates and Emerging Market issuers, at competitive financing rates.

**Figure 1.8. Global growth of open-end investment funds, 2008-2017**



*Note:* Regulated open-end funds include mutual, institutional and exchange-traded funds.

*Source:* Investment Company Institute, International Investment Fund Association.

Also, the growth of low-cost, highly diversified exchange-traded funds (ETFs) has contributed to improved financial deepening, and greater ability for institutional and retail investors to diversify holdings across asset classes and geographies. Moreover, the proliferation of funds has increased investor choice; greater, more consistent and more transparent financial information; and greater ability to tailor investments to particular industries or strategies. To this end, the rise of sustainable investment funds (including environmental, social and governance ESG investing) illustrates growing investor interest in financial products that enhance risk assessment and better aligned with societal values to seek long-term value. That investors are increasingly utilising this diversity of investment products, and at much lower costs, may suggest greater trust in the functioning, transparency and liquidity of the product adaptations.

One positive aspect of credit intermediation through asset managers is that the asset management entities themselves are generally considered resilient. Because they are not the asset owners and the funds are generally not leveraged (as constrained by regulation), these funds do not share the features of banks or broker dealers that are exposed to high leverage from short term liabilities, and thus default risk.



Nevertheless, investment funds do have certain features that might amplify market stress. As open-ended investment funds provide daily liquidity to investors through on-demand redemptions of fund shares, investors expect to be able to exit funds at short notice with little impact to prevailing market prices. While this may be true for individual trades, such funds may be subject to investor runs when risk aversion suddenly rises and heightened redemptions of funds occurs.<sup>13</sup> In addition, features of at least some funds contribute to a first-mover advantage, whereby redeeming investors do not bear the full cost of redemptions, and instead these costs are borne by remaining unit holders.

These features could become problematic in open-ended funds that invest in less liquid assets, or assets that are more likely to experience sharp decreases in liquidity during periods of market stress. The rise of funds holding high-yield corporate bonds, bank CoCo bonds, emerging market bonds, and leveraged loans have contributed to the rise of debt in advanced and emerging market economies. Should credit conditions deteriorate, the eroding quality of debt held by certain funds could prove to be the driver of outflows on falling returns.

Thus, heavy redemptions in bond funds that do not effectively manage liquidity risk could, under extreme circumstances, force selling of assets that exacerbates downward price movements and asset price contagion across related markets. While such episodes are uncommon, there are concerns that greater levels of open-ended funds, a decline in broker-dealer capacity to engage in fixed-income market making, and rich market valuations have made market liquidity more fragile. Thus, fixed-income market stress in a rising rate environment amid deteriorating credit conditions could be more consequential in the future.

Also, ETFs that trade in less liquid markets, such as corporate and emerging market bonds, or loans, could also contribute to spillovers in the underlying markets under periods of market stress. ETF mechanisms utilise selected market participants to serve as “authorised participants” to create and redeem ETF shares when the underlying assets deviate from the share price. However, these APs are under no obligation to engage in this market arbitrage to align the prices. During some prior periods of stress, the value of shares of at least some ETF deviated substantially from the value of underlying assets for brief intervals, suggesting that authorised participants did not sufficiently engage in voluntary arbitrage that would ensure market efficiency. While ETFs are generally perceived as having equity-like liquidity, such liquidity may prove illusory for some funds that can only sell assets at a significant discount in times of stress (Central Bank of Ireland, 2017).

As the growth of asset management has resulted in a much larger amount of debt, (including high yield corporate debt, EM debt, and leveraged loans) in funds’ assets under management, investor trust in the orderly functioning of the funds during periods of stress in fixed income markets could be tested.

### ***Structured products***

One of the most notable developments in non-bank financial intermediation in the decade prior to the crisis was the sharp rise of structured products that pooled various credit exposures (such as mortgages, trade receivables, commercial real estate, and leveraged loans), and issued units or tranches of liabilities that catered to investors’ demand for particular risk exposures. In this manner, financial engineering was able to transform and market risks and returns in an array of offerings, and distribute them outside of the banking system to investors seeking higher returns.

Some forms of these innovations experienced unexpected and heavy losses during the financial crisis. Shadow banking products such as subprime CDOs, credit arbitrage asset backed commercial paper vehicles (ABCP), and structured investment funds (SIVs), were a key factor in the loss of public trust, because they contributed not only to investor losses but also to the demise of a number of institutions and the need for public sector intervention that put taxpayer resources at risk.<sup>14</sup>

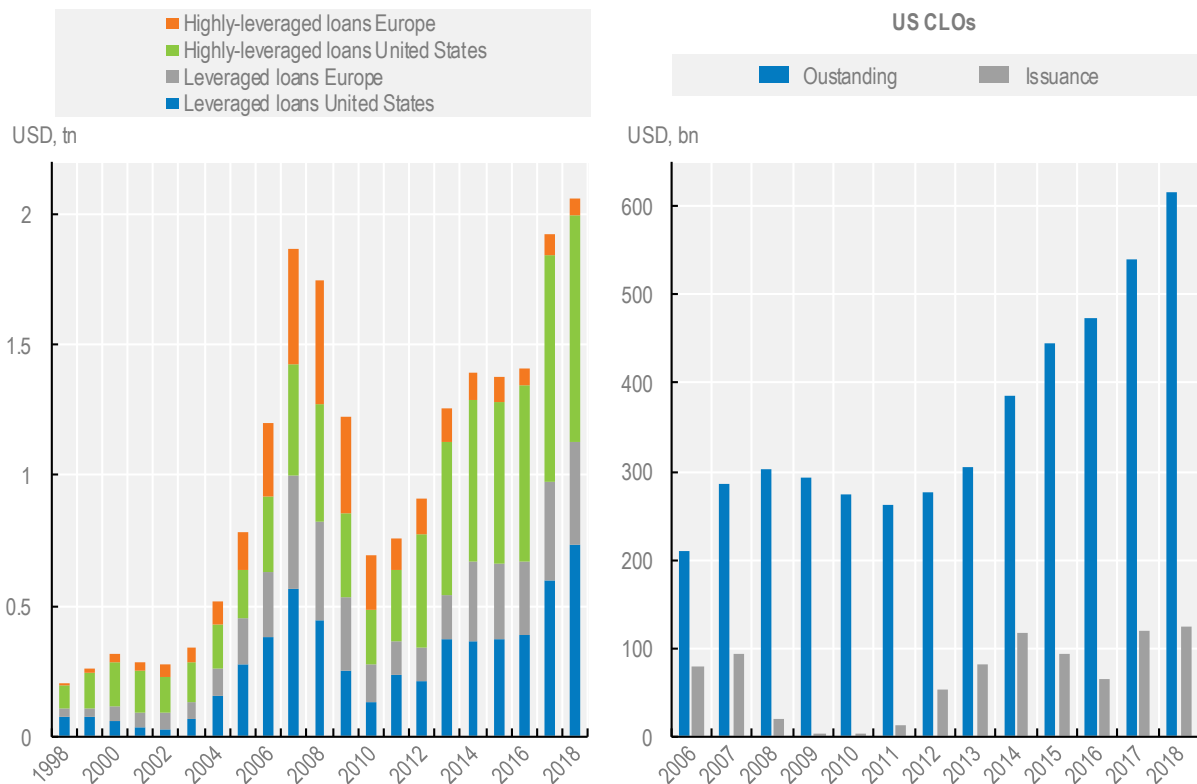
With the demise of these riskier forms of structured products, arguably less opaque forms have grown in the aftermath of the crisis. One of the structures that was relatively resilient during the crisis was the collateralised loan obligation (CLO), which benefited from covenant-based protections in leveraged loans. Their growth illustrates the revival of the securitisation markets in the United States and Europe. While they provide benefits to investors looking for diversified higher yielding risks, there are potential risks associated with both the nature of credit risk, and the potential for the structures to perform badly.

