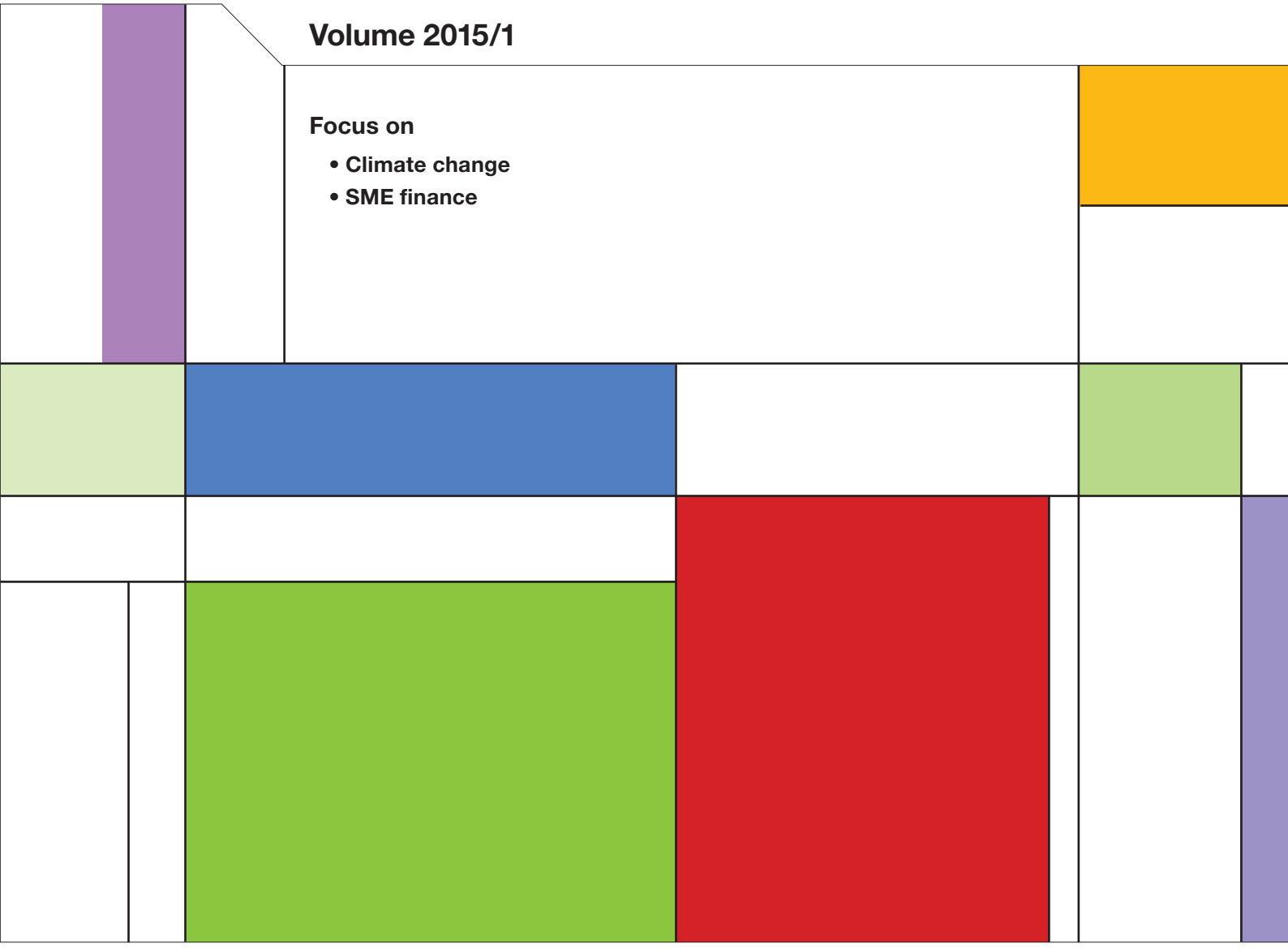
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Financial Market Trends

Volume 2015/1

Focus on

- Climate change
- SME finance



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Foreword

Financial Market Trends *provides regular updates of trends and prospects in the international and major domestic financial markets of the OECD area and beyond. It provides timely analysis of and background information on structural issues and developments in financial markets and the financial sector. This issue of* Financial Market Trends *compiles the articles that have been released online over the past few months.*

The first two articles in this issue, written in the run-up to the 2015 Paris climate conference (COP21), analyse financial issues related to climate change. The first article examines the transition to a low-carbon and climate-resilient economy from a financial sector perspective more broadly. The finance and climate nexus is manifold and spans from dealing with financial risks from climate change to mobilising capital for climate change mitigation and adaptation. The paper argues that beyond such capital mobilisation, the main challenge lies in ensuring a transition-consistent capital reallocation, in which the financial sector has a key role to play that needs to be more widely promoted and appropriated.

The second article provides an overview of the potential implications of climate change for the financial management of disaster risks. It outlines the contribution of insurance to reducing the economic disruption of disaster events and discusses policy approaches to supporting the penetration of disaster insurance coverage and the capacity of insurance markets to absorb disaster risks, including through the use of capital markets instruments and international co-operation in risk pooling. It concludes with a number of recommendations for improving the financial management of disaster risks in the context of climate change and some areas of further work.

The final article follows up on, and complements, earlier work related to market-based financing of small and medium-sized enterprises (SMEs). Specifically, it looks at public equity financing for SMEs and argues that the development of this market segment could promote investment in SMEs and, together with securitisation and other non-bank debt financing instruments, encourage an enhanced allocation of risk and risk taking, and thus support growth. It finds that despite the benefits of public SME equity, its share is small and an equity gap exists especially for risk financing. It then identifies a number of important impediments to the wider use of public equities for SMEs that need to be addressed, such as admission cost and listing requirements, lack of liquidity, educational gaps, limited ecosystems, and tax treatment, all of which require attention by regulators and policy makers alike.

An index of previous articles ("recent features") can be found at the end of this issue which we hope will again serve our readers with valuable information and analysis.

Comments and questions should be addressed to the Financial Affairs Division of the OECD Directorate for Financial and Enterprise Affairs (e-mail: fmt@oecd.org). Find out more about Financial Market Trends online at www.oecd.org/daf/fmt.

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Finance and climate: The transition to a low-carbon and climate-resilient economy from a financial sector perspective

by
Jean Boissinot, Doryane Huber *and* Gildas Lame*

Climate change is a major political and economic challenge. This paper sketches out its relevance for the financial sector. Necessary low-carbon investments imply a significant yet manageable financing gap. However, we argue that beyond capital mobilisation that has attracted most attention until now, the main challenge is ensuring a transition-consistent capital reallocation. The financial sector has a key role to play in that respect, complementary to appropriately designed climate policies. To help the financial system fulfil its role, the understanding of the economics of climate change should be deepened and a sector-wide business-oriented appropriation of these issues should be promoted.

JEL classification: Q54, E10, E44, G12, G14, G21, G22, G23, G28.

Keywords: Climate change, low carbon, climate finance, green finance, investment, capital allocation, financial system, risks

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I. Introduction and overview

The 2010 Cancun Conference established a long-term objective in combating climate change: to limit the increase in global average temperature to 2°C. The achievement of such an objective represents a "macroeconomic" challenge: global GDP has increased by a factor of 100 since the beginning of the industrial era, resulting in a 20-fold rise in annual CO_2 emissions and a relentless increase in CO_2 concentrations in the atmosphere. The necessary reduction of emissions will require fundamental changes in the global economy to combine a strong growth path with a sustained reduction in emissions and built-in resiliency to the potential adverse consequences of climate change. The transition to a low-carbon and climate-resilient economy (which we would hereafter refer to as the "low-carbon transition" even though this transition encompasses more dimensions) is now a major challenge at the global level.

A transformation of this kind entails significant dedicated investments in the coming years. The amounts involved and the specific characteristics of certain investments require both the public and private sectors to be brought into play. Currently, however, investment both in the developed and the developing countries (and its financing) is still biased towards high carbon and insufficiently resilient to the consequences of climate change while investments dedicated to a shift in the energy production mix and low-carbon technologies remain insufficient and the respective role of public and private financing is poorly understood.

Building on these observations, expectations regarding "climate finance" and the financing of the transition toward a low-carbon climate-resilient economy are high but often remain confused. As a recognition of the new focus on finance, major recent reports (IPCC, 2014c; NCE, 2014) included a chapter dedicated to the contribution of finance to climate change mitigation while the United Nations Environment Programme (UNEP) initiated an "Inquiry into the Design of a Sustainable Financial System" (UNEP Inquiry, 2015, 2014) and high-level events gathering practitioners and policy makers (e.g. UN Climate Summit held in New York in September 2014 or the Climate Finance Day in Paris in May 2015) made the issue very visible.

Trying to bring the various contributions into perspective, this article sets out a typology of the (financial) challenges related to climate change before focusing more specifically on the financing of the transition to a low-carbon economy and the implications of the consensus emerging around the need to achieve a different investment pattern. Taking stock of the double imperative to mobilise capital for the transition and achieve a climate-consistent capital reallocation, it seeks to sketch out a policy agenda that exploits the possible complementarity between finance and climate policies. In the financial sector as in many other parts of the economy, aligning policies is probably the single most important challenge to contribute to effectively addressing climate change.

II. What is climate finance?

In its broadest definition, the concept of "climate finance" refers to financial flows expected to contribute to the reduction of emissions and to the adaptation to current climate variability as well as future climate change, encompassing private and public funds domestic and international flows (IPCC, 2014c, p. 106). The discussion can also refer to the concepts of incremental investment (additional capital expenditure – capex – required for embedding a mitigation and/or adaptation dimension in a project), incremental cost (cost of capital of the incremental investment and any additional (net) operating costs) which should not be confused with the macroeconomic cost of mitigation. In some contexts, for example, the discussions under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC), climate finance refers more specifically to financial flows to developing countries (typically, public flows specifically pledged for a mitigation or adaptation purpose and associated private flows). Overall, climate finance brings together a number of very different issues (private financing, public intervention, North-South financing, etc.) and covers three distinct objectives: mitigation, adaptation, coverage of losses and damage.

The three dimensions of climate finance

The financing of mitigation (i.e. limiting greenhouse gas emissions into the atmosphere) typically covers financing the means of producing decarbonised energy, improving building energy efficiency, etc. Mitigation basically covers energy transition (90% of carbon emissions come from energy, compared to 10% from processes, such as cement manufacture), and the issues surrounding its financing are therefore closely linked.

While it is increasingly unlikely that all adverse climate change will be prevented (IPCC, 2014a, b, d), economies must be adapted to make them resilient to its consequences: higher sea levels, more frequent or more intense natural disasters, more serious droughts, etc. As adaptation is essentially an incremental layer, adaptation financing must, i.a., be distinguished from the more comprehensive financing of a country's infrastructure and other public and private investments. For example, rather than the financing of a transport infrastructure in its entirety, it entails implementing and funding the additional costs associated with facilities to prevent damages in future flood-prone areas.[1]

Finally, loss and damage financing covers demands from the most vulnerable countries to cover the irreversible losses they may suffer due to the consequences of climate change, and the corresponding financial instruments may take various forms.[2]

Distinguishing between global aspects and domestic financing issues

Beyond these three dimensions, a clear distinction must be drawn between global climate financing which is the subject of negotiations within the UNFCCC and the more general issue of financing the energy transition and the adaptation of economies, which is a more domestic challenge.

Since the 1994 Climate Convention (Articles 4.3 and 4.4), which referred for the first time to global climate financing by the developed countries,[3] the three above-mentioned dimensions have been gradually acknowledged in the context of the negotiations: while initially focused on mitigation, adaptation (with the introduction of a dedicated committee in 2010), and more recently loss and damage (recognised at the 2013 Warsaw Conference with the creation of a dedicated mechanism) were progressively included in the scope of the

negotiation. Global climate financing, which primarily refers to financial flows from developed countries to developing countries and entails significant geo(political) aspects, is one of the important challenges of the UNFCCC negotiations (the next one to be concluded at the COP21 in Paris in late 2015[4]). Often embodied in the commitment made in Copenhagen to mobilise USD 100 billion per year by 2020 for the benefit of developing countries – which has been more recently assessed by the OECD (2015c) and found to be close to USD 60 billion in 2013-14 – it includes significant and complex redistribution challenges.

On the contrary, the financing of the transformation of economies is primarily a domestic matter. At world level, IPCC (2014c) estimates that the financial flows dedicated to mitigation and adaptation stood at around USD 345-385 billion annually between 2010 and 2012. From a global perspective, close to three-quarters of these capital flows remain in the country of origin, a percentage that rises to 90% for private flows (Buchner et al., 2011). In an economy such as Germany's, these flows, which bring together both private capital and public finance, represented almost EUR 37 billion or about 1.5% of GDP in 2010 (Juergens et al., 2012) and around EUR 22 billion (about 1.1% of GDP) in France in 2011 (Morel et al., 2014). While most of the time, this financing is not explicitly identified as climate finance activity but part of the daily activity of the financial sector as a whole, it certainly needs to expand and further develop (Knight and Chan, 2014).

III. More investments or different investments?[5]

The macroeconomics of energy transition points toward the need to redirect investments

Assessing the amount of finance required to achieve the objective of limiting warming to less than 1,5°C or 2°C compared to the pre-industrial era remains difficult. A macroeconomic assessment of transition-linked challenges is an essential prerequisite.

A few years ago, the measurement of the opportunity cost of inaction was at the centre of an important controversy. Stern (2006) advocated immediate action which, he argued, would be less costly than inaction and that should be understood as the best insurance against hysteresis in climate behaviour if the increase in temperatures exceeds the +2°C threshold. By contrast, emphasising the costs for present generations brought about by excessively voluntary action, while the benefits accrue to supposedly better-off future generations who will be better equipped technologically to address climate change, Nordhaus (2006) supported gradual action.

This controversy now appears to be largely outdated if not irrelevant. Firstly, the debate has been clarified as to the nature of different views on the consideration of a particularly lengthy time period, the nature of the risks and the role of uncertainty (see, for example, Gollier, 2006[6]). Secondly, while the assessment of the macroeconomic impacts of climate change is still far from perfect, such uncertainty does not justify inaction (Pindyck, 2013; Gollier, 2014) and evidence of the cost of delayed action are compelling (Furman et al., 2015). Finally, policies aiming at the development of the technologies that would allow a transition to a more carbon-neutral economy are pivotal (see Acemoglu et al., 2015, for an analysis of the shift to clean technologies and King et al., 2015, for an appeal to increase R&D efforts toward clean technologies) but the relative cost of these technologies is already no longer systematically unfavourable (NCE, 2014, 2015). Overall, even if the costs of a voluntary transformation of our economies allowing a significant reduction in emissions should not be disregarded and the conditions in which benefits

(other than environmental ones) are likely to materialise should not be taken for granted (Ouvrard, 2015), the analysis suggests that action can and should be undertaken now.

More generally, the macroeconomic analysis of the transition points toward the need for a redirection of investments (with investments consistent with the transition replacing investments made irrelevant) rather than additional investments (with investments needed for transition coming in addition to those implied in the "no transition" baseline scenario).

The process of redirecting investment implies a significant but manageable financing gap

If primarily based on redirecting investments, the development of a low-carbon economy will only marginally require additional capital. Indeed, available evidence suggest that the need for additional investment remains limited in view of the renewal of investments scheduled for the coming years.

For example, considering necessary investments in infrastructure, land and energy management representing USD 89 trillion from 2015 to 2030 or USD 6 trillion/year,[7] NCE (2014) estimates that a 5% increase (representing USD 4.1 trillion, i.e. USD 300 bn/year) would be enough to "decarbonise" and adapt these investments. This corresponds to a net increase taking into account the additional investment costs in the energy efficiency of buildings, industry or transport, or in low-carbon technologies for power generation, as well as reduced capex from fossil fuels[8] or from better designed and more compact cities as taking climate change into account would also require to redirect some investment away from projects that would be undertaken according to a business-as-usual model.

Assuming that USD 300 bn/year of net increase in capex required to limit climate warming to 2°C provides a ballpark estimate of the need for additional capital, this order of magnitude, while clearly significant, realistically appears within reach.[9]

IV. Mobilising capital for the transition and achieving a climate-consistent capital reallocation

Financing the transition requires both mobilising some additional capital, including through achieving an effective cooperation between private financing and public intervention, and ensuring that, overall, capital is allocated in a manner that is consistent with the low-carbon transition

The direct financing of the specific investments required for the low-carbon transition, private finance and public intervention

Currently, climate finance focuses mostly on the direct financing of infrastructure, innovations or projects aimed at lower-carbon and more energy-efficient economies. Financing these investments comes up against three main difficulties.

Firstly, they are often long-term investments, i.e. investments whose cash flows typically imply a break-even horizon of 10-15 years or more. For that reason, there may be a number of difficulties with the financing of these investments (see Boissinot and Waysand, 2012, or FSB, 2013, 2014, for an analysis of these potential difficulties).

Secondly, while there is a clear socio-economic case for these investments, their profitability to the private sector is often less clear-cut, as they do not generate enough of a cash flow back to investors and public intervention is often needed to monetise positive externalities (reduction in emissions but also, for example, improvements to public health in the case of a water management programme).

Finally, these investments often have to be made against a background of (real or perceived) high risks and major uncertainty. These risks may arise for a number of reasons: underlying technology choices may end up not being the right ones, legal and regulatory environments may change, the relevant markets may fail to develop as expected, and the speed of climate change as well as that of the global policy response remain uncertain, etc. These effects are exacerbated by the fact that, the further away the breakeven horizon of the investment is, or the more volatile the situation is perceived to be, the harder it is to evaluate the risks associated with it and the higher the minimum required return on investment will be.

Climate-related projects often embody a combination of all these characteristics (uncertain financial return due to the length of the project, limited experience with the technologies employed, fluctuations in energy and commodity prices, etc.). Consequently, the risk-return profile of these projects may appear relatively unfavourable, and their appeal from the point of view of a private sponsor/financier may be limited (however, it is important to note that climate-related projects are not systematically handicapped by these difficulties).

Focusing on the need to invest for the transition (in a broad sense: from innovation to infrastructure) and looking at the financing of these investments, policy recommendations revolve around the mobilisation of private capital. Looking at how to better attract the financing capacity of financial entities such as institutional investors, such recommendations have emphasised:

- the need for efficient investment frameworks, especially the importance of the efficiency of the contractual framework as well as that of regulatory stability (in its various dimensions: tax, environmental regulation, prudential regulation, etc.);
- the need for providing the private sector with clear and credible orientations/strategic commitments (hence the key role of policies such as the pricing of carbon or wider reforms of national energy policies, including the phasing out the implicit subsidies to fossil fuel oriented technologies);[10]
- the potential role of additional policy interventions targeting the financing of low-carbon investments and further adjusting their relative risk-return profile (through policies decreasing the risk and/or increasing the return of low-carbon investments);
- possibly, the need to accompany the development of dedicated financial instruments through ensuring that an adequate framework can robustly support such developments.

This approach emphasises the strengthening of the legal and regulatory framework, the business climate[11] and, more generally4, the clarity, predictability and sustainability of governments' policy regarding their medium- and long-term commitment to cutting greenhouse gas emissions[12] as prerequisites for effective investment (see OECD, 2015a, 2014 and 2013, for a specific dimension of the mobilisation of institutional investors in sustainable energy financing).

In addition, it insists on the importance of ensuring the consistency of public policies within the low-carbon transition (OECD, 2015b) and on the role of climate policies (both economy-wide policies such as putting a price on carbon, and more targeted interventions) that can make the transition to related investments more attractive by "monetising" positive externalities associated with reductions of greenhouse gas emissions which, in the absence of policy signals (standards, introduction of taxes or emission trading schemes, etc.) have no commercial value.[13] Whilst public interventions, in the form of

taxes, cap-and-trade schemes, subsidies or standards (for a discussion of possible interventions and their relative efficacies, see for example McKibbin and Wilcoxen, 2002, or Aldy et al., 2010) are not a prerequisite for the realisation of certain investments, it certainly is essential to the comprehensive and overall management of the transition to a low-carbon economy and will impact the way it is financed. The efficiency and cost effectiveness of these public interventions should be a key objective and when a public intervention plays a direct role in the funding arrangements, its role should remain limited (covering investments that have a demonstrated positive socio-economic evaluation but will not generate a profit under existing market conditions) and its design may be (partly) determined by its interaction with the financing of the investment.

Finally, financial innovation may play a useful role. "Green bonds"[14] have been a prime example of rapidly expanding instruments that could mobilise capital toward financing low-carbon investments. These instruments, aimed at raising money on the bond market for activities with a demonstrated positive impact on the environment and climate, are essentially a disintermediated solution for financing or refinancing "green investments", and the only difference between them and a "traditional" bond is that investors are given comfort about the "greenness" of the underlying assets with a framework designed to provide assurance on this.[15] Other "green" financial innovations include the development of dedicated infrastructure funds, venture capital dedicated to "green techs", "green securitisation", etc.

The development of green financing instruments may contribute to a "ratchet effect" in the allocation of capital to activities related to energy transition. This may happen directly as capital raised through such instruments cannot be reallocated to "non green" projects and, to some extent indirectly through the possible negative signalling effect of companies decreasing their reliance on green financing instruments and/or changing investor preferences that are less willing to invest in "non-green" projects. If they become significant enough (i.e. develop in a market of a scale comparable to those of "non green" instruments, which is not currently the case), these developments may eventually influence the financing terms to the disadvantage of companies which cannot meet investors' changed preferences and/or cannot provide assurances about the "greenness" of their projects. The development of green financing instruments can be supported by a strengthening of market standards such as the Green Bond Principles (ICMA, 2015) especially regarding the standardisation of the rules on project eligibility and the monitoring of the use of proceeds. More generally, this also relates to the gradual emergence of a new standard which reflects the greater insistence of investors on the integration not only of climate-related issues in capital allocation but also, more generally, those related to environmental, social, and corporate governance (ESG).

But green bonds are just one among many financing vehicles (equity, "traditional" bonds, bank loans, etc.) meeting a range of needs and it is worth noting that some may be dedicated (private equity funds specialising in green techs, infrastructure funds with an emphasis on energy transition, etc.) while others need not be.