CLOs are structured vehicles that purchase and manage portfolios of leveraged loans, and sell tranches of these portfolios with a range of ratings (AAA senior tranches through mezzanine B tranches, and equity) to provide tailored products to meet the risk and return demand of a range of institutional investors.<sup>15</sup> This tailoring allows CLOs to redistribute the high yields on risky leveraged loans (non-investment grade, by definition) and through tranching offer yields that are above similarly rated corporate debt. CLO managers earn a fee for managing the portfolio and where they hold equity, also receive returns on their investment through superior credit risk management.

CLO issuance and outstanding fell sharply after the financial crisis due to investor concerns over structured credit products, and the extreme volatility of CLO tranche spreads during the crisis. However, with the stabilisation of the leveraged loan markets resulting from improved credit conditions in the US and Europe, CLOs again became a popular investment vehicle due largely to the search for yields among institutional investors in an increasingly low yield environment. CLOs have grown to over USD 600 billion in the United States, and now own nearly 60% of the leveraged loan market (Figure 1.9).

A particular concern is that the underwriting standards of underlying leveraged loans has deteriorated. While bank loans include covenants to help lenders reduce borrowers actions that can increase financial risks, leveraged loan issuers have increasingly reduced covenant protections, and in return offer investors additional yield. While this has benefits during benign credit conditions, it can expose investors to higher losses when credit conditions deteriorate. Industry participants and regulators raised concerns when covenant light (“cov-lite”) loans grew to 35% of leveraged loan issuance by 2007; cov-lites were over 80% of issuance in 2017 (S&P Ratings, 2018). As such, rating agencies and market analysts are raising concern over the potential for significant losses during the next credit downturn.

CLO holdings are dispersed widely across institutional investors. While institutional investors traditionally held triple-A tranches of the CLOs, the reach for yield has incentivised insurers, pension funds, and asset managers to demand lower rated A and BBB tranches, which would perform considerably worse than similarly-rated corporate bonds during deteriorating economic and credit conditions.<sup>16</sup> Moreover, due to their illiquidity, the mark-to-market volatility on tranche spreads are significantly higher than comparable corporate bond prices during periods of market turbulence.

**Figure 1.9. Leveraged loans and US CLOs, 1998-2018**

*Note:* Data show in this figure are derived from leveraged and highly leveraged loan deals in the United States and Europe from twelve economic sectors over the period 1990-2018. Outstanding amount is calculated based on loan issuance but excludes the value of drawn and undrawn revolving credit facilities. Linear amortisation schedule is postulated for term loans A and other amortising loans (i.e., mortgages, equipment, construction, commercial loans). All other terms loans are not amortised as they are repayable at maturity. To account for loan re-financing, a 40% early repayment ratio is used. Financial companies are excluded from the sample. *Source:* Refinitiv, SIFMA, OECD calculations.

### ***1.3.2. Market-based finance outlook: consequences of a repricing of debt on liquidity***

#### ***Investment funds***

The growth of investment funds has been beneficial with respect to product choice, diversification, dramatically lower costs, and increasing transparency of performance and risks. In this manner, it has brought the benefit of stable post-crisis returns to a wider span of the investing community, who perceive that the liquidity provision from open-ended funds and ETFs allow for rapid exit of markets should market sentiment sour. Notwithstanding these important benefits, the significant growth of credit in open-ended funds raises concerns about continued performance during a period of deteriorating credit conditions, and in light of structural features of open-ended funds that may make them susceptible to run-risk and herding (where multiple funds and other investors' selling reinforces collective selling behaviours).

It is important to note that the international policy debate over the extent of run-risk, fund herding, and contagion has benefited from a wide range of research on the behaviours of

funds, institutional investors, and fixed-income market liquidity. Results about the extent of such behaviour in past crisis episodes are mixed, and there is ample evidence that funds contributed to restore market liquidity in at least some episodes of stress, as market prices deviated significantly from what participants considered to be fair or intrinsic asset value.

Nonetheless, a body of research suggests that funds, while not the cause of market runs, could contribute in some scenarios to runs in less liquid markets due to first-mover advantage, herding, and negative feedback dynamics where investors respond to an initial round of losses by selling additional fund shares, causing forced asset sales (Cetorelli et al., 2016). Moreover, there is some evidence that during periods of market stress, such funds would sell even more assets than needed to meet redemptions in an effort to improve cash or liquid asset buffers (Morris and Shin, 2017). A simulation of corporate bond markets by the Bank of England suggests that a severe but plausible set of assumptions regarding market participant behaviours, redemptions from open-ended investment funds can result in material increases in spreads in the European corporate bond market. In the extreme, this could lead to dislocations in corporate bond markets (Baranova et al., 2017).

Thus, potential liquidity risks from open-ended funds and ETFs, among other instruments, could contribute to unexpected losses for investors who were not invested in these products during a prior credit downturn, and could also contribute to greater spillovers in underlying markets. Products such as leveraged loan or bank CoCo ETFs, while a small part of the market, may be sensitive to deteriorating credit conditions, and sharp declines in their market values could contribute to reduced confidence in the ability of investors to exit these products on demand.

To the extent these events occur, they could erode the fragile restoration of trust since the financial crisis. Such erosion could have a financial impact, through higher costs of equity and debt financing, reduced market access of higher-risk borrowers, fragile market liquidity and higher cost of trading in normal and stressed market conditions. In turn, these costs would tighten financial conditions, and the efficiency losses would be borne by government, corporate and household borrowers, affecting economic growth.

### *CLOs*

The outlook for the CLO market, and its potential for loss during deteriorating credit conditions, merits a review of myriad regulatory efforts to address misalignments of risk in leveraged loan and CLO structures.

In light of growing risks in the leveraged loan markets, US authorities issued leveraged loan guidance to regulated banks and non-bank subsidiaries of bank holding companies to limit the amount of leverage in syndicated deals. There is evidence that the guidance helped reduce the riskiness of leveraged loans syndicated by banks; however, the overall market continued to grow due to increased regulatory arbitrage by non-bank syndicators (Kim et al., 2016).

In 2014, US and European regulators and banking authorities adopted credit risk retention rules for securitisations, which sought to align the incentives of originators with tranche investors, to minimise morale hazard. The rules served to “keep skin in the game” by ensuring that securitisers held a portion of equity in the CLO, to align their incentive to minimise losses for the entire CLO structure (Federal Reserve, 2014). The CLO market outpaced its pre-crisis peak as private equity and other institutional investors contributed equity to this market, which raises questions as to the effect of the regulation on the securitisation process.

Nevertheless, this regulation was considered onerous by the industry, which raised concerns that it could hamper the viability of the CLO market. In early 2018, a US Court of Appeals exempted managers of open-market CLOs from the risk retention rule.<sup>17</sup> Consequently, CLO securitisers' ability to distribute risk may introduce the potential for misaligned incentives, when the CLO sponsors' equity is no longer at risk.

In 2018, CLO managers have begun to distribute the equity tranches to other investors, including to retail investors through open-ended funds. While some investor communications claim that the equity has performed well during the cycle, the structures have not experienced a credit downturn amid rising interest rates, which imposed severe losses on CLO equity during the financial crisis. Moreover, CLO equity is highly illiquid and has higher risk characteristics than the underlying leverage loans themselves. From a policy perspective, the growth of this practice could invite scrutiny to the adequacy of investor protection and suitability.

From a markets perspective, growing losses in CLOs could have several consequences. First, it could transmit losses to CLO subordinated tranche holders, trigger higher spreads on senior tranches, and impose losses on banks, insurers and asset managers. Also, growing losses could curtail CLO demand for leveraged loans, which could contribute to much higher financing costs for highly leveraged companies, thereby elevating defaults and restructuring within the industry. This spillover to the real economy might contribute to a broader decline in credit conditions, whereby rising underwriting standards and risk aversion further tighten financial conditions for corporate financing.

### *Implications for trust of rising market-based finance*

In the post-crisis era, the international community of financial stability and regulatory authorities has made concerted efforts to address the riskiest forms of non-bank financial intermediation through a suite of financial policy measures.

However, should evolving risks in parts of market-based finance expose new faultiness that could have financial stability implications, it could erode public trust in the efficacy and completeness of post-crisis financial reforms. In particular, unexpectedly high leveraged loan and CLO losses that impact investment funds and pensions, respectively, which would be felt more directly by the investing public. This could erode public trust in the post-crisis policy response to the high-yield and securitisation markets, as well as in bodies who concluded that the most concerning shadow banking risks had largely been addressed (FSB, 2017b).

As well, higher losses in and amplification of risks from funds, should they occur, may raise broader concerns about the resilience of fixed-income market liquidity, and trust in products that have substituted prudent credit risk assessment for market liquidity.

## 1.4. Financial innovations

One of the most prominent developments in finance in the post-crisis period has been the development and adoption of financial technologies, or “Fintech”. These technologies are broadly associated with either the use of distributed ledger (blockchain) technologies, or the use of advanced computing in finance, such as through the application of artificial intelligence combined with highly sophisticated analytics and computer power. Also, the use of blockchain has supported the development of crypto-assets, which are digital asset that function to varying degrees as a medium of exchange and that use strong cryptography to secure financial transactions. Application of these technologies has led to the

proliferation of high-frequency and algorithmic trading in financial markets, and also the use of forms of crypto-assets for more efficient payments, trading and investments.

The growing use of distributed ledger technology has implications for the speed, efficiency, cross-border reach, and potentially the security of financial transactions (OECD, 2018b). As well, the availability and value of crypto-assets have grown exponentially in recent years, as investors seek alternative and decentralised ways to create market value and transact in a highly-secured and immutable manner.

The rapid growth of these financial innovations has benefited from a certain level of investor and financial consumer trust in the benefits of digitalisation in finance. In this regard, an important element of this trust is the extent to which market participants and consumers have positive engagement with various financial technologies that improve speed and cost efficiencies, inclusion through access to financial services, and improved data security. However, these rapidly growing technologies have been mostly untested during periods of sharp downturn and volatility, or major cyber events. Notwithstanding the promise of these technologies, major incidents that involve loss, traditional fraud, cyber theft, and malfunctioning could quickly undermine the public's current engagement, and may raise concerns about the further proliferation of the use of such technology in the financial system. As with any innovations, the outcomes of a changing competitive landscape and opportunities for regulatory arbitrage could have unintended consequences that give rise to distrust.

This section further considers the developments related to several key aspects of the financial markets, including algorithmic and high-frequency trading, and the growth of crypto-assets. It assesses the growth and impact of these technologies over the past decade, and then considers the outlook, including risks and spillovers that could contribute to an erosion of investor and public trust.