Beyond financing the low-carbon transition, the financial sector should contribute to climate-consistent capital reallocation

While the analysis suggests that the main challenge of the low-carbon transition relates to capital reallocation, the contribution of the financial sector to the transition

should extend beyond the direct financing of transition-specific investments. However, this capital reallocation dimension is currently underappreciated.

First, the risk-return handicap faced by low-carbon investment could be directly addressed by public intervention but correction may also seek to adjust the (current perception of the) relative risk-return profile of low-carbon projects vs. high-carbon projects – more generally, of climate-consistent projects vs. projects that would be ill conceived once climate-related trends are effectively factored in. Indeed, even though climate-related risks start to be recognised, they currently appear mispriced. These risks are multifaceted but could be broadly distinguished as the risks directly related to the consequences of climate change and the risks associated with the future implementation or strengthening of climate policies. The former are "climate risks" ranging from the impact on natural disasters, resources availability to potential geopolitical developments. The latter are "transition risks" or "carbon risks" typically changing the economics of activities or assets, leading to potentially "stranded assets", e.g. assets representing reserves of fossil fuels which will be unburnable because of binding requirements to limit greenhouse gas emissions (see CTI, 2013; Caldecott et al., 2014a, b; and Caldecott and Rook, 2015).[16]

In addition, the transition is not limited to investments in physical or tangible assets that reduce carbon emissions (such as the infrastructures, innovations or projects discussed previously). It requires a more comprehensive and granular transformation. It also requires adjustments ("climate-proofing") in non-specific investments (for example, taking into account energy performance when considering the upgrading of a production line). Taking into account climate-related developments in a more pervasive manner in financing decisions would contribute to re-orienting investment decisions, consistently aligning them with the transition toward low-carbon and climate-resilient economy.

Overall, when assessing risk, there seems to be a greater emphasis on the cost of adaptation or, in the case of low-carbon investments, on their specific risks, rather than on the "climate risks" and "carbon risks". This lack of symmetry in risk assessment leads to a "carbon bias" and results in an allocation of capital which is probably ineffective in the medium to long term.

V. Leveraging finance as a complement to climate policies

Going beyond the current policy agenda

While not misguided, the current policy agenda focused on the "visible side" of financing climate change mitigation (i.e. the mobilisation of capital for the financing of investments that are directly related to the transition) is insufficient. The capital allocation dimension of the low-carbon transition has to be properly considered in addition to ensuring the financing of transition related investments.

Moreover, the financial sector's fundamental functions (aggregating information and reaching out to virtually every part of the economy) could be instrumental in amplifying economic and policy signals throughout the economy and influencing behaviour so that the financial sector can play a complementary role to well-designed climate policies.[17] This complementarity could be direct (i.e. explicitly sought for) or indirect (i.e. a result of financial analysis and processes unrelated with concerns over climate change). In that respect, the effectiveness of good climate policies (notably, policies aiming at putting a price on carbon) can be enhanced by a financial sector that is able to factor in climate related issues – and the financial sector is increasingly calling for good policies to be

implemented in order to secure an orderly transition. In that respect, the earlier the financial sector is able to assist and address these issues, the greater its contribution to an efficient and orderly low-carbon transition will be.

Closing the knowledge gap…

To achieve this complementarity, furthering the understanding of the economics and finance implications of climate change is key. Some developments could be seen both from conceptual and practical perspectives. Conceptually, the (economic) analysis of climate change consequences or the impact of climate policies has made some progress.[18] In the meantime, the long-standing focus on corporate disclosure and reporting (financial and extra financial information) is increasingly trying to address environment-related information in order to assess environmental risks (the appropriation of climate-related issues sitting within the wider effort to integrate ESG factors into the financial system).

However, this effort has to strengthen further. The integration of the assessments of the IPCC reports (IPCC, 2013, 2014a, b, c, d) into the macro- and microeconomic analysis is still limited and the related financial analysis even more so – although various dimensions of these issues are being explored[19] – and the extent to which these risks are already priced in is highly uncertain.

If climate issues are to be included in financial analysis and their potential financial consequences better understood, it is very important that more information should be available from which the sensitivity of companies and projects to climate change and the carbon risk can be assessed by the financial intermediaries. The climate change sensitivity would comprise the impact of climate change on the underlying activities, e.g. the impact of rising temperatures on tourism[20] and on energy demand,[21] or more generally, the impact of temperature, availability of water, increase in adverse weather developments on the localisation of certain economic activities, etc. The carbon risk assessment would look at the sustainability of activities if measures to cut emissions are strengthened which will limit the production capability of and/or demand addressed to companies, especially for petrochemicals, oil industry suppliers, and the like. A clearer understanding of these risks would help to reduce them due to a more selective behaviour and better risk management on the part of financial intermediaries and investors.

… and promoting business-oriented appropriation to bridge the finance gap

Beyond closing the "knowledge gap", effective business appropriation has to follow. This broader approach should take account of the more structural issue of the long-term trends related to climate change (including risks and also opportunities) as well as encourage the financial sector to embrace the subject of climate change more broadly and assess its sensitivity and resilience to medium-term risks, something that might lead to changes in business conduct – e.g. prompting investors to withdraw or reduce their level of investment in certain sectors or seek certain protections. A degree of increased awareness is already apparent from the interest shown in responsible investment or the development of corporate social and environmental responsibility. But given the materiality of the issues in question, this approach requires an attitude which goes beyond mere *affectio societatis* or client driven changes (a worthwhile approach that nevertheless might not be sustained over time) but properly and thoughtfully factors these issues into (strategic as well as day-to-day) business decisions.

Such appropriation need to be specific: while relevant for every part of the financial system, climate change would not mean the same for every actor and the different actors would have to consider climate change factors with respect to their own perspective. These considerations and the strategies required also depend very much on the nature of the financial institution: banks, insurance companies, pension funds asset managers or private equity firms will not have the same risks to assess in respect of their activity,[22] nor will the implications for their operations be the same.

Some real progress regarding this appropriation is already discernable and financial innovation can help financial institutions to take action. This exercise is already being conducted by some institutional investors and asset managers who are currently developing low-carbon investment strategies (see for example Andersson, Bolton and Samama, 2014). These strategies enable investor to maintain an overall market exposure (hence a performance close to a benchmark index) while limiting their exposure to companies that are most affected to climate related risks. In effect, they aim to allow investors to capture a "free option on carbon" that exists if the market does not currently price in carbon risks. Until such time as the world economy has a sufficiently strong carbon policy, this green index performs in line with the benchmark index, but is bound to significantly over-perform as and when the policy signal becomes stronger. Other strategies may be developed such as the development of an active shareholder engagement on climate related issues[23] and other selective divestment decisions (see for example the announcements by Norway's Government Pension Fund Global, and other institutional investors which have joined the Portfolio Decarbonisation Coalition).[24]

For the banking sector, the key issue is to incorporate climate-related risks into the process of credit risk analysis. By way of example, retail banking needs to analyse better the consequences of how predictable energy price rises will affect the solvency of a household taking out a mortgage and the implications of those rises for the energy efficiency of the property financed (energy spending) or its location (transport costs). In corporate and investment banking, the issue is rather to make this analysis a routine part of credit decisions (especially in project finance and corporate finance).

For the insurance sector, there are implications both for liabilities (risks underwritten) and assets (financial portfolio management). The latter is similar to the challenges faced by institutional investors. The underwriting of risks includes, for example, the pricing of insurance policies in the context of an increase in the frequency and impact of adverse weather developments or outright natural disasters or joint work with public authorities which may require prior implementation of a strategy for adaptation and resilience to the consequences of climate change later being recognised in premia. In that respect, the involvement of insurers in the design of natural disaster resilient cities[25] is an actual example of the direct complementarity finance and climate policies could achieve.

Developing a comprehensive policy agenda

A distinction could be made between the objective of financing the transition-related investments ("direct approach") and the broader objective to capitalise on the (direct and indirect) complementarity between well designed climate policies and the financial sector functions ("fundamental approach").

While the "direct approach" has led to the design of a consistent group of policies, the comprehensive development of the "fundamental approach" is still a challenge. Public

authorities (notably those responsible for financial stability) are beginning to develop policies aiming at exploiting or enhancing the complementarity between finance and climate policies.

In 2014, following a voluntary Green Protocol from the banking sector and considerable dialogue, the Brazilian banking supervisor introduced requirements for all banks to have environmental and social risk management systems in place. It has also asked banks to monitor environmental losses as part of the Internal Review for Capital Adequacy (ICAAP).

Since 2013, the Bank of England (BoE) has begun work on analysing the implications of climate change-related risks for financial stability and the changes needed in the financial sector. The Prudential Regulation Authority (PRA, the supervisory authority which is part of the BoE) recently published a report (Bank of England, 2015) the implications of climate change for the insurance sector[26] while the BoE is developing a wider research agenda on climate change and financial stability (analysis of the risks steaming from "stranded assets" and of climate change as a medium to long-term trend).

Following the recommendations of the Green Financial Task Force (2015), Chinese authorities are considering the introduction of a specific responsibility of banks ("lender liability") regarding effective due diligences on borrowers' compliance with environmental regulations in China. Rather than "greening" its rules, China appears to be leveraging on the financing process to ensure compliance with environmental legislation.

Following some initial work (see the 2013 report on financing the low-carbon transition, DG Trésor and CGDD, 2013), French authorities have, as part of the Energy Transition Act (2015), introduced mandatory reporting by non-financial and financial corporates (essentially, listed firms) on climate related risks as well as a specific reporting on climate risk assessment by institutional investors, and they are developing stress tests aiming at assessing the implications of climate change for the financial sector.

These efforts (see UNEP Inquiry, 2015a, 2015b, for a more comprehensive review of public initiatives) are likely to become more global as the G20 mandated the FSB to "review how the financial sector can take account of climate-related issues".[27] It will be able to build on parts that are already considered (disclosure, risk assessment, stress testing, etc.) but further work (by academics, financial analysts, financiers and policy makers) is still critically needed to make the most of the capital allocation function of the financial system and maximise the contribution of finance to the low-carbon transition.

Notes

1. Adaptation is often more efficiently (including in terms of cost effectiveness) delivered when this dimension has been embedded early in the design of the project. As such, it may be difficult to properly identify this additional cost.
2. The insurance approach (generally dependent on risk reduction measures, particularly against droughts in Africa or storms in the Caribbean) is appropriate for some risks (severe random events). The classic insurance approach is no longer appropriate for slow onset but certain events (such as rising sea levels). It no longer responds to the two characteristics of insurance: the unpredictability of an event and the ability to spread risk over time and regions (Balogun, 2013). These events could be covered by innovative tools based on the principle of life insurance rather than property and casualty insurance. In both cases, this entails accumulating capital over the long term to address a certain event, possibly while taking measures to postpone it or keep it at bay. Many practical problems still arise, including awareness-raising, the interests of the population and financing capacity, but the Warsaw Loss and Damage Mechanism provides a

framework for addressing these issues. For events with the most radical consequences (e.g. submersion of an island), the difficulties will be complex and closer to compensation for indigenous peoples in the USA or Australia than to insurance provision against a storm. The experience of these countries has allowed a number of "reparation" solutions to be tested and has shown that financial compensation mechanisms have generally not worked very well, except where comprehensive guidance was provided (social, cultural, etc.).

3. In this context, developed countries are called Annex II countries, most of them members of the OECD at the time of the 1992 UN Framework Convention on Climate Change.

4. COP21 refers to the "21st Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change" that France will be hosting and presiding in Paris from 30 November to 11 December 2015; see *www.cop21.gouv.fr*.

5. The remainder of this paper focuses on the financing of the energy transition in OECD economies.

6. One of the sources of the most significant variations in assessments of costs and damage at the centre of this controversy arises from the discount rate adopted in cost-benefit analyses, with Nordhaus (2006) accusing Stern (2006) of using an arbitrarily low discount rate (giving relatively greater weight to the future) to justify voluntary emission reduction policies. Subsequent work has clarified our understanding of the different factors and effects that must be taken into account.

7. Including taking into account the increase in the population and the proportion of the middle classes in the world population. This increase in the proportion (and therefore the volume) of the middle classes in the world leads to an increase in the need for infrastructure, energy, etc.

8. By way of illustration, CTI (2013) estimates, for example, that a substantial part of the USD 650-700 bn in annual investment in finding and developing new fossil fuel production capacity may not be compatible with the objective in terms a reducing emissions and limiting warming to 2°C. See below the discussion on "stranded assets".

9. To put into perspective the need for an additional USD 300 bn/year, it could be noted that, while it eventually proved unsustainable, loan origination in the US subprime mortgage market went from about USD 100 bn in 2000 to more than USD 600 bn in 2006.

10. Investments unlikely to reduce greenhouse gas emissions are currently benefiting from explicit or implicit subsidies which distort prices and significantly slow down the energy transition in both the developed and developing world. IEA (2014) estimates that subsidies to fossil-based energy totalled USD 550 bn in 2013 worldwide, compared with subsidies to renewable energy of about USD 100 bn (King et al., 2015).

11. An illustration of the importance of the "investment environment" can be found in the latest data reported by Buchner et al. (2014), which show that the overwhelming majority of private finance flows are invested in their country of origin. In addition to the fact that that these investors may prefer to fund projects in their own country or may be wary of exchange risks, this probably reflects in part a lack of familiarity with foreign systems of legal or regulatory control. Taking just the system of subsidised tariffs for renewable forms of energy, one can see how hard it must be for an investor to keep track of the many changes occurring in most countries which have adopted such tariffs in recent years.

12. In the EU, national commitments to cutting greenhouse gas emissions will derive from the European undertakings adopted by the European Union following agreement in the European Council on 23 October 2014. And at international level, one aspiration of the Paris Conference (COP21) is to demonstrate the international community's willingness to commit to the long-term reduction of carbon use.

13. The "monetisation" of positive externalities could also come through valuing induced savings in use of resources at operating/downstream stages (some of these resources are tradable – water, energy, etc. – so the profits made by using less of them can be captured although such capture could be tricky as savings could be realised by others).

14. Buhr (2013, 2014) and Robins et al. (2014) provide some background on green bonds. For an up-to-date description of the market, see CBI (2015).

15. For companies or institutions which already hold such "green" capital given the nature of their activity and/or their internal traceability system, green bonds are, in fact, part of their existing capital-raising exercise. Consequently, it is impossible to know whether the rapid growth of the green bond market reflects an overall growth in climate financing or whether it works essentially by revealing projects with specific characteristics.

16. In addition to work on stranded assets, other works seek to add new dimensions to risk analysis (see Buhr, 2014, for example), assessing the existence of neglected risks deriving from the insufficient adaptation (*maladaptation*) of investments to climate change (Serkine, 2015) or highlighting how (some of) these risks are already (partially) priced in for certain assets (Mauroux, 2015).
17. Given the potential of finance to influence non-financial behaviour, one may think that financial sector policies could be a substitute to insufficient climate policies. However, such an approach would imply a trade-off between sound financial decisions from financial actors (and possibly non-financial actors as well) which are a prerequisite for financial stability and policy-induced decisions which could eventually be proven unsustainable as they are not grounded on robust fundamentals.
18. Llewellyn (2007) may be a seminal piece of analysis in this field. For recent examples, see WB (2012, 2013, 2014) or RBP (2014) for an analysis of 'climate risks' (i.e. the economic impacts of climate change) and CTI (2011, 2013), or Caldecott et al. (2014a,b) and Caldecott and Rook (2015) on "carbon risk" and "stranded assets" (i.e. for an analysis of the impact of climate policies).
19. See for example Standard & Poor's (2014) Mercer (2015) for a general approach and CTI (2014a, 2014b, 2015) for a closer examination of the financial implications of "carbon risks".
20. See for example a switch of visitor flows potentially affecting the hotel industry.
21. Energy demand may become lower in winter in some zones but higher in summer.
22. In terms of risks, banks would have a (often medium term) credit driven exposure to long-term trends, while institutional investors and assets managers would have to factor in these trends in their asset allocation decisions, and insurers could be affected on their asset side but also on their liability side through the risks they are underwriting.
23. See for example Stausboll (2015), Summers (2015).
24. The Portfolio Decarbonization Coalition was launched at the 2014 UN Climate Summit. It brings together institutional investors other and stakeholders to promote actions towards reducing the induced carbon-intensity of their investments and portfolios.
25. See UNEP FI (2014).
26. Following publication of the UK Climate Change Act 2008, the Department for Environment, Food and Rural Affairs (DEFRA) may ask any "reporting authority" to provide information on its strategy for adapting to climate change, though authorities are not obliged to do so. In late 2013, DEFRA invited the supervisory authority (PRA) to submit a "Climate Change Adaptation Report". The PRA accepted and decided to focus primarily on insurers.
27. Communiqué, G20 Finance Ministers and Central Bank Governors Meeting, Washington, DC, USA, 16-17 April 2015; available at *https://g20.org/wp-content/uploads/2015/04/April-G20-FMCBG-Communique-Final.pdf*,

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Financial instruments for managing disaster risks related to climate change

by
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This article provides an overview of the potential implications of climate change for the financial management of disaster risks. It outlines the contribution of insurance to reducing the economic disruption of disaster events and policy approaches to supporting the penetration of disaster insurance coverage and the capacity of insurance markets to absorb disaster risks, including through the use of capital markets instruments and international co-operation in risk pooling. It concludes with a number of recommendations for improving the financial management of disaster risks in the context of climate change and some areas of further work.

JEL classification: G22, G23, H84, Q54

Keywords: Climate change, natural disasters, extreme events, insurance, reinsurance, catastrophe bonds

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I. Introduction

Among the key implications of climate change is its expected impact on the severity and frequency of (extreme) disaster events. Even if a strong agreement on the mitigation of climate change through reductions in greenhouse gas emissions is achieved, adaptation to the impacts of climate change and the loss and damages resulting from climate change-related extreme events will be a critical element of the international response and "the only response available for the impacts that will occur over the next several decades before mitigation measures can have an effect" (Stern Review, 2006).

Disasters present a broad range of human, social, financial, economic and environmental impacts, with potentially long-lasting, multi-generational effects. The financial management of these impacts is a key challenge for individuals and governments in developed and developing countries. Risk transfer tools such as (re)insurance and capital markets instruments (catastrophe bonds), provide financial protection to households, businesses and governments affected by disasters by providing a means to manage the financial losses and supporting recovery and reconstruction.

The potential role of risk transfer tools in supporting adaptation to climate impacts and addressing loss and damage from climate change-related extreme events has been recognised as part of an eventual international climate change agreement.[1] This paper provides an overview of the implications of climate change for the financial management of disaster risks. It also includes a number of considerations for governments wishing to support the contribution of global insurance and capital markets to managing the impacts of extreme events, such as:

- The impact of climate change on the availability and affordability of private insurance coverage of disaster risks and the potential benefits of measures to encourage coverage by private insurance markets.
- The capacity of reinsurance markets to provide coverage for climate-change related losses and the role of alternative reinsurance and capital markets instruments in supporting market capacity.
- The benefits of international co-operation in addressing the potential impacts of climate change.

The paper concludes with options for possible future work on this topic.

II. The impact of climate change on disaster risks

Current projections of how climate change will impact the nature of extreme events are subject to considerable uncertainty due to the complexity of the global climate system. However, some general trends are apparent. Climate change and the resulting higher atmospheric humidity are likely to increase the frequency and severity of extreme events, including heat waves, tropical and extra tropical cyclones, tornados, hailstorms, floods and storm surges. As global temperatures increase, so does the likelihood that the world will encounter "severe, pervasive and irreversible" impacts from climate change (IPCC, 2014).

In their special report on *Managing the risks of extreme events and disasters to advance climate change adaptation* (2012),[2] the Inter-Governmental Panel on Climate Change found evidence of a number of likely impacts of climate change on the nature of extreme events (subject to significant regional variation), including that:

- The frequency of heavy precipitation or the proportion of total rainfall from heavy falls will likely increase over many areas of the globe.
- Average tropical cyclone maximum wind speed will likely increase in some ocean basins.
- There may be a projected poleward shift of extratropical storm tracks.
- Mean sea level rise will very likely contribute to upward trends in extreme coastal high water levels.
- Changes in heat waves, glacial retreat, and/or permafrost degradation will affect high mountain phenomena such as slope instabilities, movements of mass, and glacial lake outburst floods.

There is also some evidence that the intensity of tornadoes may increase as a result climate change (Elsner, Elsner and Jagger, 2015) and that hotter temperatures and drought may be increasing the frequency and size of wildfires in the United States (Dennison et al., 2014).

An increase in the frequency and severity of extreme events, combined with an increasing concentration of people and assets in vulnerable locations (such as coastal areas) is likely to result in more extensive economic, social and environmental impacts from extreme events. There is already significant evidence of an increase in the frequency and severity of natural disasters[3] as well as changes in the geographical range of certain types of extreme events.[4] Between 1980 and 2011, the number of weather-related loss events increased 500% in North America, 400% in Asia, 250% in Africa, 200% in Europe and 150% in South America (Munich Re, 2012)[5] (see Box 1).

Box 1. **The impact of climate change on losses from extreme events**

A number of studies have attempted to calculate the possible impacts of climate change on disaster losses for different regions of the world based on specific climate change scenarios. For example, the Inter-Governmental Panel on Climate Change's A2 climate change scenario of a 0.37 m sea-level rise in the North Sea could lead to an increase in average annual expected losses from EUR 0.6 billion in 2009 to EUR 2.6 billion in 2100 from storms and sea surges in Northern European countries, with the increase ranging from 100% to 900% (depending on the country) (Swiss Re, 2009).

In the United Kingdom, the number of residential properties at high risk of flooding (1 in 75 years, which has generally been considered uninsurable in the United Kingdom) could increase from approximately 370 000 properties in 2012 to between 700 000 and 2.1 million properties in the 2080s, mostly as a result of climate change (with a portion of the increase related to a projected increase in assets in vulnerable regions) (Ramsbottom, Sayers and Panzeri, 2012).

In the United States, between USD 66 billion and USD 106 billion worth of existing coastal property will likely be below sea level nationwide by 2050, with USD 238 billion to USD 507 billion worth of property below sea level by 2100 (Risky Business, 2014). Based on a mid-range scenario for future sea level rise, two-thirds of communities studied along the East and Gulf coasts could see the frequency (number of days) of high-tide flooding increase by three times from current levels with a number of communities vulnerable to regular extensive flooding from high-tides alone (currently, extensive flooding usually only occurs as a result of storm surges) (Spanger-Siegfried, Fitzpatrick and Dahl, 2014).