#### *1.4.1. Growth of trading electronification and crypto-assets*

##### ***Algorithmic and high-frequency trading***

Algorithmic and high-frequency trading refers to forms of electronification of market trading that rely on computer algorithms to execute order strategies, and the use of substantial technological power to execute trades very quickly, thereby gaining an advantage over traditional traders. Firms pursuing HFT strategies tend to generate a large number of orders, hold open positions for very short periods and cancel a large share of orders that they generate, which is only possible to execute effectively in markets that have sufficient liquidity (BIS, 2016). This speed and agility has benefits in that it allows for operational and cost efficiencies, and can facilitate the absorption of new financial information into market prices.

Moreover, algorithmic high-frequency trading has become a much larger part of equity, FX, and increasingly fixed income markets, and also has grown considerably in the trading and market-making of ETFs. These technologies have lowered the cost and increased the speed of transactions, and are credited with providing additional liquidity to certain markets during normal market conditions.<sup>18</sup>

However, some strategies appear to have reduced liquidity and exacerbated flash crashes that have occurred with growing frequency over the past several years (Table 1.1). While these limited flash crashes have not led to broader market contagion, such incidents draw attention to questions about the resilience of market functioning. More turbulent outcomes that destabilise markets and contribute to widespread losses could challenge public perceptions with respect to the costs and benefits of algorithmic and high-frequency trading.

**Table 1.1. Market flash crashes in selected economies, 2010-2019**

Country	Market	Year
United States	S&P (equity)	2010
United States	Nasdaq (equity)	2013
United States	Treasury	2014
United States	NYSE (equity)	2015
United Kingdom	British Pound	2016
United States	Dow Jones (equity)	2018
Japan	Yen	2019

*Source:* OECD staff examples of large flash crash events, for illustrative purposes.

These types of trading occur both in established broker dealers and independent principal trading firms (PTFs), which have grown substantially in the post-crisis era. Such firms are distinct from broker-dealers in that they are not driven by client relationships and client driven orders, and do not need large balance sheet capacity to make markets. As such, their balance sheets are small, and they are (mostly) not subject to strict capital requirements.

Algo-HFT participants are now more prevalent in trading in equities and currencies, but are growing in bond trading. Also, PTFs are also becoming more prevalent market-makers and authorised participants for ETFs. Thus, they are not just relied upon for efficiency and speed, but as an increasingly central component of the liquidity provision of numerous financial products.

Of key concern to investors and policy makers is that there are a growing number of incidents of “flash crashes,” in which these types of trading firms and algorithmic strategies appear to contribute to extreme market volatility. A prominent flash crash in equity markets occurred in May 2010, when the Dow Jones Industrial Average experienced its largest ever intraday point decline of 9%. An assessment of the causes of the flash crash by public and academic researchers found that while HFT did not cause the flash crash, these traders contributed to it by demanding “immediacy” ahead of other market participants (Kirilenko et al., 2014). Immediacy absorption activity of HFTs results in price adjustments that are costly to all non-HF traders, including the traditional market makers. In 2014, a flash crash in the US Treasuries market also drew attention to the influence of HFT strategies in fixed income markets. An assessment of the event indicated that the combination of high HFT activity and low market depth likely amplified the price dynamics (Bouveret et al., 2015). There is evidence that, during the 2016 flash crash of the British pound, hybrid firms that employ HFT technology and strategies, or provide direct electronic access (DEA) to HFTs, contributed to extreme price volatility. Evidence from researchers at the U.K. Financial Conduct Authority found that such traders initially trade against the direction of the initial price movement, but subsequently tend to follow and exacerbate the price change (Aquilina, et. al., 2018).

These incidents illustrate that the role of PTFs can temporarily increase volatility when liquidity is most needed. Recent research suggests that these episodes seem to have in common the fact that illiquidity brings more illiquidity, contrary to the dynamic that in normal market conditions supply and demand for liquidity are shaped by risk pricing, which can have a self-stabilising effect. By contrast, in a crash, an increase in illiquidity fosters a disorderly run that accentuates the downward price movements (Cespa and Vives, 2017).

Thus, the key issue is whether these PTFs and HFT strategies at traditional broker-dealers could lead to greater disruption and volatility. While their strategies have not caused havoc on the system yet, during a period of abundant central bank liquidity and market confidence,

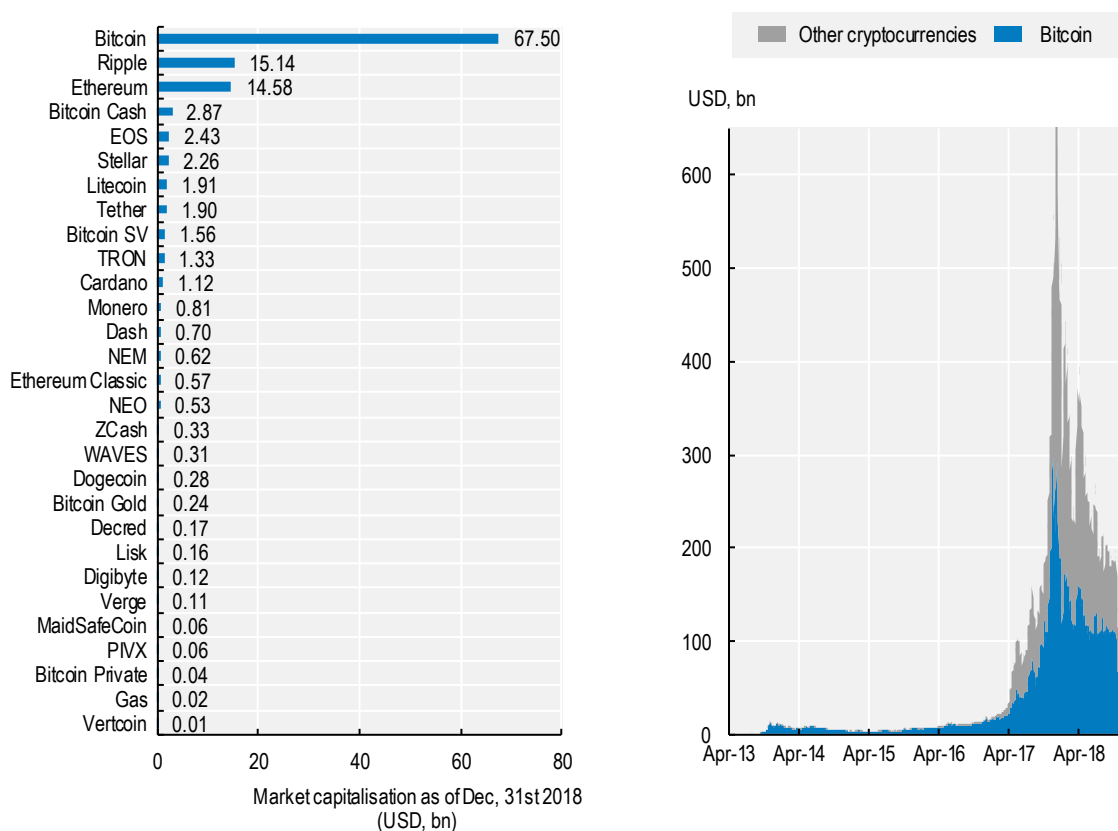


questions arise regarding their behaviours that could to amplify stress (BIS, 2017). In this regard, perhaps the biggest concern is that market traders, both retail and institutional, have growing concerns about the reliability of market liquidity, which could make the markets more prone to risk aversion amid bouts of volatility.<sup>19</sup> This, in short, increases avenues of contagion during periods of crisis. However, given the growth of these market intermediaries and influence of their strategies in important markets, recently new forms of regulation are being applied in some markets, such as in Japan and the European Union.

### *Crypto-assets*

One of the effects of the sharp loss of public trust in financial markets after the crisis was the search by some participants for alternate marketplaces (Blundell-Wignall, 2014). For various reasons, demand among a portion of market participants was driven by technologies that would not rely on centralised bodies, including authorities and global banks, to provide trust to the transactions, to approve and record transactions. Also, in some cases, a portion of market participants sought to delink the value of such transferrable assets from the direct influence of central banks.

**Figure 1.10. Market capitalisation of selected crypto-assets, 2013-2018**



Source: Refinitiv, Coinmetrics, OECD calculations.

In the post-crisis era, these societal demands gave rise to tradable crypto-assets, backed by a distributed ledger technology referred to as blockchain. The features of blockchain allow for ledgers of the transaction and related asset information to be distributed across all

parties in the network, such that the blockchain then becomes a permanent, immutable record the transactions. In this regard, the benefits of blockchain include transparency, traceability, and a greater level of trust (OECD, 2018c). In this manner, this technology helped foster the development of crypto-assets for payment and unit of account, bringing benefits to participants in the crypto-markets.

In light of these developments, trading of crypto-assets resulted in sharp increases in crypto-asset valuations, such that the entire market rose from under USD 10 billion in 2015 to peak at nearly USD 700 billion in 2017 (Figure 1.10), as Bitcoin alone rose to a market capitalisation of USD 300 billion. In the wake of several market incidents, and following various communications by market authorities raising concerns over the trading and resilience of the pricing in the crypto-asset markets, valuations have fallen considerably.

In response to the shortcomings in these forms of crypto-assets, in 2019 there has been an increase in industry announcements to issue so-called “stablecoins”, which are crypto-assets that are pegged or backed by real assets such as commodities or fiat currencies. The intention of anchoring to real assets is to reduce volatility and to increase public trust in the currency-like qualities of such digital assets. The developers of the crypto-assets labelled “stablecoins” seek to reduce volatility by anchoring the “coin” to a reference asset (e.g. a sovereign currency) or a basket of assets. While the actual use of stablecoins has been limited, several new stablecoin initiatives launched by global financial institutions and large technology companies (“BigTech”) suggests the potential for widespread international adoption, with its benefits and risks.

Therefore, the instability of the uncollateralised crypto-asset markets and the uncertainty over new stablecoin plans, raise the need for more vigilant monitoring and coordination of policy responses.<sup>20</sup>

Various analyses of crypto-asset markets highlight challenges including rapid market developments and the fragmented nature of the markets; lack of transparency (including the identity and location of token issuers); and data gaps that hamper proper assessment of risks (FSB, 2018). Moreover, the debate over crypto-assets has drawn attention of policy makers to give further consideration to centralised digital currencies backed by central banks.

#### *1.4.2. Financial technology outlook*

As the adoption of fintech technologies continues, there is considerable potential for these innovations to bring lasting impact to quality and diversity of services, cost and overall productivity. Given concerns over flagging productivity in advanced and emerging market economies in the post-crisis era, a technology-driven productivity boost would have reinforcing benefits (BCG, 2018); McKinsey, 2018a); contributing to economic and wage growth that can support higher societal trust.

However, since the development and adoption of innovative technologies also bring potential risks, continued structural changes in the financial sector, combined with periods of heightened market volatility and market stress, could expose underlying vulnerabilities associated with financial innovations.

Despite contributing to extreme volatility during flash crashes, thus far algo-HFT strategies have not been the primary cause of the crashes, and affected markets have eventually stabilised. Market-stabilising behaviours have occurred during an era of highly accommodative monetary policy and benign credit conditions, in which a sharp fall in asset prices disconnected by fundamentals would invite value or arbitrage investors to profit

from low valuations. Also, the effective use of policy tools, such as trading circuit breakers on exchanges, have helped restore market order, although at times they have been indicated for exacerbating financial market volatility.

However, during periods of heightened uncertainty amid more fragile market liquidity conditions, it is conceivable that trigger events, such as a large default or a significant operational failure, could create negative feedback dynamics that result in extreme price movements, which could contribute to contagion across markets. In this regard, the rapid shift of some PTFs from liquidity providers to liquidity consumers, particularly around unexpected events, could destabilise markets and contribute to a sharp drying up of liquidity (Hautschm et al., 2018). Though a downside risk, a major occurrence of this type could contribute to concerns over market resilience of trading platforms and exchanges.<sup>21</sup> Market participants that rely on stable market liquidity for their market-intermediation business are raising concerns that, amid a normalisation of monetary policy that reduces liquidity in the system and causes shifts in liquidity demand, the impact of algo/HFT could lead to more severe bouts of contagion (Kolanovic, 2018). With increasing frequency, authorities have been raising concerns over the potential impact of algorithmic and high frequency trading in ways that could exacerbate market volatility and destabilise price discovery mechanisms, eroding trust in the financial markets.