III. Managing the financial impacts of disasters

Extreme disaster events can have severe financial and economic implications for governments, businesses and households through the direct damages they cause to buildings, equipment and infrastructure as well as through indirect consequences such as business interruption, loss of employment and output, and decreased tax revenues (not to mention the human suffering of those impacted by disaster events).[6] These impacts are particularly severe for developing counties, and the poorest households within those countries, due to their more limited capacity to manage climate risks.

The management of these impacts requires careful consideration of options for mitigating the impact of such events, such as measures to:

- reduce exposure (building codes and land-use planning, structural protection measures);
- enhance emergency preparedness to minimise disruption; and
- address financial impacts through the use of risk transfer tools.

The effective financial management of disaster risks will usually require a mix of these approaches tailored to countries' circumstances. In general, high-frequency/low-severity events can be most cost-effectively managed through risk reduction measures while low-frequency/high-severity events are usually more effectively managed through risk transfer (Linnerooth-Bayer and Hochrainer-Stigler, 2014).

Financial management tools provide timely funding for recovery and reconstruction and can reduce the economic disruption resulting from disaster events. Urbanisation and increasing property prices create additional risk exposure to disasters, and climate change may heighten those risks in the absence of adaptation being enhanced. Higher levels of insurance penetration reduce the impact of natural disasters on economic growth and government revenues, and provide governments with greater flexibility to provide fiscal stimulus in the aftermath of a disaster (see Box 2).

If properly designed, insurance can also contribute directly to reducing overall losses by encouraging risk reduction:

- Risk-based premiums for insurance coverage and premium discounts for effective risk reduction measures can provide incentives for reducing risks by offsetting the costs of risk reduction measures with lower future premiums for insurance coverage.[7]
- Risk reduction measures implemented by policyholders, such as elevating a building to protect against flood or installing storm shutters to protect against wind damage, can make an important contribution to reducing losses from extreme events in the context of climate change. For example, building a home on an elevated platform between 0.5 meters and 1.5 meters could reduce losses to between 10% and 80% below present-day levels even in the context of a sea-level rise that would otherwise increase 1-in-200 year losses by 20% (Lloyd's and RMS, 2008).

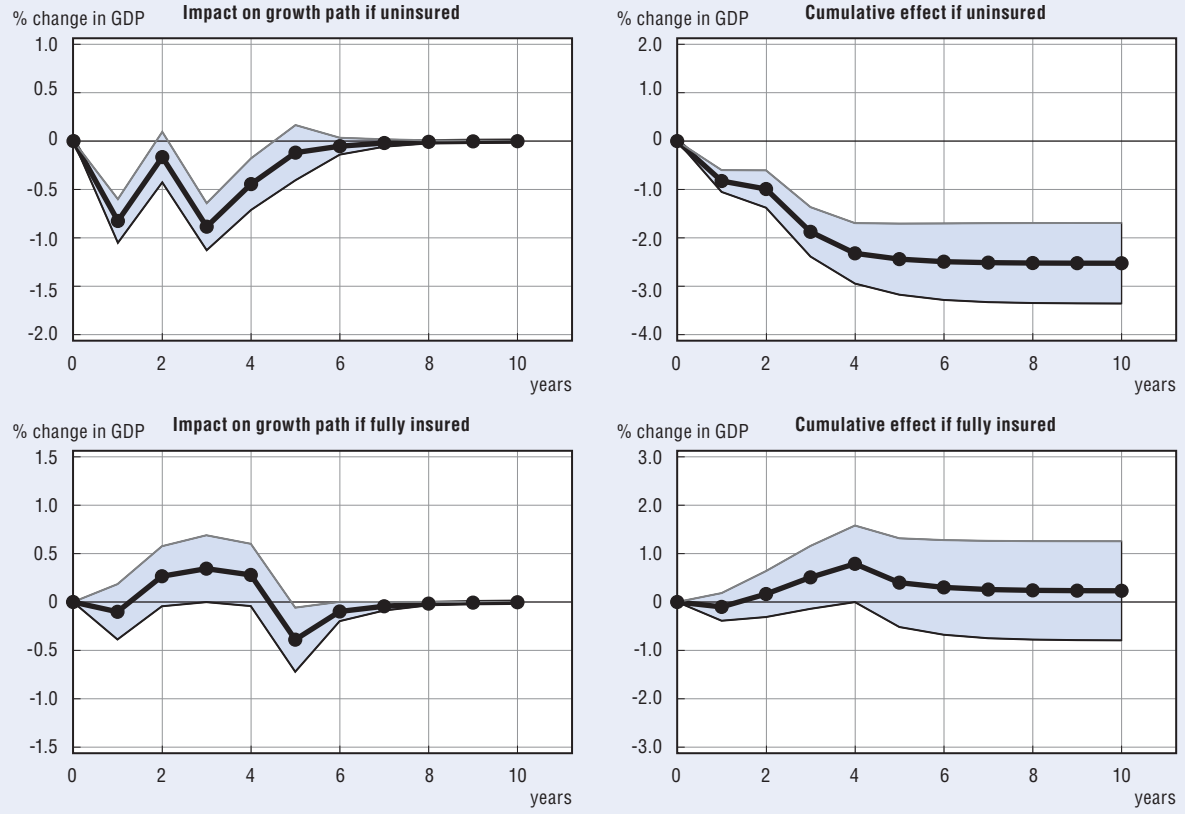
Despite the positive impact of insurance on mitigating the impact of disaster events, a significant "insurance gap" remains, particularly in developing countries, in terms of the share of the economic losses from disasters that are covered by insurance. Between 2005 and 2014, insurance covered approximately 51% of all losses in high-income countries but less than 10% of losses in developing countries (see Figure 2). Limited insurance coverage of disaster losses has the potential to create large fiscal exposures to disaster risks given the expectation that governments will compensate uninsured private losses, in addition to the substantial costs related to recovery and the restoration of public assets.

Box 2. **Insurance penetration and the economic impact of disasters**

A number of studies have been undertaken on the economic impact of natural disasters and the role of insurance in reducing that impact. Using data for high-and middle-income countries from 1975-2008, Melecky and Raddatz (2011) estimate the impact of geological, climatic, and other types of natural disasters on government expenditures and revenues. They found that countries with lower levels of insurance penetration faced larger declines in economic output and more considerable increases in fiscal deficits in response to disasters than countries with higher levels of insurance penetration.

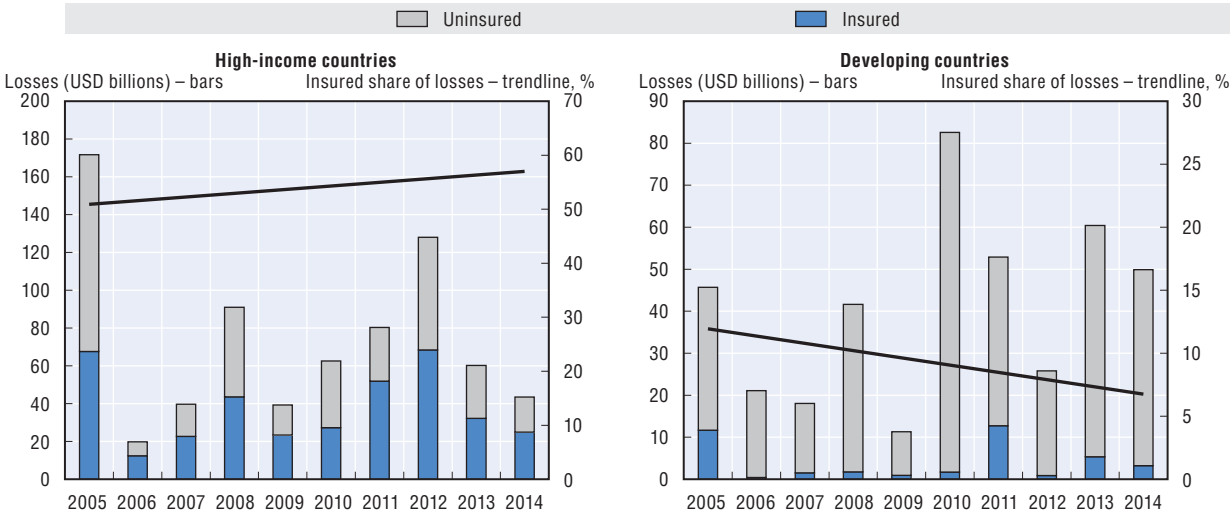
Similarly, von Peter, von Dahlen and Saxena (2012), using data on 2 476 major natural catastrophes in 203 countries between 1960 and 2011, estimate separately the impact of disaster-related losses with and without subsequent insurance pay out. They find that insured losses have no statistically significant impact on long-term output (i.e. GDP growth does not diverge significantly from its pre-disaster trend) while uninsured losses come with additional macroeconomic costs, amounting to a cumulative output cost over 10 years of 2.3% or more (Figure 1).

Figure 1. **The role of risk transfer**



Note: The left-side panels show the deviation of real economic growth from its trend due to a typical disaster event for an economy with no private insurance coverage and an economy with full insurance coverage. The right-side panels show the cumulative deviation of GDP from trend over 10 years for each type of economy.
Source: von Peter, von Dahlen and Saxena (2012).

Figure 2. **Insured and Uninsured Losses (USD billions)**



Note: Losses related to disasters that affected both high-income and developing countries were allocated to the income group where most of the losses occurred.

Source: OECD calculations based on insured losses and total damages reported for meteorological disasters (floods, storms, hail, cold/frost and droughts/fires/heat waves) in Swiss Re *sigma* annual reports on natural and man-made catastrophes (2006-14). The categorisation of countries between high-income and developing countries was undertaken based on the World Bank country classification (*http://data.worldbank.org/about/country-and-lending-groups*, accessed 31 March 2015).

An increase in the frequency and severity of disasters as a result of climate change, by reducing the insurability or affordability of insurance coverage, may exacerbate the insurance gap that hampers the ability of economies to recover from natural disasters. Private insurance for certain risks may become financially unviable as a result of a more frequent occurrence of – or more severe impact from – disaster events (see Box 3). This could potentially lead to the withdrawal of private insurers from the market or substantial increases in pricing.[8]

Box 3. **Impact of climate change on insurance affordability**

A number of studies have looked at the potential impact of climate change on the affordability of insurance for specific risks in hazard-prone regions of the world:

- Premiums for hurricane insurance in the US Atlantic basin, under a high-climate change scenario (a slight decline in the number of named storms in 2040 relative to 1990, although with an increase of almost 70% in the number of Category 4 or 5 storms) could increase by as much as 150% over 1990 levels (Kunreuther, Michel-Kerjan and Ranger, 2013).
- In the Netherlands, derived risk-based premiums may need to increase on average by 93% to 102% in 2040 and 641% to 797% in 2100 (depending on demographic assumptions) in some areas in response to a 2-3 times increase in estimated flood probability between 2015 and 2040, and a 16-20 times increase in estimated flood probability by 2100 (based on a set of sea-level and river discharge scenarios in the context of climate change (Aerts and Botzen, 2011)).
- In the United Kingdom, in the context of a global temperature rise of 4°C, the annual average insured flood loss due to increased precipitation-based inland flooding could increase by 30%, resulting in an increase to the inland flood component of insurance premiums of approximately 21% (AIR Worldwide and UK Met Office, 2009).

The developing world is generally viewed as the most vulnerable to climate change due to more limited levels of disaster resilience, lower coverage through insurance markets and less fiscal flexibility. An analysis by Standard & Poor's Rating Service estimates that the vulnerability to climate change is highest among low-rated sovereigns based on a higher proportion of the population living in low-lying coastal areas, greater dependence on agriculture in GDP, and higher levels of exposure and more limited capacity for adaptation. According to some estimates, emerging economies may face costs of up to 19% of GDP by 2030 under a high climate change scenario (Economics of Climate Adaptation Working Group, 2009).

IV. The contribution of financial instruments to the management of disaster risks

Encouraging disaster insurance coverage by private insurance markets

To address constraints to the availability and affordability of insurance coverage for disaster risks, public policy options to support coverage of disaster risks by private insurance markets require consideration. There is significant international experience in this regard as many countries have implemented measures to encourage disaster insurance demand, created public disaster (re)insurance facilities or have made targeted investments in disaster prevention with the aim of improving the insurability of disaster risks.

The *insurability* of risks depends on a number of factors, including: i) that a sufficiently large pool of risk can be created (mutuality); ii) that the expected loss burden can be quantified; iii) that the time at which the insured event occurs is not predictable (randomness); and iv) that the premium cost is sufficient to cover the expected losses from disaster events and is affordable to the community of affected policyholders (economic viability). Climate change has the potential to challenge a number of these factors by impeding the ability to assess exposure (see Box 4) and undermining the economic viability of insurance offerings due to higher and or more frequent losses as a result of extreme events.[9] Further, very slow-onset, foreseeable climate impacts, such as sea-level rise and desertification, are unlikely to be insurable given that they are not random and because they can affect whole regions (IIASA, 2009; Warner et al., 2009).

A key challenge to the viability of disaster insurance has been the establishment of a sufficiently large pool of policyholders with independently distributed probabilities of loss. In many countries, insurance for disaster risks (or certain types of disaster risks) is an optional add-on to other policies, which has generally led to limited take-up and significant underinsurance of these risks, even where the extra premium for disaster insurance coverage is affordable. Policyholders tend to underestimate the disaster risks they face, misunderstand exclusions from coverage of disaster risks or expect governments to provide financial assistance or compensation in the event of large-scale disaster. Some countries have addressed this lack of demand by choosing to make disaster insurance mandatory or requiring insurers to offer disaster coverage as a mandatory extension to property insurance policies (see Box 5).

However, this approach may not be politically feasible in all countries, leading some countries to use other approaches (see Box 6).

Box 4. **Assessing climate change risks for insurance**

The calculation of expected losses from extreme events is undertaken based on sophisticated catastrophe models that use the characteristics of historical and simulated events to calculate various estimates of possible losses for a given portfolio of insured assets based on location and structural characteristics (or insured losses by including the terms and conditions of the insurance policies covering those assets).

The historical occurrence of extreme events plays a fundamental role in the development of catastrophe models, and opens these models to the risk that the predictive capacity of historical events may decline in the context of climate change. A number of the major catastrophe modelling firms have made important adaptations to their models to address this risk (for exemple, allowing users to choose between a standard long-term catalogue and another long-term catalogue that considers elevated sea-surface temperatures which impact the nature of tropical cyclones); however a significant level of uncertainty remains, particularly as a result of the potential for interaction among impacts and feedback effects that are not well-understood (Kunreuther and Michel-Kerjan, 2007; Kunreuther et al., 2012).

A misunderstanding of the impact of climate change on the frequency and severity of extreme events could lead to a significant underestimation of losses by the global insurance industry. For example, if the loss experience of 2005 to 2014 were considered a "new normal" for disaster losses in the context of climate change, reinsurers could be underestimating 1-in-10 year losses by as much as 50% (Petkov, Coleman and Sugrue, 2014).

The inherent uncertainty about the implications of climate change could also lead to higher premiums as insurers are likely to respond to uncertainty and the risk of under-pricing with higher prices. Research undertaken by Kunreuther et al. (1995), based on a survey of underwriters, found that uncertainty in the understanding of a risk by the underwriter leads to significantly higher (1.43 to 1.77 times higher) premiums than the suggested pricing for a better understood risk.

Box 5. **Compulsory disaster insurance**

A number of countries have chosen to require disaster insurance coverage through mandatory purchase, or extension requirements.

- *Mandatory purchase:* A few countries require property owners to purchase insurance coverage for disaster risks. In Switzerland, natural disaster coverage (with the exception of earthquakes) is required for almost all property owners. In most Swiss cantons, a public insurer has been established to provide such coverage. In Romania, coverage for flood, earthquake and landslide risks, up to a standard amount, is required for all residential properties.
- *Mandatory extension:* In a number of countries, insurance companies must include coverage for disaster risks in the property policies that they offer. For example, in Belgium, insurers must automatically include comprehensive disaster insurance in their property policies. A tariff office has been established to arbitrate between policyholders and insurance companies in the case of properties that are difficult to insure at affordable rates. In France, coverage for disaster risks is automatically included in all property, motor vehicle and business interruption policies with reinsurance offered by a public reinsurer. In the United Kingdom, until 2011, the insurance industry committed to include flood insurance coverage in all insurance policies contingent on the government's commitment to make investments in risk reduction – although this agreement will be replaced by a public reinsurance facility (Flood Re) for high flood risk properties beginning in 2016.

Box 6. **Approaches to supporting disaster insurance demand**

A number of countries where disaster insurance is available have aimed to address pervasive underinsurance of disaster risks through communications initiatives and forms of indirect compulsion, such as:

- *Encouraging risk awareness:* In Germany, insurance companies, consumer organisations and regional governments have invested significantly in raising awareness about disaster risks, the need for financial protection and the risk of depending on government compensation which may not be forthcoming for property for which insurance is available. Penetration rates for disaster insurance coverage have reportedly improved as a result of the awareness campaign, although remaining around 33%.
- *Improving policyholder awareness of their level of protection:* In Australia, insurers must provide policyholders with a clear and concise overview of flood coverage under their insurance policies, based on a standard definition of "flood". This requirement, combined with the experience of a significant flooding event in 2010-11, has supported a substantial increase in the coverage of flood in home building policies to over 80% from 54% at the time of the 2010-11 Queensland floods.
- *Indirect compulsion:* In the United States, federally-regulated mortgage lenders are required to ensure that borrowers in high-risk flood zones are protected with flood insurance provided by the public National Flood Insurance Program. While this requirement has led to higher levels of flood insurance purchase at the time of acquisition, flood insurance policies, on average, lapse after two to four years, even in areas covered by this requirement leaving significant levels of underinsurance among those that choose not to renew their policies (Michel-Kerjan, 2010).

International reinsurance markets play a critical role in the financing of disaster losses, especially for extreme events. For example, reinsurers absorbed an estimated 60% of the insured losses of the 2011 floods in Thailand, 73% of the insured losses from the 2011 New Zealand earthquakes and 95% of the insured losses from the 2010 earthquake in Chile (Hartwig, 2013). The global nature of these markets allow reinsurers to benefit from the diversification of disaster risks across a wider geographic area, reducing the possibility of correlated disaster losses across a portfolio of covered risks and therefore reducing the cost of insuring those risks.[10]

Supporting private market capacity to insure disaster risks

In a number of countries, an impediment to broad (voluntary) insurance coverage for certain disaster risks has been the high-frequency and/or high-severity nature of those risks which limits the availability of insurance coverage at premium levels that households are willing and able to pay. Where the scope of such uninsurable risks is limited, this has often been addressed through targeted investments in risk reduction. For example, in Australia, a range of specific mitigation investments have been made by the government to reduce the potential for loss in areas severely affected by the 2010-11 Queensland floods. In Germany, a programme has been established to allow households in flood exposed areas to obtain a flood resilience certificate, based on an assessment by authorised experts, as a means to secure insurance coverage.

In countries that face difficulty in insuring certain risks, government (re)insurance facilities have sometimes been established to support insurance availability. These facilities may provide direct insurance to property owners for disaster risks or provide reinsurance coverage to insurance companies for such risks.[11] In many countries, such facilities are aimed specifically at reducing the maximum risk exposure faced by the

insurance sector in the event of a disaster, thereby addressing a key criterion for insurability. Such facilities may be particularly useful in developing countries where insurance companies may face more limited (or more costly) access to international reinsurance markets.

However, intervention in the provision of disaster insurance must be carefully designed to ensure that government involvement does not discourage the development of private markets for disaster insurance. Many countries have designed their facilities with the aim of maximising private sector participation and minimising government exposure:

- *Limiting government intervention:* In the United States, a number of publicly-backed insurance pools have been established to cover wind and storm damage in hurricane-prone states in the Southeast. These pools have used various mechanisms to encourage private sector participation in the insurance of the risks they cover, such as mandating that the pricing of premiums offered by the pools is above private-sector levels and through various incentives to private companies to expand coverage and takeover existing policies from the state pool. Permitting insurance premiums to increase as risks increase has also been demonstrated to increase private insurance underwriting, and to lower the share of the state-backed insurance pool market (Citizens Property Insurance Corporation, 2015).
- *Sharing exposures with the private sector:* A number of disaster insurance schemes involve public-private partnerships that establish specific thresholds for the coverage of risks by the private and public sectors. For example, the Japanese Earthquake Reinsurance Co. Ltd retrocedes (re-reinsures) 50% of mid-level exposures back to the private sector and adjusts the level of retrocession periodically based on changes in market capacity.[12]

Countries with underdeveloped insurance markets and limited penetration of property insurance face additional challenges to ensuring widespread availability and affordability of disaster insurance protection. In many of these countries, it is not just a matter of ensuring that insurers and policyholders add comprehensive disaster coverage to existing property insurance policies but also to ensure that insurance coverage for property risks is available in the first place. Constraints to the financial capacity of insurance companies as well as limitations to the availability of the necessary data for underwriting disaster insurance products limits the cover available from private companies in developing countries, while a lack of insurance culture (awareness of the need for – and benefits from – insurance) and/or an unwillingness to acquire insurance given other competing (and usually more immediate) demands for households' limited income impedes the demand for insurance products.

In Southeast Europe, with the support of the World Bank and the Global Environment Facility, countries have collaborated on the establishment of Europa Re as a means of encouraging the development of local catastrophe insurance markets. Europa Re provides a comprehensive market development package that includes reinsurance capacity, insurance market infrastructure services and technology solutions such as access to a sophisticated web-based production platform that supports automated pricing, underwriting and claims management, among other services. The platform was launched in 2014 and a number of insurance companies in member countries are now offering Europa Re's disaster insurance product in their markets. However, complementary measures to support demand for insurance may be necessary in order to have a significant impact on overall levels of coverage.