The growth of crypto-assets as a medium of exchange and the sharp volatility of decentralised crypto-assets suggests that the further growth of the market may need to evolve in ways that could build trust among investors and users. In this manner, the development of stablecoins, which seek to address aspects of this instability by being pegged to fiat currencies or traded assets such as commodities, indicates that the structure of the crypto-assets being offered is in a transformational phase. New developments may give rise to exuberance, but also to additional uncertainty regarding their impact on liquidity in traditional markets and questions over their encroachment on implicit or explicit financial safety net (such as central bank liquidity backstops).

#### *1.4.3. Implications for trust of FinTech*

Overall, public trust in these innovations could prove to be fragile. Should some incidents of product malfunctioning, security breaches and/or fraud occur give rise to perceptions that taint otherwise transformative technologies.

Given the heightened regulatory scrutiny to algo/HFT in light of periodic market disruptions, algo/HFT contribution to a more pronounced and debilitating flash crash could raise investor and public concern over the efficacy of existing policies to sufficiently address the extent of vulnerabilities in electronic trading and the rise of PTFs.

Also, while substantial losses in crypto-asset markets did not appear to spill over to securities markets, further developments and interlinkages through futures markets and cross-asset collateralisation could lead to greater disruptions in the future. The investing public may find that, at least in some jurisdictions, regulatory engagement that relies on monitoring and light-touch treatment may need enhancements. This may be of particular concern where new forms of stablecoins could be considered viable alternatives to fiat currency for international payments, trading, and a store of value.

The potential for these risks, should they emerge, to hinder progress may warrant further consideration from policy makers.<sup>22</sup> The challenge is to find ways to both secure and further distribute the benefits, while avoiding the hazards to the markets and financial consumers (OECD, 2018b).

## 1.5. Consequences and policy considerations

### *1.5.1. Consequences and implications for trust*

Growing fragilities in debt, market-based finance and financial innovations in fixed-income and digital markets, are often manageable in periods of economic growth, but have much more serious consequences amid sharply deteriorating economic and credit conditions, and when uncertainties over policy actions arise. The OECD Economic Outlook 2019 notes that the economic outlook remains weak and there are many downside risks that cast a dark shadow over the global economy and people's well-being (OECD, 2019a). Moreover, the global economy remains largely dependent on persistent policy support. Ten years after the financial crisis, with subdued inflation, central bank balance sheets remain at unprecedented levels, interest rates are historically low, and government debt, except for a few cases, is much larger. Moreover, private sector debt is growing fast in major economies, and the quality of debt has been deteriorating, including a heightened stock of leveraged loans.

Should global economic growth and credit conditions continue to deteriorate, a new bout of financial stress could erupt, the financial markets could become more vulnerable to episodes of contagion (OECD, 2019a). Deteriorating credit conditions that contribute to higher corporate credit defaults would in turn affect funds holding speculative bonds and loans, and CLO tranche structures would be tested. Moreover, rising volatility and uncertainty could augment the impact of future flash crashes that aggravate selling pressures across multiple markets. Finally, increased risk-aversion could extract liquidity from at least some crypto-asset markets, and impose real losses to end users.

While resilient financial systems are able to withstand fluctuating investor sentiment without affecting trust, several factors raised in this chapter could erode public trust in markets, under severe conditions, including:

- Outcomes that result in unpredictably high and widespread losses across major fixed income asset classes, particularly where monetary policy incentivised a reach for higher-yielding and higher duration assets;
- Protracted debt market stress that reduces market access, raises financing costs, and in turn affects the public through offsetting mechanisms, including (government) higher taxes or lower services; (corporate) lower capital investment and job growth;
- A sharp decline in exuberance in non-bank financial intermediation where heightened liquidity transformation occurred, or where deteriorating credit quality and weaker structures incentivised excessive risk taking;
- Incidents in which market disruptions from widespread adoption of financial technologies raise concerns over market integrity;
- The extent to which these factors cause a deterioration of sustainable and inclusive economic growth.

Should a constellation of market developments cause the erosion of public trust, it could have a wide range of consequences in terms of market engagement, including market depth, cost of credit, and supply of liquidity. It could also contribute to higher aversion to market products in market-based finance, such as ETFs and liquid alternative funds, which could raise the cost of transacting. The erosion of trust could also impact the way that consumers of financial services engage with financial adaptations and innovations.

Moreover, if financial stress were to be amplified across markets and financial institutions, events could draw scrutiny to the unevenness of the implementation of post-crisis financial reforms. Furthermore, a sharp erosion of societal trust could hinder policy makers' future efforts to employ tools that impose costs or require legislative approval (OECD, 2017).

Public institutions – including central banks, fiscal authorities, regulators and enforcement authorities – have a number of ways to help safeguard against the erosion of public trust in markets, particularly during periods of market turbulence that may expose underlying structural fragilities. As well, there is room for greater attention by financial and business leaders with respect to principles and guidance, corporate culture, conduct, and balanced attention to the needs of various direct and societal stakeholders.

### *1.5.2. Policy considerations*

The following policy considerations seek to address the potential fragilities in each of the covered market segments, to help safeguard resilience and public trust:

#### ***Fixed income markets and debt***

Authorities with systemic risk oversight could give greater attention to the potential risks of high and/or rising debt levels in their financial stability assessments, and more formally link the systemic concerns to the stance of monetary policy.<sup>23</sup> Given the potential of quantitative easing to contribute to elevated asset valuations and high debt levels over an extended period, these experiences should be more formally specified where maintaining financial stability is part of the central banks' mandate. Recent developments of GDP-at-risk models at some central banks hold promise for incorporating economic and financial risks so that monetary policy makers better understand the consequences these trade-offs (e.g. policies that promote economic growth and lower unemployment at the expense of greater downside risks due to asset mispricing and higher debt).

#### ***Sovereign debt***

The link between sovereign debt management and public trust is important for the functioning and liquidity of the debt markets, upon which pricing for other traded risk products occur. Principles of sound public debt management are followed to strengthen the international financial architecture, promote policies and practices that contribute to market stability and transparency, and reduce countries' external vulnerabilities.

In this regard, the IMF-World Bank Revised Guidelines for Public Debt Management offer guidance that is increasingly pertinent in a rising rate environment (IMF, 2014). Principles on debt management strategy and risk frameworks should be given careful consideration to ensure the appropriate balance between minimising funding costs and addressing refinancing risks, including under periods of acute market stress.

Also, in case of an illiquidity concern, sovereign debt managers are encouraged to take additional proactive steps to address potential risks associated with deteriorating market liquidity (OECD, 2019b).

#### ***Corporate debt***

In the case of corporate debt, a collective action problem arises because there is no clear public oversight over the levels of corporate debt and their implications, notwithstanding systemic surveillance of financial stability risks. Market-based forces for restraining excessive corporate debt, which have functioned well in the era of modern finance, have

shown signs of excessive exuberance, which suggests that market forces may not function effectively to serve as a restraining force during periods of highly accommodative monetary policy.

Thus, in order to address rising debt levels more proactively to prevent systemic risks, it is important to communicate the level of risk concerns by central authorities, so that markets can better interpret the implications for the corporate credit markets. For example, when systemic risk authorities raise concerns about the growth of debt and leveraged loans, rating agencies, asset managers and institutional investors may benefit from guidance to incorporate these concerns into their investment strategies and risk management. Such guidance might serve as a soft tool to help strengthen central bank communications on potential systemic risks of debt.

In this respect, greater use of early warnings by systemic risk bodies – within central banks or as a multi-authority bodies – should be used to flag credit concerns early in the cycle so that market participants are more attuned to the potential risks, and can price the debt accordingly.

Since micro and macroprudential tools for banking systems can contribute to a shift to market-based lending, additional tools are needed to ensure that overall corporate debt levels can be contained when stability risks arise. Leveraged loan guidance by some authorities have had limited effect because the syndication has shifted to market-based finance to avoid the leverage restrictions. Thus, enhanced regulation would need to also give consideration to the use of loans in funds, public pensions, and also CLOs.

### *Market-based finance*

#### Asset managers

Over the past five years, national regulators, international organisations and standard-setting bodies have made considerable progress by engaging with the asset management industry to assess structural risks of investment funds. In this regard, the FSB and IOSCO have developed and operationalised principles to address structural vulnerabilities of asset management activities (FSB, 2017a; IOSCO, 2018). Efforts are being taken by some authorities to incorporate these into regulations where appropriate.

To solidify this progress, full and consistent implementation of the recommendations is important. International peer reviews by international organisations and standard-setting bodies of the operationalisation of these recommendations could assess the consistency of adoption across jurisdictions.

Also, authorities may further consider the use of system-wide market liquidity simulations to better understand the resilience of fixed income markets, particularly where open-ended funds and ETFs are prevalent and where broker-dealer intermediation is less resilient due, among other factors, to regulatory reforms. That said, care should be taken to also incorporate the behaviours of the range of large asset owners, to ensure a balanced perspective across the financial ecosystem (Blackrock, 2017). Results could be published so that market participants are better informed of the level of financial authorities' concerns over potential risks, which in turn would help guide investment fund managers in formulating prudent liquidity strategies.

Regulators should further assess the potential downside risks, to also understand how ETFs in less liquidity markets (e.g. fixed income, emerging markets) might perform under severe market stress. This knowledge would better help ETF sponsors, APs and investors better

understand the range of potential outcomes to guide their own behaviours and risk decisions. Liquidity risk practices of ETFs, and the disclosure of APs with respect to their obligations and activities on behalf of the ETFs, could be further assessed to determine if any additional policy consideration is needed.

### CLOs

To the extent that regulators in the United States and Europe sought to strengthen the rules and not inhibit further growth of the market, the unprecedented exuberance in the CLO market suggests this balance needs further calibration. Thus, risk-retention rules with respect to securitisation of CLOs could be reviewed and strengthened. Authorities may consider ways to ensure that CLO managers' interests are sufficiently aligned other tranche holders to incentivise due diligence and prudence in managing the risks throughout the credit cycle.

Market regulators should closely scrutinise the marketing of CLO tranches into products that are sold to retail investors, such as open-ended funds, or to smaller institutional investors that may not have the sophisticated in-house analytical capabilities.

Rating agency methodologies for CLOs could give further consideration to plausible default and recovery rates of covenant light loans during severe credit stress, and also to underlying assumptions of market liquidity.

### *Financial innovations*

Given the increasing frequency of severe market incidents in which algo/HFT behaviour exacerbates price volatility, potential severity of spillovers in less-liquid markets is cause for concern. As some major central banks have raised concerns that the amplification of market risks due to HFT could have financial stability consequences, a greater understanding of the strategies, impact and interconnectedness is warranted. Moreover, greater understanding of the diversity of business models are needed.

Such analysis at the national and global levels would arm policy makers with greater ability to consider appropriate micro and macroprudential measures, where needed. For example, regulators may wish to assess the algorithms and strategies of large independent players, and to simulate how, under some circumstances, interactions with other market intermediaries could lead to highly disruptive market spillovers.

Taken together, these recommended areas could be considered by policy makers and corporate leaders, were applicable, to help improve financial market resilience in ways that fundamentally safeguard both investors' and the public's trust.

## Notes

<sup>1</sup> For a description of the importance of trust and investor optimism as two key components of investor confidence, see Ko (2017). Optimism relates to prospects for asset portfolio returns and variances including a temporal assessment of investment prospects based mostly on economic and business fundamentals.

<sup>2</sup> The efficient markets hypothesis, developed by Eugene Fama, states that asset prices fully reflect all available information. This necessitates fair disclosure regimes that are based on timely and broad dissemination of financial reports that are accurate.



<sup>3</sup> Market participants include investors (institutional and retail), issuers, intermediaries that engage in market making and facilitating the process of credit intermediation, and other entities that support this process. The distinction between such participants and the general public is that the latter includes portions of society that are not actively engaged in the markets, but nevertheless expect that financial markets serve the broader good, from supporting economic growth, jobs creation, and positive spillovers to other parts of society.