Financial protection against disasters for the most vulnerable populations in developing countries faces further challenges. High underwriting costs relative to the size of sums insured and few available options for cost-effective distribution of insurance products hamper the potential for these products to achieve commercial viability at affordable premium rates to the poor. Micro-insurance schemes covering disaster risks have been established in a number of countries as a means of reaching these segments of society. However, many of these schemes have not been able to demonstrate commercial viability or achieve significant scale, and development agencies continue to be essential sources of funding for these approaches. Innovative approaches have been implemented to address affordability and distribution of micro-insurance:

- *The development of distribution channels for micro-insurance products:* to lower transaction costs and support affordability, mobile phone technology, micro-finance institutions and farm implement suppliers have acted as distribution points for micro-insurance products, eliminating the need to establish an independent distribution network.
- *The use of transparent and accessible parametric-based triggers:* the use of weather indexes (particularly for crop insurance) reduces transaction costs by eliminating the need to assess the particular risks for each individual policyholder when establishing premiums and the need to undertake loss adjustment in the event of claim. The use of parametric triggers can also reduce moral hazard (since claim payments are based on an index, not on actual loss experience) although it may introduce "basis risk" if the index is not well correlated with the occurrence of actual losses.
- *Establishing capacity to cover excess losses:* this is particularly important when insuring correlated risks of disaster events. Access to reinsurance coverage at an affordable premium is essential for the long-term viability of micro-insurance providers in order to ensure that insurance premiums are within the means of policyholders. At present, few micro-insurance schemes benefit from reinsurance coverage due to limited access to markets or premiums for reinsurance coverage that are unaffordable.[13]

Enhancing the role of capital markets

As noted above, international reinsurance markets play a critical role in absorbing losses from natural catastrophes. The capacity of private insurance markets to absorb losses in the context of climate change will depend on the continued availability of sufficient capacity in international reinsurance markets. Currently, the reinsurance market does have the capacity which, if properly harnessed, can be deployed as a tool against climate-change related disaster risks.

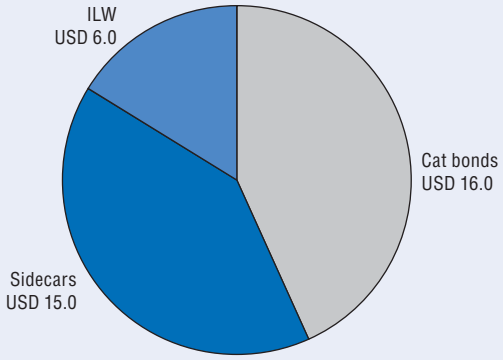
The overall capacity of reinsurance markets has increased substantially in recent years as a result of an increase in capital among reinsurance companies as well as the development of alternative reinsurance and capital market instruments, such as catastrophe bonds, sidecars (special-purpose reinsurance vehicles) and industry loss warranties (see Box 7 for a description of these instruments).

Box 7. **Alternative reinsurance and capital market instruments**

In recent years, a number of alternative reinsurance and capital market instruments have been created as a means to capitalise on profitable opportunities to cover catastrophe risks, including catastrophe bonds (cat bonds), sidecars and industry loss warranties (ILW) (Figure 3).

Figure 3. **Distribution of alternative reinsurance and capital market instruments**

September 2013, in USD billion



Source: Guy Carpenter (2013).

Catastrophe bonds: "A high-yield bond that contains a provision that may cause the principal or interest payments to be delayed or lost to investors in the event of a specified loss, such as a hurricane or earthquake" (OECD, 2011). Catastrophe bonds have been issued by direct insurers and reinsurers to cover a broad range of risks, including wind storms and earthquakes across various geographical regions (the United States, Europe, Caribbean, Japan). A few governments (Mexico) and public authorities (Metropolitan Transportation Authority of New York) have also issued catastrophe bonds to transfer disaster risks. The bonds are collateralised with high-quality collateral, reducing counterparty risk, and can be designed to trigger payouts based on:

- the actual losses experienced by the bond sponsor (indemnity-based);
- an index of industry-wide loss estimates for a given event (industry index-based);
- modelled losses for an event of a specific magnitude (model-based); or
- the physical characteristics of the disaster event, such as magnitude and location of an earthquake or hurricane (parametric-based).

Sidecars: Sidecars (also known as collateralised reinsurance) are special-purpose reinsurers, often established by traditional reinsurers, whose purpose is to provide dedicated collateralised quota-share reinsurance coverage (i.e. to cover a constant share of each loss for a given risk). Sidecars are usually established as a means to mobilise third-party capital to increase reinsurance capacity from hedge funds, private equity funds, investment banks and other investors who become shareholders in the sidecar (FitchRatings, 2014).

Industry loss warranties: Industry loss warranties are a type of reinsurance or derivatives contract through which an insurance company can purchase loss protection that is triggered based on the level of industry-wide losses for a given event (FitchRatings, 2014). The products are usually transacted over-the-counter between two (re)insurance companies or between a (re)insurance company and a third-party investor, such as a hedge fund.

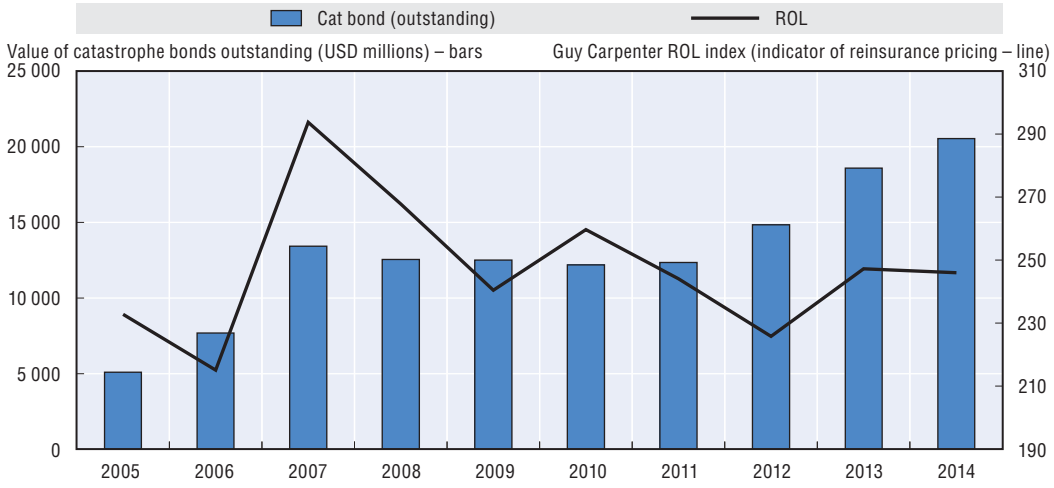
Catastrophe bonds and other alternative risk transfer mechanisms can substantially increase the capacity of markets to absorb catastrophe risks by:

i) *Providing an additional (substantial) source of capital to cover catastrophic losses*. Investors in catastrophe bonds and sidecars are *generally* not reinsurance companies (although (re)insurance companies do provide some of the capital) and therefore provide an additional source of capital for the coverage of catastrophe risks. Capital markets also have enormous potential to absorb losses relative to the capacity of the global (re)insurance industry, for example, an estimated USD 900 billion in pension fund assets could be available for allocation towards insurance-linked securities (including catastrophe bonds) if there was sufficient supply (Guy Carpenter, 2014).

ii) By transferring risk to capital markets, *alternative reinsurance and capital markets instruments reduce insurance companies' need to hold capital and increase their capacity to write new business*.

An increase in the use of alternative reinsurance and capital markets instruments for catastrophe risks could also make a contribution to the affordability of the premiums paid by households, businesses and governments for disaster insurance coverage. The limited correlation between financial market performance and disaster risks should reduce the co-variability risk that is included in the pricing of reinsurance premiums (Cummins and Trainar, 2009). By offering an alternative to traditional reinsurance, alternative reinsurance and capital markets instruments can also exert competitive pressure on reinsurance markets (Gray, 2014) and potentially moderate the volatility of reinsurance cycles (see Figure 4).

Figure 4. **Growth in catastrophe bond capital and market conditions**



Notes: Guy Carpenter estimates of capital bonds outstanding (USD million). Guy Carpenter's Global Property Catastrophe Reinsurance Rate on Line (ROL) index provides a measure of the cost of property catastrophe reinsurance over time. The ROL index is generated in January each year by Guy Carpenter. In the figure, the index values are reported for the previous year under the expectation that the amount of catastrophe bond capital outstanding at the end of the year might impact the index value at the beginning of the following year.
Source: Guy Carpenter (2015a, 2015b).

While growing, alternative reinsurance and capital markets instruments still account for less than 20% of the global capacity for property catastrophe reinsurance. Demand for catastrophe bonds may be impeded by relative illiquidity and less familiarity among investors with this asset class; spreads for catastrophe bonds remain 70 basis points or more above similarly-rated corporate high-yield debt (Swiss Re, 2006, 2015).[14]

The significant cost of structuring transactions may also be limiting the issuance of catastrophe bonds and increasing the minimum size necessary for an issuance to be economically viable although initiatives to improve standardisation have reduced these costs over time. There may also be regulatory or tax disincentives (treatment of interest income relative to premium income) for issuance of catastrophe bonds relative to traditional reinsurance. Prudential regulators have generally committed to equivalent regulatory treatment for catastrophe bonds relative to other forms of risk transfer[15] although the classification of risk transfer through alternative reinsurance and capital markets instruments is not always straightforward and may not provide recognition of the advantages and disadvantages of catastrophe bonds over reinsurance.[16] In recent years, investors in catastrophe bonds and other alternative capital structures have provided competing risk transfer vehicles.

Multi-country risk pooling

Diversification benefits can also be achieved by governments seeking insurance coverage for their contingent disaster-related liabilities across countries. Smaller countries can achieve lower costs of insurance by participating in risk pools with other countries, particularly with countries where the probability of simultaneous losses from a single event is lower.[17]

By a set of Caribbean countries, with the support of the World Bank and a number of donor countries, the Caribbean Catastrophe Risk Insurance Facility (CCRIF) was established to provide coverage for earthquake and hurricane risk across participating countries.[18] The CCRIF provides pay-outs of up to USD 100 million based on parametric triggers such as wind speed, storm surge and waves for hurricanes and ground shaking for earthquakes. In 2013, coverage was extended to include excessive rainfall. The pay-outs provide immediate liquidity in the aftermath of a disaster event. Premiums are paid by participating governments, calculated based on the level of risk and coverage chosen for the given peril. In 2013-14, the CCRIF provided coverage to its members for USD 619 million in total aggregate risk. The CCRIF retains a portion of the risk (USD 27.5 million) and cedes the rest to international reinsurance and capital markets, providing it with sufficient coverage to pay claims arising from a 1 in 536 year event without drawing on its reserves (World Bank, 2014a). In 2014, the World Bank issued a USD 30 million catastrophe bond for hurricane and earthquake risk in the CCRIF participating countries, with the proceeds of the bond (if triggered) passed through to the CCRIF on the basis of a swap transaction between the World Bank and CCRIF (World Bank, 2014b).

The World Bank has estimated that, relative to the cost of an individual country going directly to the reinsurance market for coverage, the pooling of risks through the CCRIF has allowed for reinsurance coverage at a 54% to 59% lower cost for hurricanes and a 54% to 62% for earthquakes – with an even greater savings relative to the costs to these countries to self-insure through the use of reserves (World Bank, 2012).

In 2014, an initiative to create a similar pooling of risks among Central American countries was announced. The Central American pool would be separate from the Caribbean pool but would access capital markets on a joint basis. According to the proposal, the additional diversification of risk achieved through the inclusion of Central American countries[19] is expected to reduce the cost of coverage for CCRIF members by 25% (Central American countries are expected to achieve a premium cost reduction of 36% relative to accessing international reinsurance markets individually) (World Bank, 2014a).

Pacific Island countries[20] entered a third pilot year in testing the possibility of a Pacific Catastrophe Risk Insurance pool (World Bank, 2015). Similar to CCRIF, the pool offers parametric-based coverage for tropical cyclones and earthquakes with the aim of providing short-term liquidity to participating governments in the event of disaster. Over time, the pool is expected to achieve up to a 50% reduction in the cost of premiums relative to the cost of insuring these risks on a country-by-country basis (World Bank, 2011).

In Africa, the Africa Risk Capacity provides coverage to African countries[21] affected by severe drought. Pay-outs are based on the occurrence of a severe deviation in rainfall levels that is likely to cause significant emergency response costs (food aid) in a participating country. Coverage is available for up to USD 30 million per country per season for drought events that occur with a frequency of 1-in-5 years or less. In order to benefit from the programme, countries must undertake an assessment of the relevant risks and prepare a contingency plan for the use of pay outs from the facility which also supports resilience among participating countries. Participating countries pay premiums for the level of coverage sought with estimated cost savings of around 50% relative to the cost of seeking equivalent coverage on an individual country basis. Reinsurance coverage is sought for the pool from international reinsurance markets (Africa Risk Capacity, 2015).

While experience thus far has been limited to developing countries benefiting from donor financial support, similar benefits from pooling risks may be achievable in developed countries. For example, Watson, Johnson and Dumm (2012) used catastrophe models to examine the impact of geographic diversification on hurricane risk in the United States. The authors found a significant decline in the level of reserves required (53% of reserves) to cover losses from hurricanes with return periods above 1-in-25 years (with even greater declines as the return period increases) when calculated on a multi-state rather than individual state basis.

V. International co-operation

The expected increase in the severity and frequency of extreme disaster events as a result of climate change requires countries to examine their approaches to disaster risk financing with the aim of encouraging the availability and affordability of disaster insurance coverage, including by enhancing reinsurance capacity. The establishment of multi-country risk pooling offers one form of international co-operation in the effort to adapt to the impact of a changing climate – other forms of international co-operation may also be beneficial.

A number of proposals that combine public sector adaptation funding with private insurance mechanisms have been put forward in the context of climate change negotiations, including proposals from the Alliance of Small Island States, and the Munich Climate Insurance Initiative (see Box 8). These proposals provide a potential avenue to leverage private financing (insurance payments in the event of a disaster) to cover losses

Box 8. **Loss and damage proposals**

Two proposals have been put forward to the Ad Hoc Working Group on Long-Term Cooperative Action (as part of the climate change negotiations) on how to address loss and damage from climate change impacts that cannot be mitigated through reductions in greenhouse gas emissions.

Alliance of Small Island States (AOSIS)

AOSIS has proposed a *Multi-Window Mechanism to Address Loss and Damage from Climate Change Impacts* to support adaptation to climate change in Small Island Developing States, Least Developed Countries and other developing countries. The proposal includes three components: i) an insurance component to address losses as a result of climate-change related extreme events; ii) a rehabilitation/compensatory component to address progressive damage related to slow-onset impacts of climate change such as sea-level rise, increases in ocean and land temperatures and ocean acidification; and iii) a risk management component to support risk assessment and management tools for extreme events and slow-onset impacts. The components would be supported by a technical advisory facility and a financial vehicle/facility that would, respectively, provide advice and funding related to the activities under each component. The insurance component would support countries in securing cost-effective insurance coverage for extreme events through the use of regional pooling, assisted reinsurance schemes and capital market instruments such as catastrophe bonds and weather derivatives. The rehabilitation/compensatory component would act as a compensation mechanism for damage from uninsurable slow-onset event with pay-outs triggered based on indicators such as sea level rise, sea surface temperature, air temperature, precipitation, wind speed, soil salinity and/or ocean acidity. The risk management component would involve technical and financial support for risk assessment (weather data and analysis) and risk management (land-use planning building and infrastructure upgrade) activities (AOSIS, 2008).

Munich Climate Insurance Institute (MCII)

MCII has made a submission on *Insurance Instruments for Adapting to Climate Risks: A proposal for the Bali Action Plan*. The MCII proposal includes a prevention pillar to provide funding for risk reduction measures and a two-tiered insurance pillar to support a Climate Insurance Pool for very extreme losses and a Climate Insurance Assistance Facility that would support public-private insurance systems targeting vulnerable populations (such as micro-insurance, regional risk pooling initiatives, etc.). The Climate Insurance Pool would be capitalised by funding from countries and/or premiums and would access reinsurance markets to transfer a portion of the risk of extreme events (Munich Climate Insurance Initiative, 2008).

from extreme events and potentially reduce the cost to the taxpayers of protecting against the (still uncertain) impacts of climate change. Using such approaches, funding could be provided for the payment of premiums, affording coverage for disasters should an extreme event occur.

These proposals share a number of similarities, including: i) funding for disaster mitigation measures to address high-frequency, low-severity events; ii) technical assistance to support insurance coverage of disaster risks for households and small-scale producers, including support for micro-insurance and for the development of the necessary infrastructure to support private insurance; and iii) an international climate pool to provide funding for recovery and reconstruction in countries impacted by extreme

(low-frequency/high-severity) disaster events. The scope of the proposals could potentially address a number of the key constraints to supporting the financial management of disaster risks.

In June 2015, G7 leaders committed to "increase by up to 400 million the number of people in the most vulnerable developing countries who have access to direct or indirect insurance coverage against the negative impact of climate change related hazards by 2020". According to the proposal (GIZ and KfW Development Bank, 2015), this will be accomplished by:

1. Investing in the capacity of insurance companies in developing countries to provide disaster insurance coverage, through public equity investment in developing country insurance companies, technical assistance to build the necessary infrastructure for quantifying disaster exposures and support for technical capacities to underwrite disaster risks.
2. Supporting the start-up costs related to developing new regional insurance schemes, investing public resources into the equity of such schemes and providing support for premiums paid by participating countries during the early stages of the schemes.

VI. Conclusion

Disasters result in a broad range of human, social, financial, economic and environmental impacts, with potentially long-lasting, multi-generational effects on affected countries. Climate change is expected to have significant impacts on the frequency and intensity of disaster events, including heat waves, droughts, bush fires, tropical and extra tropical cyclones, tornados, hailstorms, floods and storm surges, causing more extensive economic, social and environmental impacts. This expected increase in disaster losses is likely to exacerbate the insurance gap that exists for the coverage of disaster risks, particularly in developing countries, with important financial and economic implications.

The financial management of disaster risks through the use of risk transfer mechanisms can make an important contribution to reducing the economic impact of disaster events. Governments should examine the impact of climate change on the availability and affordability of private insurance coverage in their countries and consider the benefits of measures to encourage coverage by private insurance markets. Initiatives to improve risk awareness as well as various forms of compulsion, may be necessary to ensure that demand for disaster insurance coverage establishes a sufficiently large pool of disaster risks. As losses increase in the context of climate change, governments may also need to examine impediments to the supply of insurance, such as a lack of the necessary data for risk pricing, limited financial and/or technical capacity in the insurance sector, insufficient management of disaster risks (land-use planning, protective infrastructure) or limited access to reinsurance coverage, including any significant impediments to accessing international reinsurance markets. Financial support from governments and/or donors may be necessary to overcome some of these impediments and/or share some of the risk. Any government intervention in insurance markets should consider the potential impact on the development of private insurance markets and seek to maximise the contribution of the private sector to covering disaster risks.

Capital markets offer a potential significant source of capacity to cover disaster risks in the future and governments may want to examine whether there are any (unwarranted) impediments to the development of alternative reinsurance and capital markets

instruments. Governments might also want to consider whether there is a need to support the development of alternative reinsurance and capital markets instruments (by encouraging standardisation or implementing measures to support market liquidity, etc.) to ensure that there is sufficient market capacity to manage increasing disaster risks. There are a number of examples of governments providing support for the development of markets in specific asset classes as a means to further public policy objectives, such as the efforts to encourage housing finance in the United States through the development of markets for residential mortgage-backed securities, which may offer lessons should a significant gap in reinsurance capacity emerge. For governments facing constrained budget and large potential exposures, issuing catastrophe bonds to mitigate fiscal exposures to natural disaster costs may be an interesting option for managing financial risks.[22]

Multi-country risk pooling has demonstrated the benefits in terms of reducing the cost of insurance coverage for small countries. It may be possible to replicate these benefits across a larger range of countries, including for extreme events that are uninsurable in the context of a changing climate, in order to benefit from large-scale geographical diversification. In the context of the international negotiations on climate change adaptation, governments should examine the potential for leveraging private sector funding for the management of climate-change related disaster risks and the contribution of private insurance markets to climate change adaptation.

The OECD has developed guidance on the financial management of disaster risks which is becoming increasingly relevant in the context of climate change. The *OECD Council Recommendation on Good Practices for Mitigating and Financing Catastrophic Risks* and the *G20/OECD Methodological Framework for Risk Assessment and Risk Financing* provide, respectively, a policy framework and step-by-step guide for establishing an approach to disaster risk financing that aims to minimise economic disruption and provide financial protection against the impacts of disaster events.

Using this guidance as a basis, the OECD can contribute to the efforts of governments to manage the increasing financial impacts of disaster events in the context of climate change, including through additional research on some of the key challenges raised above. For example, the OECD could:

- Support the efforts of countries to manage the financial impacts of climate-change related extreme events by developing case studies on successful country approaches to supporting private insurance coverage of challenging natural disaster risks, such as flood risks linked to climate change in flood-prone countries.
- Undertake further analysis on the potential for alternative reinsurance and capital market instruments to absorb an increase in losses as a result of climate change-related extreme events and options for ensuring that sufficient capacity is available.
- Complete an assessment of options that could be considered in the context of international co-operation on climate change for leveraging private sector funding for the management of climate change-related disaster risks.
- Undertake an analysis of the broader set of contributions that the insurance sector could make to mitigating and adapting to climate change, such as designing insurance products that incentivise greenhouse gas reduction, the role of insurance company investments in supporting the transition to a low-carbon economy as well as solvency risks related to the impact of the transition to a low-carbon economy.[23]

- Examine how development agencies can help to overcome barriers to the provision of risk-sharing and risk-transfer mechanisms (such as micro-insurance) in developing countries. This could include experiences of innovative approaches to expand coverage to the poorest and most vulnerable households and an evaluation of the effectiveness of these approaches in providing financial protection for vulnerable households.

Notes

1. The February 2015 negotiating text of the Ad Hoc Working Group on the Durban Platform for Enhanced Action, tasked with developing a protocol, legal instrument or agreed outcome with legal force on long-term co-operative action to address climate change, references the potential role of insurance in supporting adaptation and managing loss and damage from climate change-related extreme events (*Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts*). See: *http://unfccc.int/resource/docs/2015/adp2/eng/01.pdf*.
2. The contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change reconfirmed these general findings and provided further detail on the near-term impacts of climate change (IPCC, 2014).
3. For example, in the North Atlantic (Atlantic, Caribbean, Gulf of Mexico), the total number of Category 4 and 5 hurricanes rose from 16 in the period 1975-89 to 25 in the period 1990-2004 (Kunreuther, Michel-Kerjan and Ranger, 2013). However, the number of intense Category 4 and 5 hurricanes in the Atlantic has been in a decline since 2010; at the time of writing, it had been seven years since the last Category 5 hurricane struck in the Atlantic – the longest gap since the 1980s.
4. There has been an increase in the observed geographical range of tropical storms, including the first ever recorded formation of a hurricane in the South Atlantic in 2004 (Catarina) and the formation of Hurricane Vince near the island of Madeira in 2005, the furthest northeast a tropical cyclone had ever developed in the Atlantic (Hoeppe and Gurenko, 2006).
5. This outcome principally reflects increased population at risk and enhanced reporting, and not increased incidence of the hazards.
6. While not currently a core component of sovereign credit ratings, vulnerability to climate change impacts is being considered by Standard & Poor's as a possible future ratings criterion given the possibility that climate change could impact economic, fiscal and external performance of vulnerable economies (Standard & Poor's Rating Service, 2014).
7. However, there are limitations in terms of the potential for risk-based premiums to drive costly investments in risk reduction, such as elevating existing structures to mitigate against flood risks. Land-use planning that limits construction in flood-prone areas is a much more effective approach to reducing flood risks. For more on the potential contribution of insurance to risk reduction, see Warner et al. (2009).
8. There have been a number of instances over the years where insurance companies have withdrawn coverage for specific risk as a result of a change in their assessment of that risk. For example, the unprecedented losses in the United States from the 2005 hurricane season led to an industry re-assessment of the viability of insurance for hurricane risks (and the appropriate insurance premiums in light of expected losses) given the potential impact of climate change and ever-rising coastal population levels on expected loss levels. As a result of their inability to charge risk-appropriate premiums, a number of insurance companies reduced their writing of insurance policies in hurricane-prone states which led to a large increase in the market share of state-backed insurance pools (Hsu, 2006).
9. The expected loss from disasters could increase for certain hazards and regions and threaten the affordability of insurance as a result of a shortening in the time between loss events and/or an increase in per event losses (see Box 2).
10. Some of the benefits from the diversification by reinsurance markets of disaster risks across countries may be impeded should regulatory requirements imposed on domestic insurance companies for the business they cede to foreign reinsurance companies significantly impede access to international reinsurance markets.
11. Examples of comprehensive direct insurance facilities include the *Consorcio de compensacion de seguros* in Spain and Iceland Catastrophe Insurance. Direct insurance is also provided by the New Zealand Earthquake Commission, the Turkish Catastrophe Insurance Pool and the

United States National Flood Insurance Program, although for a sub-set of disaster risks. Examples of reinsurance facilities include the *Caisse centrale de réassurance* in France (for all disaster risks) and Japan Earthquake Reinsurance for a smaller sub-set of risks.

12. The Japanese Earthquake Reinsurance Co. Ltd was established in 1966 as part of the foundation of Earthquake Reinsurance scheme. The JER, which is owned by the general insurance companies, acts as the sole earthquake reinsurer for the private insurance market in Japan. Indemnity losses from an earthquake event are shared by the public and private sectors; currently: JER is liable for 100% of insurance claims up to JPY 100 billion while for claims above JPY 100 billion and below JPY 362 billion, the government is liable for 50%. For claims above JPY 362 billion (and up to JPY 7 trillion), the government is liable for approximately 99.5% of claims.

13. In January 2015, a group of (re)insurance companies and brokers launched a micro-insurance venture incubator (MVI) with the aim of launching a portfolio of micro-insurance initiatives worldwide.

14. Another indicator of the relative price of catastrophe bonds is the amount of return that investors demand (demonstrated by the average spread) above the probable expected loss (excess return). Average expected excess returns for catastrophe bonds between December 2001 and December 2011 were 514 basis points (Lane Financial, 2014). In comparison, high-yield corporate debt is estimated to have an excess return (default adjusted spread) of 386 basis points between August 2000 and early 2012 (Babson Capital, 2012). In other words, investors have demanded an extra premium of over 100 basis points for catastrophe bonds for an equivalent probability of default.

15. For example, the Solvency II directive, which outlines insurance company capital standards in the European Union, confirms the full and unconditional recognition of securitisation on the same terms and conditions as reinsurance. Securitisation is allowed to cover technical reserves of both insurers and reinsurers and to be taken into account in the calculation of the standard capital requirements of insurers and reinsurers on the same footing as reinsurance (Cummins and Trainar, 2009).

16. For example, catastrophe bonds can reduce counterparty risks for the issuer (as the funds are usually held in investment-grade assets by a separate entity) and offer relatively stable multi-year pricing for the issuer of the bonds, as the price paid by the issuer for multi-year coverage is established at the time of issuance (Swiss Re, 2006). However, catastrophe bonds can create "basis risk" for issuers when pay outs are not directly linked to actual losses, such as is the case of index, model or parametric-based bonds. In addition, catastrophe bonds have generally included high triggers which make a direct comparison to traditional reinsurance challenging.

17. However, if only countries facing significant disaster risks choose to participate in the pooling arrangement, challenges related to adverse selection would arise.

18. Seventeen governments are currently members of the facility: Anguilla, Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, Nicaragua, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Trinidad and Tobago and Turks and Caicos Islands.

19. For the purpose of estimating the reduced cost of coverage, the expanded facility was assumed to include Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

20. The participating countries include: Republic of Marshall Islands, Independent State of Samoa, Kingdom of Tonga, Republic of Vanuatu, and the Cook Islands.

21. Twenty-five African countries have signed on to the Africa Risk Capacity initiative, including: Burkina Faso, Burundi, Central African Republic, Chad, Republic of Congo, Djibouti, The Gambia, Guinea, Liberia, Libya, Malawi, Mozambique, Niger, Rwanda, Sahrawi Arab Democratic Republic, Senegal, Togo, Zimbabwe, Kenya, Mauritania, Côte d'Ivoire, Comoros, Gabon, Madagascar and Nigeria.

22. The World Bank Treasury department has developed a "multicat" catastrophe bond issuance platform to facilitate the issuance of catastrophe bonds by member governments wishing to mitigate the budgetary impacts of disaster events (see: *http://treasury.worldbank.org/web/documents/MultiCat_ProductNote.July2013docx.pdf*).

23. A number of insurance regulators have examined these issues. For example, the US National Association of Insurance Commissioners' Climate Change and Global Warming Working Group conducts an annual Climate Risk Disclosure Survey that captures data from insurers representing 87% of the total US market. The survey requests information from insurers on risk management, investment strategies, climate management and public engagement related to climate change. A report summarising responses to the survey is prepared by Ceres (Ceres, 2014).

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Opportunities and limitations of public equity markets for SMEs

by
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This article on public equity financing for small and medium-sized enterprises (SMEs) complements earlier OECD work on market-based finance for SMEs. The development of this market segment could promote investment in SMEs and, together with securitisation and other non-bank debt financing instruments, encourage an enhanced allocation of risk and risk taking, and thus support growth. Despite the benefits of public SME equity, its share is small and an equity gap exists for risk financing more generally. A number of important impediments to the wider use of public equities for SMEs are identified, such as admission cost and listing requirements, lack of liquidity, educational gaps, limited ecosystems, and tax treatment, all of which require attention by regulators and policy makers alike.

JEL classification: G1, G2, G23, G28.

Keywords: SME finance, market-based finance, SME public equity markets, growth markets, small caps, initial public offering (IPO), exchanges, risk capital, small equity offering

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Executive summary

This article complements earlier OECD work on market-based small and medium-sized enterprise (SME) finance. It draws on discussions with market participants and other research, and provides analysis of IPOs and related data. It does so with a view to provide **background and input to further work** on the opportunities and constraints of market-based financing for SMEs. A number of policy actions that may mitigate constraints facing equity capital market financing for SMEs and enhance its potential are also discussed in this paper. These proposed policy actions are intended to provide some guidance for policy makers when designing actual measures to support public equity financing for SMEs. Governments should have discretion as to the adoption of any these policy actions, taking into account their domestic circumstances and other policy approaches.

The share of small and medium-sized enterprise (SME) financing provided through equity markets is currently very small. Equity capital is critical to growth and the development of small IPO markets could incentivise investment in SMEs and, together with securitisation and other non-bank debt financing instruments, encourage an enhanced allocation of risk and risk taking, and thus support growth.

A more nuanced view of the SME financing gap is necessary. An **equity gap seems to exist for risk financing, in particular for fast-growing companies rather than for SMEs in general** or for mature but non fast-growing firms. SME funding is considered to be a difficult business mainly because the segment as a whole is characterised by low survival rates and a large diversity of entities, which makes it extremely difficult to assess risks. Moreover, some SMEs are not appropriate candidates for debt financing, owing also to their lack of collateral or positive cash flows, their need for longer maturities to finance capital expenditure and investment, or other impediments to servicing debt, such as irregular cash flow generation. In Europe in particular the main issue appears to be on the equity side, both public and private, rather than a generalised lack of debt financing. This situation might reflect to some extent deeper "cultural" factors.

There are benefits of public equity offerings for SMEs that extend beyond initial access to capital (IPO), to longer-term repeat access to financing (secondary/follow-on raisings), as well as to benefits related to increased creditworthiness, transparency and visibility through association with a dedicated ecosystem. Despite those benefits, the share of SME financing provided through capital markets is as mentioned currently very small, particularly in Europe, despite the fact that equity markets could serve as an alternative financing source. A number of important **impediments to the wider use of public equities for SMEs** (for both issuers and investors) are identified that require attention by regulators and policy makers alike.

Admission cost and listing requirements in the main markets are often very high for SMEs. However, a number of equity markets targeting smaller listings have been established in different jurisdictions. With momentum building behind alternative non-

bank sources of financing for SMEs, there may be an opportunity for SME equity capital markets and other equity financing stakeholders to work with the official sector to assess how public SME equity financing might best be supported.

The educational gap of SMEs with regard to equity financing, and the limited awareness of SMEs when it comes to equity instruments, limit their access to such instruments. There is a role for policy makers to bridge this gap by promoting financial education for SMEs and support the development of the skills necessary to tap the public markets. **The limited ecosystems (exchanges, platforms, brokers, market-makers, advisors, equity research)** necessary both for the development of SME equity finance and the limited liquidity in such markets may also be inhibiting. The recent decline in equity research, coupled with inactive secondary markets for small cap offerings, mean that only those institutional investors that command a special expertise in the relevant industry or sector are likely to participate. **Improving economic incentives for participants in SME equity markets** can in turn incentivise the development of healthy and vibrant ecosystems dedicated to small firms. Higher tick sizes, for instance, could provide economic incentives to intermediaries such as market-makers, when it comes to smaller shares, which in turn could improve liquidity (Weild et al., 2013).

Liquidity is most likely the key challenge in publicly traded SME equity, with SME shares tending to be very illiquid, hampering the ability of early-stage investors to realise their investment through normal exit. A number of options to enhance liquidity are available and should be considered. Increased standardisation and homogeneity could potentially enhance speed and reduce disparities that create arbitrage opportunities (e.g. differential tax treatment). **Government policy could be particularly useful** in addressing some of the illiquidity in growth markets (abolition of stamp duty taxes in AIM, the US Jobs Act creating more room in the retail investor space, etc.).

A perceived reluctance of institutional investors to invest and the asymmetric treatment of equity and debt financing in some cases (e.g. tax treatment) have impeded the fostering of SME public equity financing from the supply-side. The lack of a risk equity culture across Europe is an important obstacle to the fostering of SME equities, with striking comparisons between the United States (50% of the population invested in equities) and parts of continental Europe (e.g., only 5% of the population with direct equity investments). This calls for increased education regarding equity investments for all market constituencies (SMEs, individual investors and advisors alike) and the need to induce participation by both institutional and possibly also retail investors (e.g. private pension schemes) in order to foster the development of vivid and liquid growth markets.

Against this backdrop, policy makers should be mindful of the role of financial regulation in affecting SME public equity financing. For example, the diversity of SMEs creates the potential for substantial diversification benefits, but market players argue that such **diversification advantages are insufficiently recognised** in new regulations, affecting the capacity of institutional investors such as insurance companies and pension funds to invest in that sector. More generally, **unintended consequences of regulatory reform** perceived by the market highlight the need for a balanced and coordinated approach to regulation that will encourage the deployment of such patient capital in SME equities.

Nonetheless, specific rule-making covering equity markets should be designed with caution. **A one-size-fits-all approach to rule-making could be inefficient**, if not detrimental to the fostering of SME growth markets. **Proportionate, adapted legislation**

designed for small (and mid) caps rather than simple relaxation of certain listing and reporting requirements for SMEs could alleviate cost and other impediments for small issuers, while preserving investor protection and confidence in such instruments. Changing prospectus requirements is of particular importance so as to allow for more streamlined, proportionate requirements for SMEs, without demoting/ degrading the level and quality of information provided or risking investor protection.

While it is generally agreed that a bias exists in the **tax treatment of debt against equity** (tax deductibility of interest across the board), **views differ over the effectiveness of tax breaks** (and, for that matter, **regulatory support**) as a means to resolve the issue of suboptimal investment in SME equities in the long run, **as they do not address the structural cost disadvantages of small-sized deals, and might create vested interests, by providing benefits that go directly to the beneficiaries' profits**. On the other hand, tax relief is a simple and straightforward way to incentivise investment in SME equities at the current juncture and has proven a quick and efficient way to induce participation in small equity markets. Such interventions require backing by studies investigating whether and to what extent tax breaks are effective and what is the additionality effect of such policies when it comes to SME investment.

Private equity and venture capitalists are well established as providers of value added to SME businesses they invest in, as evidenced by a lower failure rate during the crisis. Venture capital stays involved in a business even after the initial investment period has ended, acting as **anchor investors** in any public offering. Peer-to-peer, crowdfunding and other similar financing platforms could help fill part of the finance gap created by banks. However, such new sources of finance, in their current form and magnitude, cannot yet play the role of more established sources of risk capital.

The **interconnectedness of the entire funding landscape** means that the various forms of SME financing are not necessarily exclusive. In that context, the benefits of venture capitalists remaining anchor investors after IPOing, and debt investment as basis for (entry or follow-up) equity investment by private investors are two illustrative examples of this interconnectedness. New approaches of peer-to-peer SME financing coming from high-net-worth individuals (HNWIs) with SME expertise could be another way forward, as with the existing public-private co-investment schemes in Europe (European Angels Fund, under the auspices of the EIF).

SME equity financing in public opinion remains a challenge given experiences with small cap equity markets and the tarnished reputation of the financial sector after the crisis. It may be assisted by the provision of **incentives to retail investors** participating in SME public equities (e.g. UK ISA inclusion of certain small caps or the French PME-PEA).

Promotion of equity finance for SMEs should not be seen as a way to disengage banks from SME financing, but rather as **a way to complement bank lending** and other financing alternatives. Indeed, bank lending is expected to continue to represent the primary source of financing for SMEs, not least because of its very size and informational advantages. In the context of a closely interconnected SME financing environment, a holistic and **coordinated effort by all market constituencies involved (investors, intermediaries, advisors, policy makers and SMEs)** is required to support investment in the SME asset class and allow SMEs to fully benefit from capital market financing when and as appropriate, without posing a risk to financial stability.

I. Introduction and overview

This article complements earlier OECD work on non-bank debt financing for SMEs[1] that was also part of a project on broadening the range of financing instruments for SMEs.[2] It also draws on discussions with private financial sector representatives at an OECD Financial Roundtable held in October 2014. That Roundtable focused on the identification of drivers and impediments for SME equity financing on a standalone and comparative basis (*vis-à-vis* Venture Capital and Private Equity financing) and the role of public policy in fostering publicly traded SME equities. Discussions concluded that SME funding continues to be a difficult business mainly because the segment as a whole is characterised by low survival rates and a large diversity of entities, which makes it extremely difficult to assess risks. In light of the risks, there does not seem to exist a generalised lack of debt financing for SMEs, although a shortfall of SME debt funding may arise in countries with a weak real economic growth outlook. Otherwise, the main issue, in Europe at least, appears to be on the equity side, both public and private, and this situation might reflect to some extent deeper "cultural" factors. Against this backdrop, participants recommended that policymakers be mindful not to introduce additional obstacles. This article enhances the results of these discussions and the analysis in earlier work on SME finance in several ways, including by dissecting and discussing IPO data.

To motivate the discussion and analysis, the next section briefly reviews the limitations of bank financing and looks at the "conundrum" of an SME financing gap. The following, main section on primary equity markets for SMEsanalyses, in the first two subsections, the benefits and constraints of such markets. The next subsections discuss appropriate SME definitions from a financing perspective, analyse small company IPOs and discuss proportionality as a means to spur public equity funding. The problem of liquidity, the need for a dedicated ecosystem and the fiscal bias against equity are examined in the following subsections, with the last subsection discussing the lack of equity culture and educational gaps. Concluding remarks and policy implications are presented in the final section.

II. Limitations of bank financing and the financing gap conundrum

Financing conditions for small-and medium-sized enterprises (SMEs) have remained tight in the years following the Great Recession in several OECD countries, despite an environment of monetary easing and a number of measures adopted by policy makers to enhance access to finance and credit conditions for SMEs (OECD, 2014). Opaque, cumbersome and expensive bank lending processes with strict collateral and other criteria could discourage SMEs from seeking bank credit. Despite an expansionary environment of abundant liquidity, many SMEs which need bank credit find it particularly difficult to obtain in a number of economies, especially in the euro area. A negative bias in banks' perceptions about SMEs riskiness and profitability tends to result in suboptimal lending – a financing gap –that in the current environment adds to the sluggishness in the pick-up of economic growth, particularly in Europe.

Policies addressing a financing gap for SMEs need to differentiate between *small* companies and *fast-growing* ones. Indeed, studies indicate that the size (or the age) of a company and its probability of growth are uncorrelated. The analysis of a retail bank's books has shown that SMEs do not grow any faster than any other segment and that there is no correlation between growth and age, once the data is appropriately weighted.[3]

Therefore, an attempt of policy makers to achieve growth by focusing on SMEs as a broad class could be unsuccessful because SMEs as a broad, all-embracing category do not appear to grow any faster or slower than any other companies in the real economy. Instead, policies should focus on young, high growth firms. As demonstrated by an analysis of firm-level data across 17 OECD countries and Brazil such firms are responsible for a disproportionately large share of the net job creation in an economy (Criscuolo et al., 2014).

Naturally, most SMEs enter into saturated markets, with the exception of highly innovative SMEs that reach new niches of the markets in their home jurisdiction or are able to expand internationally and sell overseas. Young, high-growth firms or "gazelles" are found predominately in knowledge-intensive and high-tech sectors (Machado and Wilson, 2014). While such fast-growing businesses are often short of funding, banks are not best placed to provide it due to structural, rather than capital, reasons. Indeed, banks in most instances are not capital constrained: despite the application of stricter capital requirements (Basel III) (ADB and OECD, 2014), in the current environment of monetary expansion and historic low cost of borrowing, many banks seem to have sufficient capital to absorb the uptake in demand one would expect as the cycle continues to improve. **While not constrained in the quantum of their lending, banks are nevertheless constrained by risk considerations**: the risk of IT development and expansion of innovative, creative start-ups is normally beyond the range of risks banks are able or willing to take.

Limited demand for finance by SMEs in weak and uncertain business environments can also be considered as a key obstacle to growth, as companies are reluctant to undertake any investment projects. Even in the case of larger companies, capex in real investment projects has nowadays been replaced by massive share buy-backs. According to observers, regulatory changes have rendered the loan process more challenging for small bank finance seekers, discouraging them further and adding to the weak demand for financing coming from weaker macroeconomic environments. Fully untangling the supply from the demand side of the SME financing question is a challenging exercise. Nevertheless, policies to assist SMEs in public listing and to stimulate demand for quoted SME equity may be warranted.

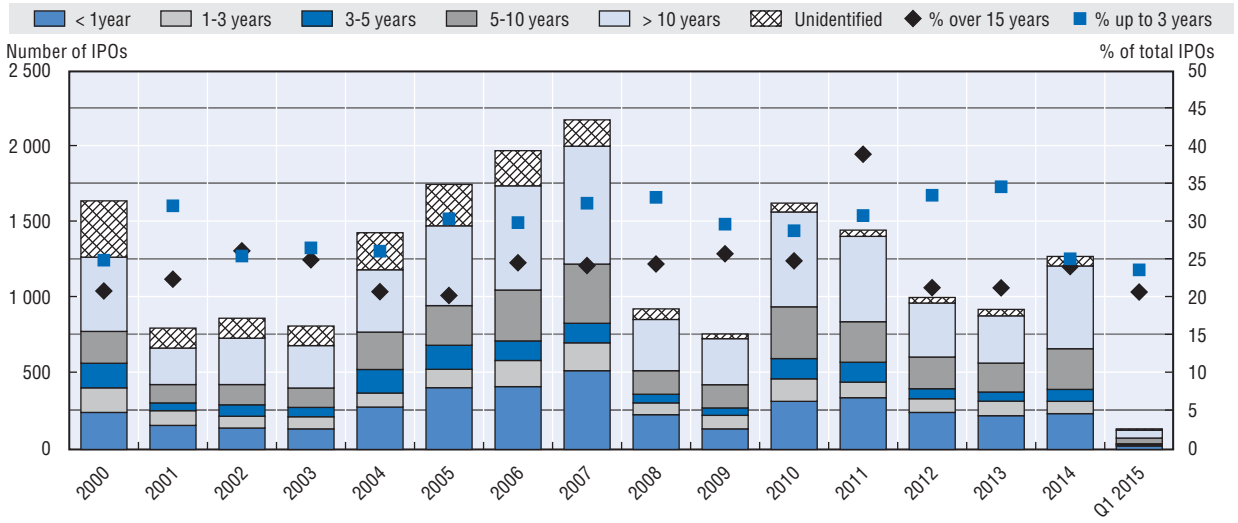
Many observers perceive a financing gap for risk finance delivered in a form that is suitable for SMEs, rather than a general SME financing gap applying to all SMEs. This view clearly differentiates between SMEs in general and fast-growing companies of smaller size. A mixture of mezzanine structures as, for example, available in the European corporate lending market, carrying higher interest rates in special structures, could be seen as a means to close such a financing gap by providing *de facto* equity in *de jure* loan structures. In this way the risk capital gap could be closed through the use of bank lending – the latter still being the preferred and best understood instrument, especially on the European continent. The bundling of standardised mezzanine for very small deals in an appropriately transparent, financial technology-supported fashion could probably be one of the few viable options available for these small, highly risky deals (Altenburg, 2015).