<sup>4</sup> See BIAC (2019), "Statement to OECD Ministerial Council Meeting May 2019: Top 10 business priorities." It is clear that digitalisation offers unprecedented opportunities to raise efficiency and productivity, enable creativity and innovation, and increase competition and consumer welfare, while fostering social and economic progress.

<sup>5</sup> With respect to corporate profitability, see Correa-Caro et al. (2018).

<sup>6</sup> It should be noted that a rise in interest rates linked to an increase in economic growth, all else equal, would be accompanied by an increase in government revenues. The impact of this adjustment in growth and cost of financing could, on net, be positive on public balances, despite the increase in debt burden.

<sup>7</sup> See Blanchard for discussion of how high sovereign debt levels could remain sustainable as long as long as very low interest rates persist. Olivier Blanchard, 2019. "[Public Debt and Low Interest Rates](#)," American Economic Review, vol 109(4), pages 1197-1229.

<sup>8</sup> Risk-adjusted book-value of returns can be considered to be the actual return on equity minus the cost of equity, based on the CAPM model.

<sup>9</sup> See additional papers from the IMF-BIS-OECD Conference on "Weak productivity: the role of financial factors and policies", January 2018, [www.bis.org/events/bis\\_imf\\_oecd\\_jan18\\_conf.htm](http://www.bis.org/events/bis_imf_oecd_jan18_conf.htm). Also, several academic papers suggest highly accommodative monetary policy shifts investment into corporates with lower productivity.

<sup>10</sup> Various measures of outstanding amounts reflect estimates based on the callable/convertible nature of the CoCos. This estimate is roughly 70% of the total CoCo bonds issued over the past five years. Bologna et al. (2018) calculates total European CoCos outstanding at USD 133 bn euros, roughly equal to the total issued over the past five years.

<sup>11</sup> "Under many circumstances sovereign debt markets may be considered as a safe haven during periods of heightened uncertainty and market volatility. However, where the sovereign conditions or sovereign market risk are in question, this may not be the case, and sovereign debt markets could transmit risk to other markets such as the bank funding markets. Evidence suggests that European sovereign debt markets exhibited aspects of flight to safety prior to the sovereign debt crisis, and more acute debt-related contagion during the financial crisis when some nations debt sustainability came under investor scrutiny. See Beirne, J. and M.Fratzcher, 2013. "The pricing of sovereign risk and contagion during the European sovereign debt crisis. ECB Working Paper Series N°1625, <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1625.pdf>.

<sup>12</sup> For further consideration of the impact of market losses on pension plans, see Yermo and Severinson (2008).

<sup>13</sup> Funds in certain jurisdictions, including the United States, are required to have liquidity risk management programmes that are designed, among other things, to mitigate the potential adverse effects of large redemptions on remaining shareholders, whether motivated by first mover advantage or other reasons.

<sup>14</sup> For example, see the Federal Reserve's use of liquidity facilities to address failures in market-based finance: [https://www.federalreserve.gov/monetarypolicy/bst\\_crisisresponse.htm](https://www.federalreserve.gov/monetarypolicy/bst_crisisresponse.htm).

<sup>15</sup> The reader should note that this section focuses on CLOs rather than the underlying leveraged loan market, which is much larger at roughly 2.3 trillion, according to Thomson Reuters estimates. The reason for less emphasis on the leveraged loan market is that it, unlike the investment grade

tranches of CLOs is inherently risky as a market of entirely non-investment grade credits. Therefore, losses due to direct exposure to leveraged loans or leveraged loan funds are to be expected, and there is presumably less of an issue of trust. By contrast, the structuring of products that transform these risky assets into AAA tranches, and are rated as such, are the source of a potential trust deficit.

<sup>16</sup> Various sources, including rating agencies, market sources, and regulatory analysis. See the Federal Reserve (2019); Bank of England (2018); Pinebridge (2017); NAIC (2018).

<sup>17</sup> In 2014, the Loan Syndications and Trading Association sued the SEC and the Federal Reserve to exempt open-market CLOs from the rules, since, among other factors, CLO managers do not originate the loans they securitise. In early 2018, a US Court of Appeals unanimously ruled that risk-retention rules for securitisations should not apply to CLOs. CLO managers are not required to retain a portion of the CLOs they manage. See US Court of Appeal decision: [https://www.cadc.uscourts.gov/internet/opinions.nsf/871D769D4527442A8525822F0052E1E9/\\$file/17-5004-1717230.pdf](https://www.cadc.uscourts.gov/internet/opinions.nsf/871D769D4527442A8525822F0052E1E9/$file/17-5004-1717230.pdf).

<sup>18</sup> The Autorité des Marchés Financiers (AMF) published a detailed analysis of the activity of market participants engaged in high-frequency trading (HFT) on CAC 40 stocks, with focus on their presence in the order book, how they provide and consume liquidity and how their behaviour changes during periods of intense stress. See AMF (2017).

<sup>19</sup> Central banks' research notes that PTF liquidity absorbing behaviours amid market turbulence, causes the risk of excessive volatility to increase, thereby provoking market turmoil. See Bundesbank (2016).

<sup>20</sup> There are several international coordination efforts with respect to FinTech and stablecoins. The OECD is exploring benefits, risks and policy responses through its Committee on Financial Markets, and through its annual Blockchain Policy Forum. Also, the G7 is assessing the potential risks from global stablecoin adoption.

<sup>21</sup> Office of Financial Research (2018), see explanation on market volatility and principal trading firms. See also, Salmon (2017).

<sup>22</sup> Philippon et al. (2017). FinTech can improve both financial stability and access to services, but this requires certain changes in the focus of regulations.

<sup>23</sup> OECD (2010). See recommendation I.C with respect to surveillance and analysis, and II.C with respect to establishment of an accountability framework.

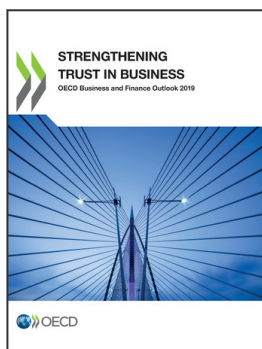
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