Equity markets are to a large extent tapped by fast-growing, young companies. Indeed, in the period 2000-15, the percentage of companies choosing an IPO path less than 3 years since foundation of the firm has been consistently higher than the percentage of older companies of 15 years or more of existence (Figure 1[4]).

SMEs are expected to continue to obtain most of their funding through bank lending despite lower lending growth, particularly in Europe. This is mainly attributed to SMEs'

Figure 1. **Breakdown of global IPOs by age of company at the time of listing, 2000 – Q1 2015**

In number of IPOs (l.h.s.) and in % of total IPOs (r.h.s.)



Notes: Global IPOs as defined in Footnote 4. Excluding real estate investment trusts (REITs) and blank check companies or special purpose acquisition vehicles (SPACs). Age from year of founding to year of listing, rounded to full years for calculation purposes.
Source: Factset, OECD calculations.

fundamentals and inherent characteristics such as diversity, scarcity of credit information as well as to the fixed costs associated with sourcing and monitoring small local firms (Wehinger, 2012). All the same, bank lending is neither the most appropriate nor the most feasible way to fill the identified risk finance gap for small, fast-growing companies.

The rapidly growing shadow banking segment, coupled with traditional venture capital, business angels and other early stage capital providers is expected to increasingly fill the gap that banks are unable or unwilling to cover when it comes to private equity financing.[5] Such private capital pools are beneficial in terms of cost rationalisation; however, alternative risk-based structures are perhaps needed in order to replace debt-driven risk finance – i.e. debt instruments used to finance equity risk – and offer a better solution in terms of quantum achieved.

Public markets are perceived as natural platforms for equity financing of small companies with important growth prospects, with a specific focus on the firms' risk and performance characteristics rather than on their size. The pool of fast-growing small businesses and their respective needs are different from those of the broad SME category. If a financing gap for the segment of fast-growing SMEs can be filled by markets for risk financing, this will have a direct impact on the ability of the real economy to grow. All the same, **public equity markets have to be regarded as complementary, rather than competitive, to bank financing.** To that end, a more coordinated effort among capital markets and the banking industry is required in order to fill this funding gap for "growthness".

III. Primary equity markets for SMEs

A. Developments of small IPOs and characteristics of SME public equity markets

As banks are reducing their lending in a post-crisis financial landscape, capital markets have to play a bigger role especially in financing long-term investment, including

in infrastructure, SMEs and knowledge-based capital, which are key contributors to economic growth and job creation.[6] The role of capital markets is even more pertinent for the financing of SMEs, as these are heavily reliant on traditional bank lending and currently face important financing constraints in a deleveraging environment where restricted bank credit availability prevails.

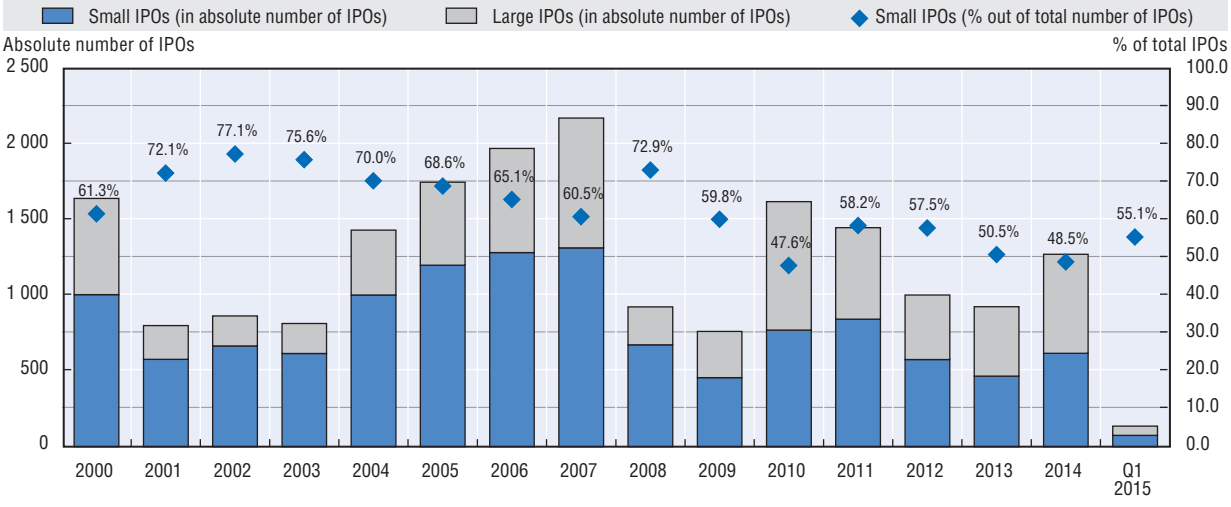
Besides the US, where equity markets are more liquid and mature, most developed and developing countries have still a large scope to increase the size, depth and relevance of their equity markets – particularly for smaller issuer firms. In many of today's economies outside the US, banks have remained the dominant source of external financing. This is the case particularly in Europe, despite the fact that organised exchanges offer an attractive and abundant alternative long-term financing source. Further development of equity markets in emerging economies is critical, as corporates rely heavily on external financing for their growth and expansion.

The number of listings and amount of equity raised in OECD countries has followed a downward trend that began in the early 2000 and was aggravated following the 2008 crisis (Isaksson and Çelik, 2013). This was true even in the US, traditionally regarded as the leading IPO market. There is also evidence (provided in the same study) for a global shift in public equity issuance from OECD to non-OECD markets, with almost 55% of all capital being raised in non-OECD markets in the period 2008-12 (compared to 20% levels before that) and 60% of all proceeds coming from non-OECD country companies.

Despite its relevance and appropriateness, capital market financing for SMEs remains underdeveloped, both for debt (securitisation, bond issuance, debt private placements[7]) as well as for equity (public listings, equity private placements). The proportion of small IPOs out of the total number of listings has dropped from mid-70% levels prior to the financial crisis to mid-50% levels thereafter (Figure 2). **The median size of IPO offerings has increased in the aftermath of the crisis**, peaking in 2012 (Figure 3).

Figure 2. **Global small IPO issuance, 2000 – Q1 2015**

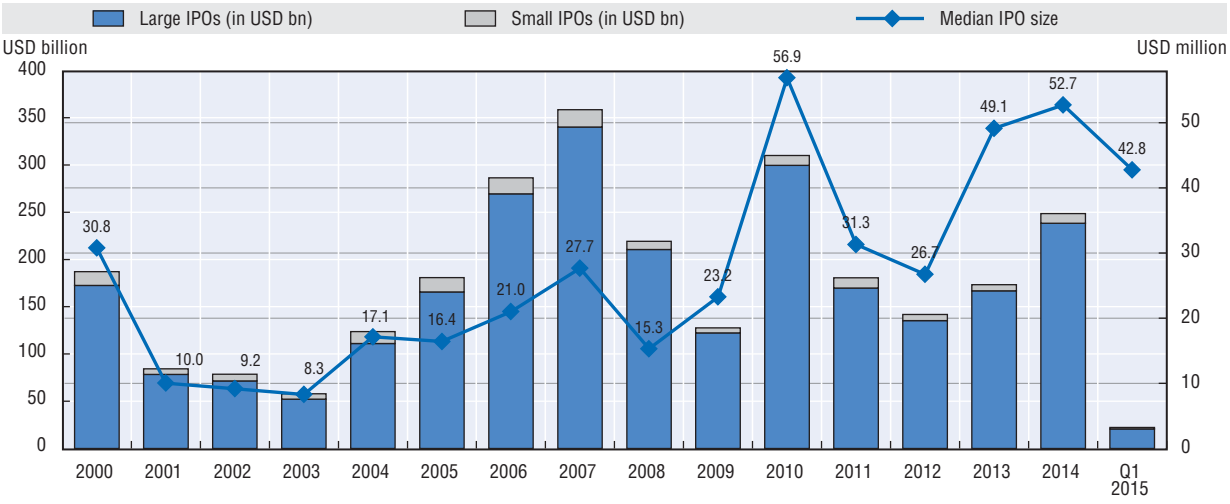
In absolute number of IPOs (l.h.s.) and % of total number (r.h.s.)



Notes: Global IPOs as defined in Footnote 4. Assuming a USD50m threshold as the cut-off for small IPOs. Excluding real estate investment trusts (REITs) and blank check companies or special purpose acquisition vehicles (SPACs).
Source: Factset, OECD calculations.

Figure 3. **Global small IPO issuance proceeds, 2000 – Q1 2015**

In USD billion (l.h.s.) and median IPO size in USD million (r.h.s.)



Notes: Global IPOs as defined in Footnote 4. Assuming a USD 50 m threshold as the cut-off for small IPOs. Excluding real estate investment trusts (REITs) and blank check companies or special purpose acquisition vehicles (SPACs).
Source: Factset, OECD calculations.

While it has dropped since, the post-crisis median size has broadly stayed above pre-crisis values, suggesting a lower use of public equity markets by smaller issuers, which in most cases represent smaller-size companies.

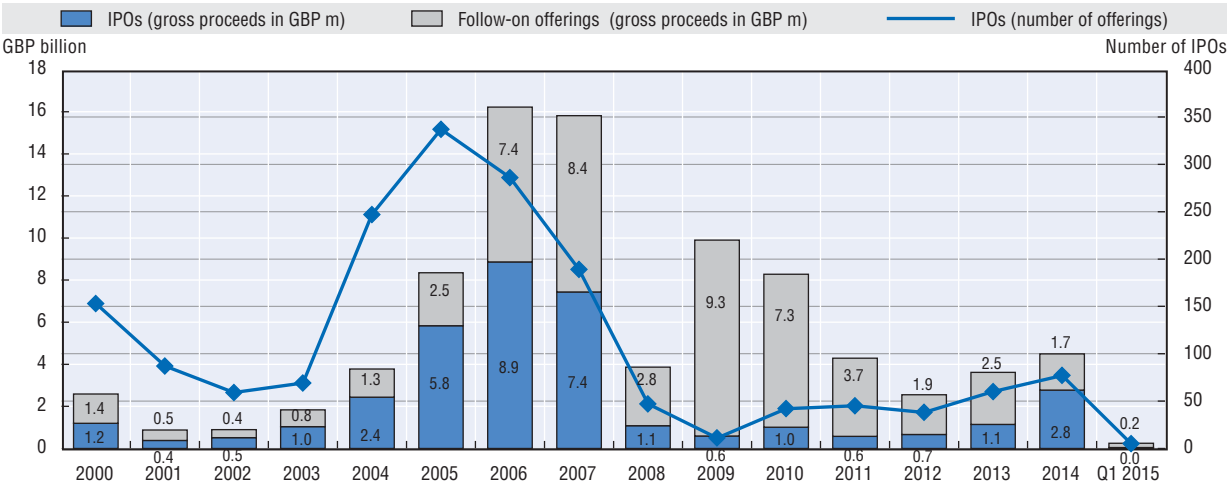
The level of follow-on offerings in secondary markets is another barometer of the health of the equity market, providing quoted companies with long term repeat access to finance. As those small companies grow, investment begins to pick up and the financing needs shift from funding working capital to funding fixed assets and other investment. The financing instruments that address those needs are also shifted from core bank lending and revolving facilities to cover day-to-day needs to equity finance to further invest and grow their business. In the UK for example, out of 4.5 bn GBP being raised on the Alternative Investment Market (AIM) in 2014, 62% was raised through IPOs and the remaining 38% through follow-on offerings (Figure 4). Activity was still reported to be much lower than prior to the financial crisis, with 77 IPOs coming to the AIM market during this period compared to on average 180-200 companies in a comparable period pre-crisis.

Public offerings in main markets entail admission costs and listing requirements that are, reportedly, "discouragingly high" for SMEs and disproportionately high relative to the size of offerings coming from smaller issuing companies. As an alternative, these companies could use trading venues beyond regulated exchanges, including multilateral trading facilities (MTF) and over-the-counter trading (OTC) of ad-hoc and irregular transactions, as well as systematic internalisers (market makers), investment firms dealing on their own account outside a regulated exchange or MTF.

A number of growth segments in regulated markets, multilateral trading facilities and other specialised SME equity platforms targeting smaller issuers have been established in different parts of the world as an alternative, and precursor, to main exchange listings. Examples of such listing platforms include the Alternate Investment Market in London UK, Deutsche Börse's Entry Market, Spain's Mercado Alternativo Bursatil, TSX Venture in Canada, NewConnect (Warsaw stock exchange) in Poland, Alternext/

Figure 4. **AIM IPOs and secondary offerings, 2000-Q1 2015**

In GBP billion (l.h.s.) and in number of IPOs (r.h.s.)



Notes: Excluding real estate investment trusts (REITs) and blank check companies or special purpose acquisition vehicles (SPACs).
Source: Factset, OECD.

Euronext and Alternativa in Europe, AltX in South Africa. The Enternext pan-European initiative (Euronext Group) promotes equity markets to SMEs and facilitates their access to financial markets. A number of growth platforms have been developed in Asia with Mothers and JASDAQ in Japan, ChiNext and the SME Board by the Shenzhen Stock Market in China, KOSDAQ and KONEX in Korea, China's Growth Entreprise Market in Hong Kong (HK GEM), the Market for Alternative Investment in Thailand, the SME Exchange and NSE India Emerge (Bombay Stock Exchange) in India.

SME growth markets offer more flexible listing criteria (see for example in Japan, Table 1), **eased disclosure requirements and comparatively low admission costs** (see Table 2 as an example) **so as to cater to SMEs' inherent characteristics.**[8] However, post-crisis activity in terms of IPOs on these specialised exchanges has slowed, in some cases more than on main exchanges (Figure 5). This may reflect the fact that advantages of listing on a main market (higher liquidity, larger range of investors) may outweigh the benefits of small growth exchanges (lower fees and more lenient listing requirements). It may be inferred that investor confidence in growth markets is also lower and therefore investor participation remains restrained particularly as compared to participation and confidence levels for the main exchanges.

At the same time, potential risks of exponential growth in the value of small platforms which may not be safeguarded by "circuit breaker" mechanisms need to be monitored. Rapidly rising valuation levels especially in emerging market growth platforms, not accompanied by a growth of the platform itself (i.e. number of listings) but instead driven by changes in the market structure, need to be carefully monitored. Recent changes in the number of securities trading accounts retail investors can hold in China aiming to spur competition between brokerage firms has, for example, contributed to a large extent to the ChiNext's valuation growth in the past year or so.

Table 1. **Listing requirements in main and growth markets, Japan**

	Main market		Mothers	JASDAQ		TOKYO PRO market
	1st section	2nd section		Standard	Growth	
Number of shareholders	2 200 or more	800 or more	200 or more	200 or more		-
Tradable shares (number of tradable shares)	20 000 units of more	4 000 units or more	2 000 units of more	-		-
Market capitalisation of tradable shares	JPY 1 billion (USD 10 million) or more	JPY 1 billion (USD 10 million) or more	JPY 500 million (USD 5 million) or more	JPY 500 million (USD 5 million) or more		-
Ratio of tradable shares to listed shares	35% or more	30% or more	25% or more	-		-
Public offering	-	-	500 trading units or more	10% or more or 1 000 trading units		-
Market capitalisation of listed shares	JPY 25 billion (USD 250 million) or more		JPY 1 billion (USD 10 million) or more	-		-
Number of years of business operation	3 years or more		1 year or more	-		-
Shareholders' equity	JPY 1 billion (USD 10 million) or more		-	JPY 200 million (USD 2 million) or more	Not negative	-
Amount of profits or market capitalisation	Ordinary profit: Total amount of JPY 500 m (USD 5 m) or more in the last 2 fiscal years Market cap: JPY 50 bn (USD 500m) or more Sales: JPY 10 bn (USD 100 m) or more		-	Ordinary profit: JPY 100 m (USD 1 m) or more Market cap: JPY 5 bn (USD 50m) or more	-	-

Source: Tokyo Stock Exchange, Osaka Exchange, Japan Exchange Regulation.

Table 2. **Fee comparison of Deutsche Börse's main market vs. Entry Standard market**

As of August 2014

	Regulated market		Open market (regulated unofficial market)
	General standard	Prime standard	Entry standard
Admission fee/inclusion fee	€ 3 000 admission & € 2 500 introduction fee	€ 3 000 admission & € 2 500 introduction fee	€ 1 500 inclusion fee
Annual fee/quotation fee	€ 7 500 p.a.	€ 10 000 p.a.	€ 5 000 p.a.

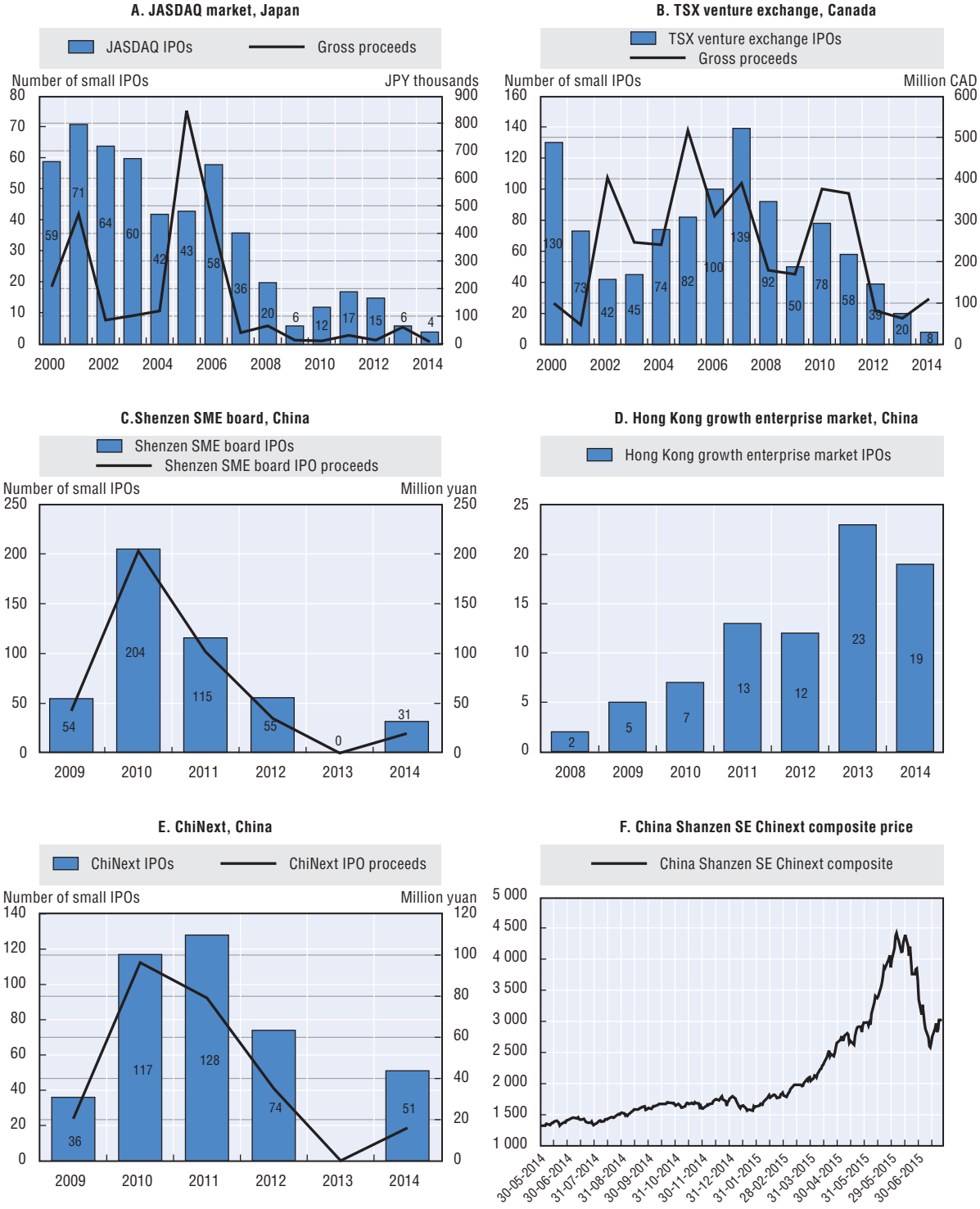
Notes: The Entry Standard for shares is a market segment regulated by the stock exchange with lighter prerequisites for inclusion and follow-up obligations that make it more suitable as an entry-level segment especially for young and medium-sized growth companies.
Source: Deutsche Börse (2015).

B. Benefits of SME public equity markets in an interconnected funding landscape

Market participants see the benefits of public equity offerings for SMEs, and these are thought to extend beyond initial access to capital (IPO) to longer-term repeat access to financing (secondary/follow-on raisings). Besides access to capital, SMEs publicly issuing equity enjoy a number of other benefits related to increased creditworthiness, transparency, visibility and credibility by association with a dedicated ecosystem and an advisor community. Public accountability, increased transparency and reporting implicitly or explicitly required by the markets encourage better management practices, governance and performance monitoring. The investor base of a company is extended (retail investors, sophisticated long-term institutionals) and at the same time risk tends to be distributed more efficiently. SME owners can realise their capital gains while enhancing the capital structure of their company and manage their cost of capital.

Figure 5. **Small IPOs in selected growth platforms**

In number of small IPOs (l.h.s.) and gross proceeds in domestic currency (r.h.s.)



Source: Factset, OECD calculations.

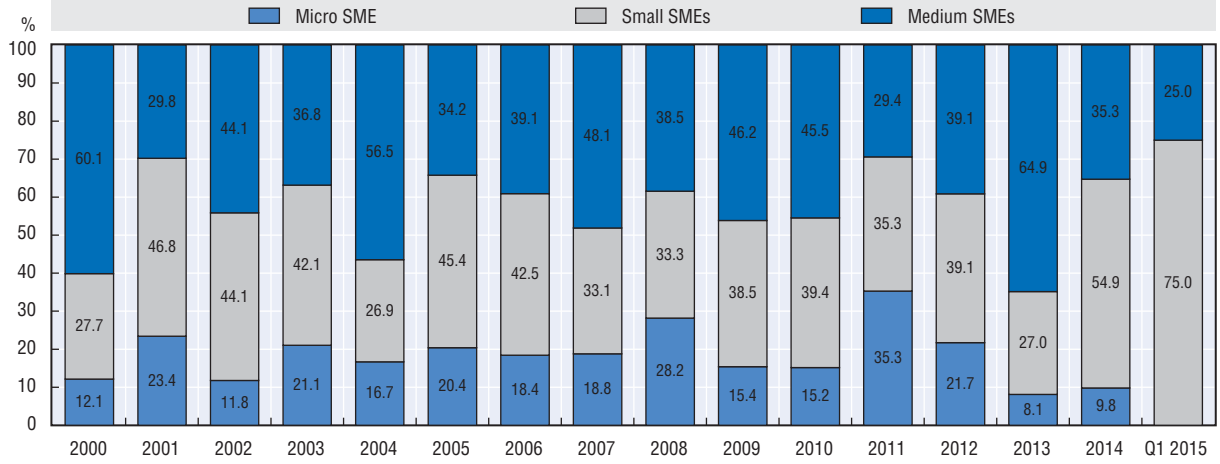
Nonetheless, SME equity markets could be considered to be most beneficial to the upper end of the SME size spectrum, at least at present time (for Europe see Figure 6). The SME universe is a fragmented territory covering a very wide range of business realities, not all of which can benefit from capital market financing. Companies of a sufficient size and adequate level of development find it easier to access the capital markets, with bank intermediation still recognised as essential for coping with information asymmetries inherent in smaller seekers of finance. Heavy reliance on pure financial market financing may prove problematic for SMEs given the size and characteristics of their individual needs at each stage of their development.

A number of inherent characteristics of SMEs may put a ceiling on their ability to draw bank financing from their "house banks". Examples of such characteristics are irregular or limited revenue streams (to respond to debt servicing requirements), limited bankable assets or the intangible nature of available collateral or unwillingness to secure debt with their own wealth. Highly levered capital structures might on the other hand make additional debt finance for expansion unsuitable for small, high-risk high-growth firms. Peer-to-peer lending and similar alternative loan providers can largely help fill the gap to bank debt finance, but cannot be considered as the most appropriate sources of risk capital for SMEs.

While public equity issuance can address the inability of some SMEs to access bank financing, equity financing should be seen as complementary to, rather than a substitute for, banking lending. Equity financing should go "hand in hand" with debt financing and the existence of both well-functioning equity and debt markets are required for efficient and effective SME financing. Various restrictions imposed on non-bank lenders in the SMEs (and broader) lending space[9] might drive investors such as hedge funds to equity investing. At the same time, a large number of hedge funds investing in SME equities have already been active in the wider SME debt space as their point of entry, gaining traction and experience with the asset class. Inversely, public listing of SME equity

Figure 6. **Split of European SME IPO sample by number of employees**

In percentage of total SME IPO sample



Notes: Based on the analysis of a sample of 1 102 IPOs identified to have been performed by European SMEs, as defined by their number of employees according to the EU definition.[1]

1. Employee criterion defined as follows: < 10 employees corresponding to a Micro SME, < 50 to a Small and < 250 to a Medium-sized SME.

Source: Factset, OECD calculations.

through primary and secondary offerings can increase the availability of, and improve conditions for, subsequent debt financing as a result of the equity on their balance sheet.

Strong links and interconnections exist between public equity markets for SMEs and the Private Equity (PE)/Venture Capital (VC) financing and the different forms of SME financing are not necessarily exclusive. Public equity offerings by small growth companies have traditionally been one of the most important exit avenues for PE and VC. But with the evolution of the risk capital model away from a leverage-based financial engineering one, observers see most of the value creation (around 80%) coming from heavier involvement in project realisation, active ownership, transformation of governance structure, expertise in the management of the business and people involved.[10] This can be reportedly evidenced by the lower insolvency rate of smaller growth companies backed by VC during the crisis. The strategic support and ongoing interaction of small companies with their VC-backers improves at the same time their suitability for a public equity offering (transparency, governance, reporting). At present, venture capitalists tend to remain involved in backed companies as anchor investors even after a company's IPO, using the public equity markets for further rounds of capital raising rather than a complete exit.

On the supply side, institutional investors like pension funds and insurance companies could constitute a great potential source of risk capital that may, however, need more regulatory support for its full deployment. Financial market regulation imposed in the wake of the recent financial crisis is thought by market participants to have unintended consequences on the flow of capital from large pools of patient capital to small units in the real economy via intermediate agents (fund and asset managers). A well-balanced regulatory and institutional framework could provide incentives for institutional investors to make their capital pools available for fast-growing SMEs and mature innovative SMEs that need capital to grow and explore new markets, while maintaining financial stability.

Some of the largest global asset management firms are providers of equity capital to VC-backed growth companies on their way to going public and upon their listing (when a listing is envisaged in a medium-term horizon, e.g. within 3 years). Such funding opportunities are sourced and brought to global asset managers by VCs that have gone through one or two rounds of seed capital investment in these companies. VCs can therefore further link fast-growing companies with other private sector actors, such as asset management companies, before their listing on a public exchange. While direct lending to SMEs may not be a profitable economic proposition for large private fund managers given the relatively high costs involved in getting a small deal done, profitable opportunities do exist in SME equity financing. Opportunities for a shift up in value that can be multiples of the investment are typically found in fast-growing but cash-burning SMEs in heavily innovative-intensive sectors such as pharmaceuticals and the broader technology sector.

Although there is space for aggregation funds and other listed investment vehicles to invest in SME equities, their viability is questionable on grounds of insufficient liquidity. Such vehicles have in the past traded at a significant discount to their net asset value, according to observers. For such structures to be fairly valued, investors require a method allowing them to realise their investment. With no cash coming out of the structure in the form of dividends and with dried up liquidity there is no way for holders to realise their investment but to sell. As a result, the bid/ask spread of the listed vehicle can

rise significantly and is subsequently treated as a permanent capital vehicle rather than a listed instrument which can be traded and monetised on demand, limiting the willingness of investors to buy in.

The emergence of crowdfunding is the most recent link in this interconnected funding landscape for SME equities. Views differ over the position of debt crowdfunding and other peer-to-peer (P2P) lending, as such platforms could potentially indirectly compete with traditional banks (particularly in the US) providing financing for innovative projects and nimble players in a quick and efficient way, in projects where speed is of the essence. On the other hand, projects funded by P2P platforms and crowdfunding have been – in most instances – turned down by professional credit assessors as not debt suitable and are being passed on by the banks to retail investors with more appetite for high-risk high-return propositions. Regarding equity crowdfunding[11] in particular, risks seem to be underpriced and leave especially retail investors unprotected against, or uncompensated for, high default rates (of around 18% on some accounts). It should be noted, however, that it is still early days for both P2P lending and crowdfunding to assess their full potential, and their evolution should continue to be monitored. Be that as it may, like venture capitalists, equity crowdfunding investors will also seek an exit for their investment and therefore require well-functioning and liquid equity markets to be used as exit routes for the growth companies they back.

C. What hinders the development of SME public equity markets

The share of SME financing provided through capital markets is currently very small, despite the fact that a number of organised exchanges and platforms could present an attractive and abundant long-term alternative financing source offering numerous benefits to all participants involved. **A number of important impediments to the wider use of public equities for SMEs,** for issuers and investors alike, hamper the promotion of equity markets for small issuers. Overcoming such impediments may be a more important effort in Japan and Europe where equity issuance overall is smaller in terms of GDP than in the United States where equity markets play are more prominent role (Figure 7[12]).

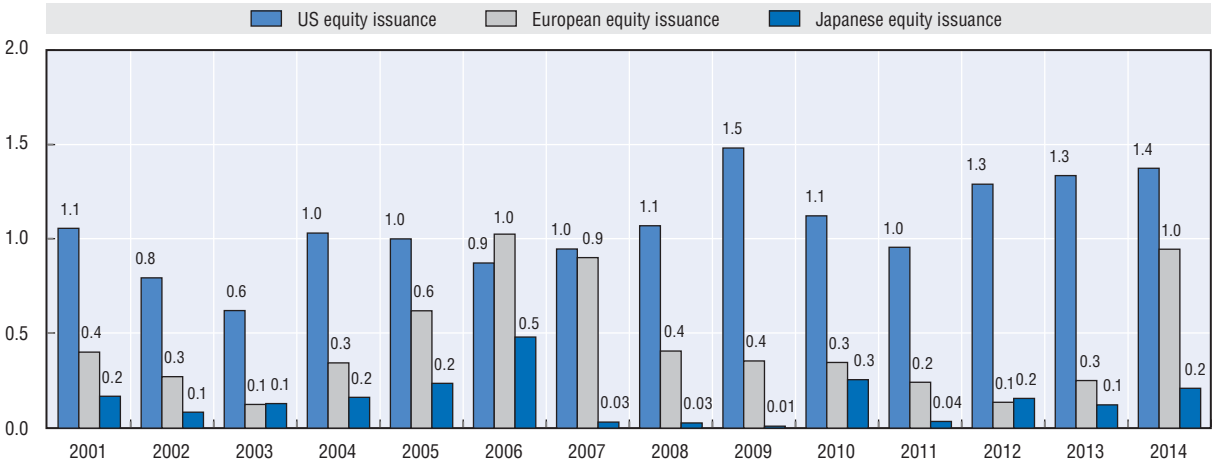
Difficulties facing SMEs seeking public equity financing are not limited to the respective cost burden (admission fees, advisors and broker commissions), although this is arguably the largest impediment SMEs face on their way to a public offering. Red tape and heavy reporting requirements are considered as an indirect form of cost related to going public. Fear of being exposed to share price volatility but also aversion to sharing sensitive information is particularly important to innovative business models (for the United Kingdom, see Figure 8). Lack of education around the process of listing and life after an IPO leads to loss of confidence to go through the offering process and partially explains the reluctance of SMEs to join equity capital markets.

Besides being reluctant to tap the capital markets, SMEs have substantial structural disadvantages that arise from limitations inherent to their nature. Such limitations are found in terms of intrinsic risk assessment due to the lack of transparent and standardised information,[13] financial sophistication and reporting capabilities, communication and visibility.

Such inherent characteristics of SMEs explain the relatively small absolute number of companies that are suitable for accessing capital markets. This might explain the focus

Figure 7. **Equity issuance in Europe, Japan and US, 2000-14**

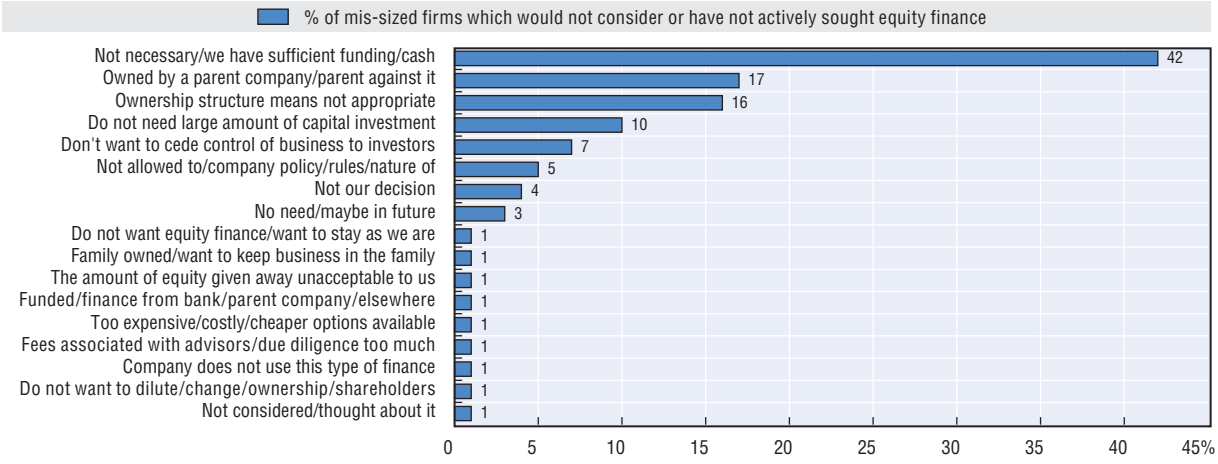
In per cent of nominal GDP



Notes: Based on annual exchange rates and on GDP in current prices. Excluding REITs and SPACs. For Japan, primary issuance only.
Source: Factset, Thomson Reuters Datastream, OECD.

Figure 8. **Reasons not seeking equity finance in the United Kingdom**

% of respondents



Source: British Business Bank (2014).

on bank lending and other forms of debt financing in the policy discussions around access to finance for SMEs.

Fast growth seems to be the common characteristic of those SMEs that are deemed suitable for tapping the equity capital markets: The majority of the 1 700 companies admitted to growth markets across Europe are noted to be the highest growth businesses in the area. For example, 1 100 small companies are quoted on (AIM) market, with the median market capitalisation value being GBP 25 million and the average close to GBP 17 million. All of these companies tend to be at the higher risk end of the spectrum, thus equity finance is often the right form of finance for them.

An alternative firm "labelling" according to the cash flow generation of a firm instead of its riskiness has been proposed by some market participants,: *cash-flow-positive* vs. *cash-flow-negative* companies, instead of low-risk or high-risk ones. Such cash-flow-

positive companies are most likely to prefer the terms of debt financing, finding equity financing at times too expensive, while on the contrary, equity financing is typically the right type of financing for cash-flow-negative ones. Despite their global nature, the primary amount of SME equity investing has been in the US, assisted by the better organised ecosystem existing in the Silicon Valley.

The limited development of successful growth company exchanges and platforms is also explained by the unwillingness of entrepreneurs to relinquish any share of ownership or control of their business (as is the case with VC investments) or accept potential lock-in periods upon listing. The ownership structure of many family-owned and -run SMEs or ownership by a parent-company render equity a less sought for financing form.

D. Re-defining SMEs: The financial perspective

There is no single definition of an SME. SMEs are generally considered to be non-subsidiary firms which employ less than a given number of employees (500 in the US, 250 in the EU, etc.; OECD, 2006). The number of employees is not necessarily the sole defining criterion in the various jurisdictions: for example, financial assets are used to define SMEs in the EU together with the number of employees, with the turnover limit for SME firms set at EUR 50 million and/or total assets at EUR 43 million maximum.[14] **Such SME definitions are designed to orient policy makers** in the design and implementation of targeted SME policies.

In practice, financial institutions do not in general follow the preferred definition of national authorities when categorising their SME lending. Each bank sets a ceiling (EUR 1 million or EUR 25 million for instance) as the cut-off point for their SME business, making it extremely challenging to identify SME financing gaps. A gap in the credit process is reported by market participants to exist in the range of EUR 2-10 million required financing, amounts too small for public offering or PE funding but too large to fall into that small category for which the bank is willing to take the risk of small loan amounts. The origination of small SME loans is extremely demanding in terms of infrastructure, fixed-cost nature of sourcing, local presence and relationship building while the risk is high, with default rates in some cases reaching 40-60% of the portfolio for start-ups, according to observers' estimates. As discussed elsewhere (Nassr and Wehinger, 2015), especially for such small loans, securitisation may offer a viable solution to the SME financing problems, by creating headroom in banks' balance sheets and allowing them to originate and monitor more small heterogeneous and mostly local credit..

The high-growth, innovation-based characteristics of small companies most suited for equity market financing are not covered by the standard SME definitions. Instead, a plethora of definitions of companies eligible for admission in growth markets exists. In Europe, an average market capitalisation of less than EUR 200 million on the basis of end-year quotes for the previous three calendar years is used as the basis of the Market in Financial Instruments Amended Directive (known as MiFID II; EC, 2014a). Wider use of such a definition would present the downside of excluding young firms with a lifespan of less than 3 years, as the definition reflects a specific purpose which is to ensure market access for more seasoned SMEs. At the same time, young SMEs would not be accounted for in the calculation of the 50% SME issuers threshold for the characterisation of the platform as an SME Growth Market (see Box 1). The European Securities and Markets Authority (ESMA) has proposed a more flexible definition to the Commission, allowing young firms with market

Box 1. **Defining SME growth markets under MiFID II**

The ongoing process of MiFID II, expected to come into force on January 2017, provides for a new category of specialist markets catering specifically for the needs of SME issuers. It envisages the establishment of a regime for the registration of multilateral trading facilities (MTFs) offering facilities to SMEs as "SME growth markets" (SME-GMs), should they meet certain criteria specified by MiFID. The establishment of this new category of market aims to raise their visibility and profile while developing common regulatory standards for such markets across the EU.

In order for a MTF to be registered as a SME-GM, at least 50% of the issuers whose financial instruments are admitted to trading on the MTF have to be SMEs at the time of registration of the MTF as an SME growth market and in any calendar year thereafter. For the purposes of MiFID Directive, SMEs are companies that had an average **market capitalisation of less than EUR 200 million** on the basis of end-year quotes for the previous 3 calendar years.

The European Securities and Markets Authority (ESMA) proposes a more flexible way for assessing the 50% threshold while allowing and promoting access of *young* issuers to SME-GM. In its technical advice on MiFID around the eligibility criteria of SME-GM, ESMA considers that as an expression of the flexible way of implementing the 50% criterion, SMEs with a history of less than 3 years should also be counted as SMEs if their market capitalisation upon commencement of trading or based on the end-year quote after the first year of trading or the average of the end-year quotes after the first two years of trading is below EUR 200 million. In addition, the 50% threshold of issuers whose financial instruments are admitted to trading and which can be classified as SMEs should be assessed on the basis of the number of issuers only, disregarding other factors such as firm size, turnover etc. Safeguards against deregistration of SME-GMs are introduced, and an SME-GM shall only be deregistered as such if it falls below the qualifying 50% threshold for a number of 3 consecutive years. Entirely new markets applying to become an SME-GM can qualify if there is an expectation that at least 50% of the prospective issuers will be SMEs.

Source: EC (2014a), ESMA (2014).

capitalisation of less than EUR 200 m even upon commencement of trading to be counted as SMEs (ESMA, 2014). The Prospectus directive, in its 2010 amendment, uses the standard EU definition for SMEs and proposes a new category of companies with "reduced market capitalisation" for listed companies on regulated markets that have an average market capitalisation of less than EUR 100 million on the basis of end-year quotes for the previous three calendar years (EC, 2010).

In the **United States**, the Securities and Exchange Commission (SEC) proposed a different approach by defining companies under USD 75 million of public equity float as ***Smaller Reporting Companies***, allowing for scaled and streamlined disclosure (SEC, 1998).[15] The Jumpstart Our Business Startups Act (JOBS Act) which became effective in 2012 introduced a new category of issuer under the Securities Act and the Exchange Act defined as an ***emerging growth company (EGC)*** (see Box 2). For a company to be qualified as emerging growth, its total annual gross revenue should not exceed the cap of USD 1 billion in the last fiscal year, allowing a significant part of new companies willing to go public to take advantage of such status.

Box 2. **Emerging growth companies under the Jumpstart Our Business Startups Act**

The Jumpstart Our Business Startups Act (JOBS Act) aimed to ease access to the public capital markets for *Emerging Growth Companies* (EGCs) in order to stimulate entrepreneurship and job creation and addresses, *inter alia*, the crisis of the US IPO market (Figures 9 and 10).

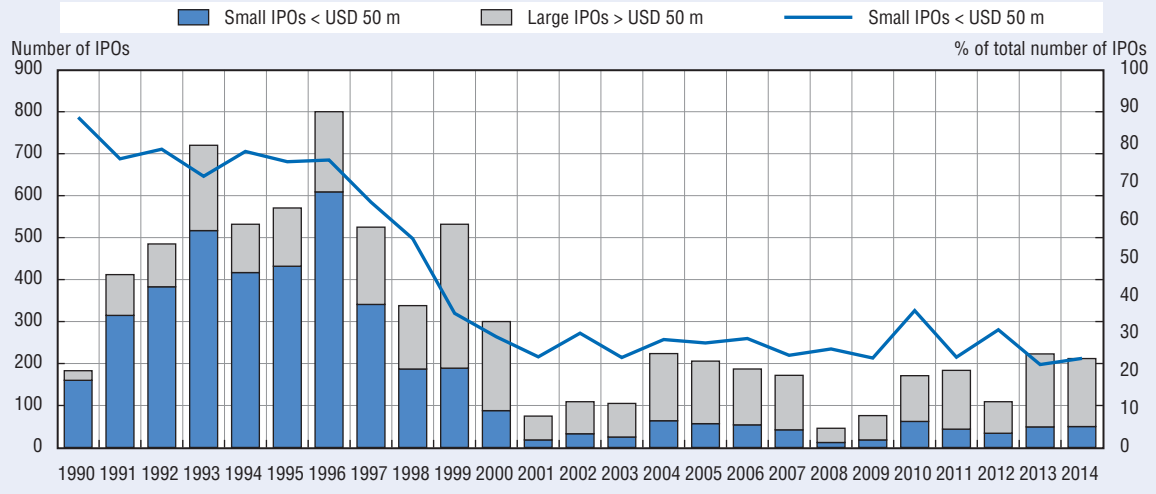
For an issuing company to be defined as an EGC, its total annual gross revenues should not exceed USD 1 billion for its previous fiscal year. An EGC remains qualified for 5 years following its first sale of common equity securities, until its revenues surpass USD 1 billion, it issues USD 1 billion of non-convertible debt securities over a rolling 36 month period, or it becomes a large accelerated filer (seasoned issuer with public float of USD 700 million or more). Issuers that had their first common equity securities offering under an effective registration statement on or prior to 8 December 2011 cannot qualify as EGCs. Foreign private issuers are eligible, representing 10% and 15% of total issuers in the first and second year, respectively, after the Act's enactment.

EGCs are provided with regulatory relief during the IPO "on-ramp" period (up to 5 years), facilitating their transition from a private to a public company:

- **Testing the waters** with qualified institutional buyers (QIBs) before or after filling a registration, EGCs benefit from prospective investors' feedback while maintaining confidentiality and flexibility around the timing of the IPO.
- **Confidential SEC registration review** allowing the company not to publicly disclose sensitive information prior to publicly filing.* Combined with the investor market sounding exercise, ECGs benefit from invaluable insights from the market and flexibility around the timing and market conditions, allowing them to decide whether and when an offering is realistic and/or optimal. Almost 90% of ECGs submitted confidentially on the second year of the JOBS Act.
- **Scaled financial disclosure** with two (instead of three) years of audited financial statements required, together with two (instead of five) years of selected financial data.
- **Internal controls audit exemption** reducing the costs and distractions of the management team from the IPO process, **streamlined disclosure of executive compensation, extended phase-in for new accounting standards** and **lifted restrictions on general solicitation (purchasers must be accredited investors) and post-IPO research**.

Figure 9. **Small IPOs by US companies, 1990-2014**

In number of IPOs (l.h.s.) and % of small IPOs in total (r.h.s.)



Notes: Excluding offerings by investment trusts.
Source: Thomson Reuters, OECD.

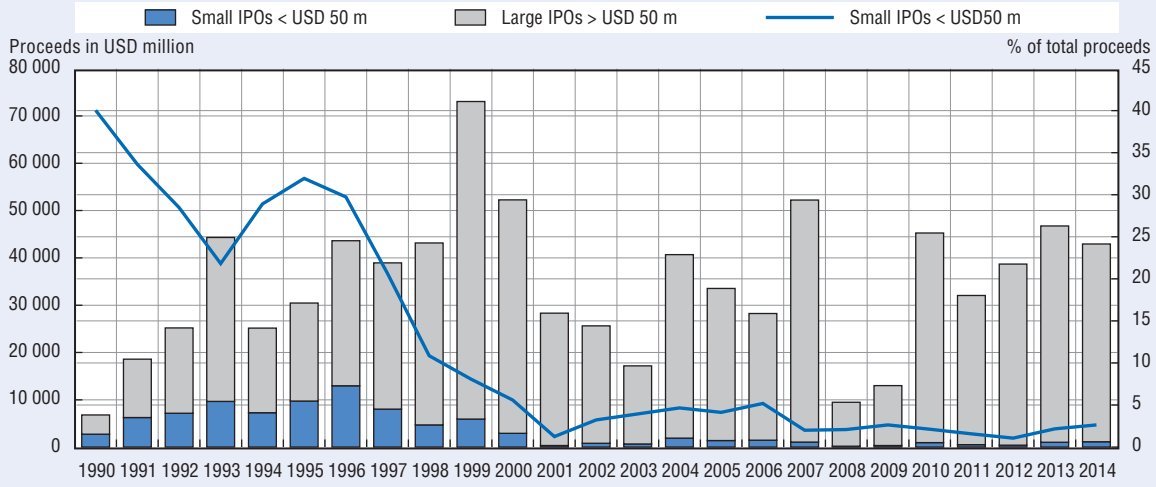
Box 2. **Emerging growth companies under the Jumpstart Our Business Startups Act** *(cont.)*

Most EGCs made use of the SEC confidential review process (almost 90% in the second year after implementation of the Act) and the scaled financial disclosure (65% of EGCs for the same period). On the other hand, companies seem to opt out of the extended phasing-in for the new accounting standards, or solicitation-related or research possibilities available to them.

All in all, the JOBS Act has helped to spur the IPO market, with more than 75% and 85% of total IPOs in US markets performed by EGCs benefiting from the relief of the Act in the first and second year of implementation of the Act, respectively (Latham and Watkins, 2014).

Figure 10. **Small IPOs by US companies by proceeds, 1990-2014**

In USD million (l.h.s.) and in % of total proceeds (r.h.s.)



Notes: Excluding offerings by investment trusts.
Source: Thomson Reuters, OECD.

* Initial confidential submission and all following amendments must be filed publicly at least 21 days before the roadshow.
Source: US Congress (2012).

Under Regulation A, non-publicly traded small companies were granted an exemption to SEC's registration rules for offerings of maximum USD 5 million [Section 3(b) of the Securities Act), allowing them to raise public equity through an abbreviated, "mini-registration" process (reduced disclosure, "test the waters" ability, etc.). Public solicitation of both accredited and non-accredited investors was also allowed. Despite its various benefits, Regulation A has not been widely used, due to requirement by the issuers to comply with state "blue sky" laws (regulating the purchase and selling of securities) in each of the states where the offering was to be conducted, but also due to the relative offering costs compared to the absolute amount being raised.

Title IV of the JOBS Act expanded the exemption from SEC registration rules for "mini public offerings", raising the threshold to offerings of securities over USD 5 million and up to USD 50 million within a 12 month period (known as **Regulation A+**).[16] Regulation A+ provides for two Tiers of offerings, Tier 1 for up to USD 20 million and Tier 2 of up to USD 50 million in a 12-month period. In order to protect investors, investor protection provisions were also expanded: issuers are subject to initial and ongoing disclosure obligations, although these are less onerous than those required of most publicly listed

companies. The purpose of Regulation A+ was to align-in some ways Regulation A+ offering statement disclosures with smaller reporting companies conducting registered offerings, with a view to reduce regulatory compliance requirements and subsequent costs (SEC, 2013). Indeed, Tier 2 offerings (up to USD 50 million) are exempt from state securities law regulation, known as "state blue sky security laws", although such offerings are required to provide audited financial statements. Similar to EGCs, issuers under Regulation A+ can "test the waters" with investors, soliciting interest in from the general public to participate in their capital raising, both before and after the filing of the respective offering statement.

The flexibility provided by Registration A+ can be especially appealing to institutional investors. Securities issued under such ruling are not restricted and shall be publicly offered and freely tradable in the secondary market.

Small equity offerings enabled by such regulation can act as a precursor to an IPO. Such mini public offerings clearly respond to the need of mature private companies of small size, willing to raise capital through equity offering but unable to take on the cost of a full listing. The experience of preparing for such an issuance and complying with the (even lighter) requirements can educate the managers and smooth the path to a potential full equity listing at a later stage.

E. Small company IPOs and proportionality as a means to spur public equity funding

Rather than trying to harmonise the SME definition across the range of financing instruments, the replacement of the "SME" by a "small IPO" or "small cap" designation for the purposes of public equity markets appears to be the most appropriate way forward. Such a definition would embrace small and medium-size firms of different age and size.

To that end, the qualification of a small company IPO could be based on the size of the offering and potentially the relative weighting of the company's market capitalisation instead of absolute company size criteria, similar to the spirit of the US regulations. Previous proposals for a Small Business Act for European SME issuers, for instance, suggested an offering size criterion of EUR 75 million coupled with a market capitalisation ceiling of 35% of the average market capitalisation on the specific listing venue (Demarigny, 2010).

A proportionate approach with regard to listing rules, regulation and supervision could encourage public equity issuance for small companies. Any attempt to lower the requirements for small company equity issuances in terms of transparency, corporate governance or disclosure could diminish investor protection and by consequence market appetite for such instruments. The application of proportionate requirements for smaller issuers would translate into different, not necessarily lower, requirements, and in some cases these would even have to be higher for small caps as compared to large caps.

The listing prospectus is a good example showcasing the merits of proportionality. Corporate governance requirements concerning audit and remuneration committees are tailored for blue chip companies with dispersed shareholding and are not relevant for most small issuers where the owner can be the inventor of the product, the manager and a major shareholder. Given the riskiness of such small innovative companies, information disclosure about the specific risks of the company (dependence on a client, a product, innovative product related information, market integrity areas etc.) should be further enhanced as compared to blue chip companies. But alleviating requirements may be an obvious solution in some cases. For example, disclosure of historical information cannot be

equally feasible for long-established companies as for the youngest, fastest growing SMEs that wish to list. Rethinking the requirements according to the age of the company and the size of the offering can result in information that is not only more proportionate but also more informative to the investor, strengthening the level of protection granted to prospective investors. **High standards of information disclosure throughout the life of an equity offering/listing should be preserved for all issuers in order to attract and retain investors.**

Proportionality in listing rules and requirements allows for more affordable transaction and regulatory costs for small equity issuers. The costs associated with the listing process and with the ongoing requirements once public are mentioned as one of the main reasons for the inability of small issuers to tap those markets. The prospectus requirements at the Alternative Investment Market (AIM) of the London Stock Exchange (LSE) is a good example of such practices: although AIM admission documents are modelled on the prospectus directive – thus the disclosure requirements are broadly similar for large and small issuers – vetting by an external regulator is not required. Such vetting involves an additional cost for the issuer that is not necessarily meaningful for a small company that is better understood by its advisors more than by any other external party. Besides cost saving, such a vetting waiver expedites the process by six to eight weeks and gives an important flexibility to the issuer with regard to market timing. This is particularly important in volatile markets when having an admission document that is tied up with the regulator can often deprive the issuer of the advantage of choosing the perfect market timing, entailing further costs.

The JOBS Act increased the threshold for registration of a class of securities with the SEC if the securities are held of record by 2 000 people or more, from 500 people previously, provided that no more than 499 of those 2 000 holders of record do qualify as "accredited investors" under SEC rules. This provision effectively allows small issuers **a wider retail participation in their shareholding,** dissociating a wider shareholder base from the perhaps costly reporting obligations applicable to larger public companies and promoting retail investment in small equity offerings. Given that this new ruling excludes from these calculations holders having obtained equity under the issuer's equity compensation plans, high-growth companies can **maintain effective equity compensation strategies for hiring** and expansion without worrying that such schemes might trigger registration requirements.

The corresponding thresholds in Europe for exemption from Prospectus requirements (the parallel to SEC registration) are as low as 150 natural or legal persons participating in an offer of securities, other than qualified investors.[17] Offerings of securities with a total consideration of less than EUR 5 million are also exempt from Prospectus requirements, as well as offerings solely addressed to qualified investors. Such disproportionately lower thresholds compared to the US are considered by market participants as an impediment to the wider use of equity markets by SMEs in Europe, forcing small issuers to perform tightly controlled institutional offerings and ending up with very tight shareholder registries. Companies that have already publicly traded equity are offered a prospectus exemption for secondary issuances of a class of securities that is already admitted to trading on a regulated market up to a limit of 10% p.a. Information on companies that are already publicly traded is available in the public domain and the production of a prospectus for a follow-on/secondary offering is therefore viewed by market participants as an unnecessary cost that neither investors nor issuers benefit from.

In such cases prospectuses tend to be "boilerplated" including a lot of information that is regarded as unnecessary or useless in the interest of time and cost, resulting in hundreds of pages of detailed information that is deemed complex to wade through by investors and heavily costly by issuers.

The European Commission has recently launched a consultation process on the Prospectus Directive with a view to making it easier for SMEs to raise capital throughout the EU while ensuring effective investor protection (EC, 2015a). The consultation considers, *inter alia*, the recalibration of all the abovementioned thresholds for exemption from the prospectus requirement, while also simplifying the information included in prospectuses, and streamlining the approval process. This is intended to facilitate the widest possible access to the capital markets by companies across the EU, with a particular focus on small companies. The consultation was launched together with the Capital Markets Union project,[18] and the final rulings are expected to reflect market developments around SME growth markets pursued in the context of the CMU.

The right balance between administrative cost or regulatory burden and transparency of information needs to be struck such that any proportionality or flexibility provided to SMEs does not result in weak investor protection or compromised integrity of market participants, weak corporate governance or insufficient transparency while the administrative burden is somehow alleviated on small issuers and small offers.

F. Liquidity and lack thereof

Low levels of liquidity, somehow inherent in the SME asset class, act as one of the most important deterrents to investment in public SME equities. Liquidity risk is reported by investors as one of the biggest challenges when it comes to small public equities. SME equity markets are reported to typically have about 30% of the liquidity of main markets (Oliver Wyman, 2014). According to market participants' illustration of the situation, 95% of the liquidity of a small equity market is concentrated in 5% of the companies, which are the equivalent of the main market's blue chips.

The relative low volume of shares traded on growth markets compared to main markets is often attributed to the small sizes and limited free float that small caps regularly offer. Entrepreneurs and owners tend to retain important stakes in the company while management compensation schemes in innovative high-growth companies often involve distribution of shares. Buy-and-hold strategies of institutional investors can also limit day-to-day trading. Minority shareholder rights and investor protection mechanisms seem to also drive depth of equity markets overall, irrespective of size of the offering.

Liquidity remains the precondition for an exit from an investment and exchanges can facilitate such exits, assisted by the broader ecosystem existing around the exchange. Listing in itself does not provide a true exit strategy for investors who want to disinvest. With insufficient market liquidity it might take years for an investor to completed sell off their holdings in a company (unless it is under conditions of a fire sale). When liquidity is constrained, investors cannot get the stocks required to fulfil their portfolio requirements in a timely fashion, deterring their participation in such markets. The small size of issue offerings are, by definition, not supporting deeper markets and present another obstacle to larger institutional investors who look for larger trades. In the absence of liquidity, price discovery is distorted altogether and investors are diverted to more accessible alternatives such as investing in blue chip shares instead.

While promotion of SME listed shares to retail investors might be a way to enhance market liquidity, appropriate safeguards would need to be put in place for their protection. Although active retail investor participation could provide much sought-for liquidity for small listed shares, risks of inappropriate sales practice and abuses may occur, highlighting the need for safeguards particularly given potential damage to confidence in markets. The right balance needs to be achieved between maintaining retail participation alongside wholesale and institutional investors in the SME equity space and appropriate investor protection mechanisms for retail investors.

In Europe, tight thresholds for prospectus requirements exemption might be damaging already constrained liquidity in the small public equity markets. As previously mentioned, issuing a prospectus can be a costly and administratively burdensome process for small companies. Smaller issuing companies are therefore indirectly incentivised to restrict their offering to a very limited number of non-qualified investors in order to be exempt from the requirement of a prospectus (current threshold set at 150 natural or legal non-professional investors). With such limited offerings, most small companies start out their life as public companies with very tight shareholder registries, which has a damaging effect on liquidity.

Similarly, denominations for transactions tend to be too large for retail investors in Europe. The minimum entry ticket for offers to be eligible for exemption from the European prospectus directive (currently set at EUR 100 000) does not render the offering easily accessible to retail investors. This effectively raises the cost and requirements of a transaction targeting retail investors and limits the spectrum of investors for small issuers that try to avoid such costs. This has a dampening effect on liquidity for small equities.

Retail participation in SME equities through collective investment vehicles of small investors might be a safer and more appropriate way for retail investors to access the SME market space. A companion product to European *Undertakings for Collective Investment in Transferable Securities (UCITs)*, allowing for illiquid instruments (whether fixed income or equities) would be an example of such investment fund. Indeed, the European *Long-Term Investment Fund (ELTIF)*, a new type of collective investment framework introduced in early 2015, allows investors to invest into companies and projects that need long-term capital. Besides infrastructure, ELTIFs can also invest in certain listed SMEs, real assets that need long-term capital to develop them, intellectual property and other intangible assets, as well as European Venture Capital Funds (EuVECA), and European Social Entrepreneurship Funds (EuSEF) (EC, 2015c).

Wealth management/private banking could be considered as an additional source of liquidity, adding to the breadth and variety of the investor base for small equity markets. Wealth management investor pools consist of several investors that tend to be well-positioned to pick winners and identify genuine growth potential and attractive investment opportunities in equities, especially in the sectors where they might have earned part of their wealth. Bridging the SME book and the wealth management book of a bank could facilitate transformative investments for growth. Unintended consequences of regulation (e.g. ring-fencing in the UK) in place raise barriers to the connection of the two books of such platforms.

Furthermore, **passive investment strategies**, such as indexing, could be examined as a new way to attract long-term institutional investors to SME listed equities, particularly

given information asymmetries and high transaction costs relative to the size of the investment.

Public policy, including tax measures, can be effective in stimulating liquidity in small equities, not only by inducing participation of institutional investors, but also retail investors specifically, in growth markets. In the UK, the abolition of the stamp duty on trades of AIM shares resulted in a 40% increase in average daily value of trading in the three months following the implementation of the policy. Furthermore, eligibility of AIM shares for ISA inclusion in August 2013 had a direct result of over GBP 4.5 bn directed into those products. Similarly, in France, the creation of a PEA-PME savings account[19] incentivises and promotes active participation of the retail base in SME quoted shares. Such promotion of investor participation in growth markets also demonstrates that the liquidity of public growth equity markets can be enhanced through public intervention, despite SME equities being relatively less liquid almost by nature. But while the inclusion of small equities in tax-efficient individual savings accounts can stimulate retail participation and deepen markets for such shares. The benefits of such widening of participation must be balanced against the high level of riskiness of investment in SME public equity. Such concerns may raise financial consumer protection issues and call for enhancing financial education especially for small investors.

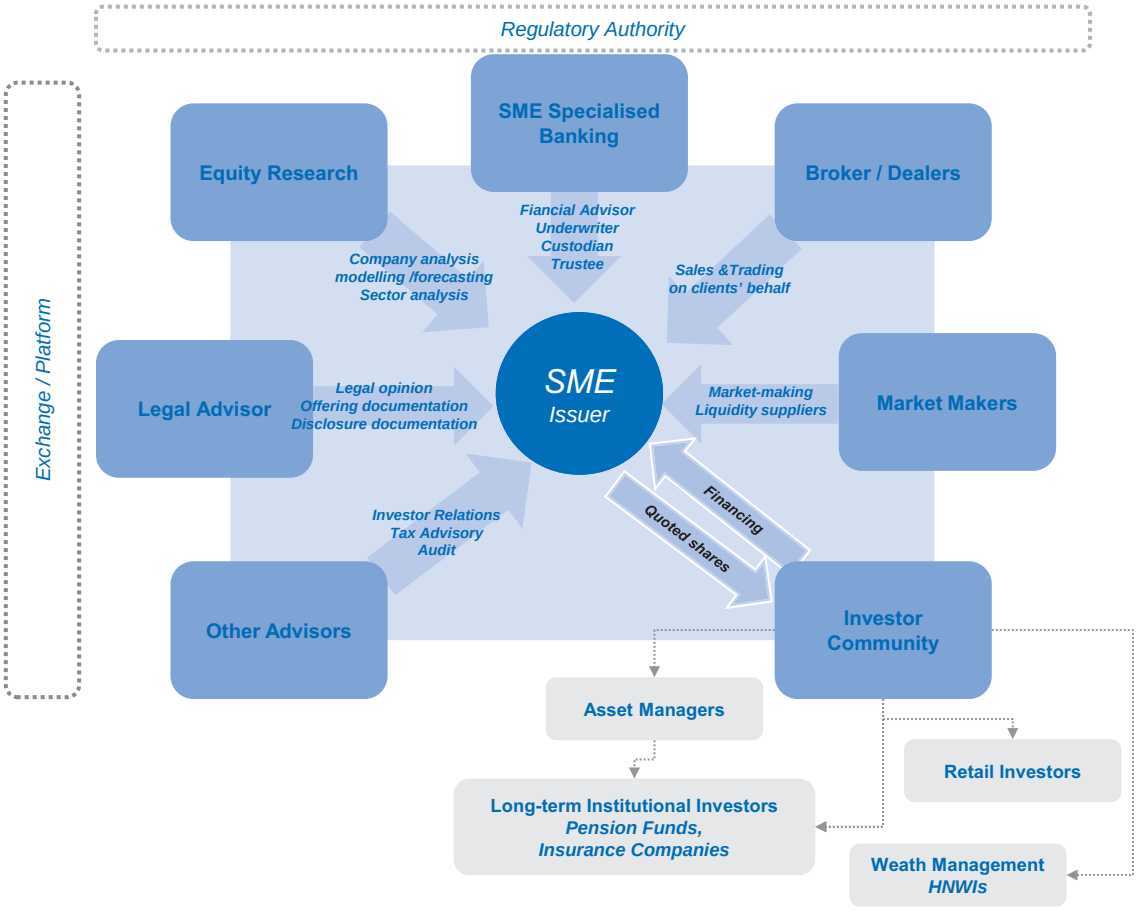
The promotion of long-term investment schemes in SME equities could be facilitated by adjustments in regulation which is deemed by the market to have unintended negative consequences on the availability of equity for SMEs, particularly in Europe (Basel III, Solvency II). Supply side institutional investors willing to invest in small equities are faced with capital requirements deemed restrictive, if not prohibitive. Risk weightings under Solvency II are often being mentioned as an example of such regulation, with insurance companies investing in government bonds with 0% risk weighting vs. 39% risk weighting for an equity investment. This is a reason why such investors may not invest, or invest very little, in equities as they would have to set aside 40% of the capital to make such equity investment. Nevertheless, financial stability concerns are relevant especially for this asset class, and any deliberate promotion of SME equities or other non-bank lending instruments for SMEs should not come at the expense of reduced overall financial stability.

G. The need for a dedicated ecosystem

Public equity markets for small companies need to be supported by a healthy ecosystem dedicated to sustain capacity to take SMEs public and support them in secondary markets. Such ecosystems consist of investment banks, SME-specialised banks, research analysts, sales, brokers, market makers, and other third party advisors focused on SMEs (Figure 11). Legal and financial advisors, accountants and other professionals providing ancillary services specifically targeted to SMEs can benefit issuing companies, investors and the overall market by enhancing transparency and confidence. Such ecosystems could be developed at the local level, in case the small local growth market model is chosen, or at a more centralised level, in case the model of proportionate participation of SMEs in some main exchanges is favoured.

The absence of an ecosystem that can cater to SMEs' specific needs can be an impediment to the functioning and deepening of equity markets and reduce these companies' willingness to list altogether. Currently the ecosystem for SMEs is not wide-ranging enough, to a large extent due to the lack of profitability, i.e. an economic rationale

Figure 11. **A valuable ecosystem for SME equity offerings**



Source: OECD Secretariat.

of SME-related services by brokers and advisors in general. A larger number of participants in such an ecosystem would create a greater capacity to take SMEs public and support them in the aftermarket.[20] Consequently, more IPOs could get executed when the "IPO window" is open, which in turn would create a willingness on the part of investors to invest in small quoted companies and lead other private companies or VC/PE investors to consider the IPO as a viable exit strategy.

Market-makers in particular act as catalysts to the provision of liquidity in secondary equity markets, but are potentially challenged by regulatory reforms. The existence of committed market-makers providing buy and sell quotes at any given time is critical to professional investors' participation in small equity markets. Without liquidity, professional investors tend to shift their assets away from SMEs into larger capitalisation stocks.

Lower trading spreads and tick sizes (minimum price variation) intended to bring down transaction costs may, according to one study, be partly responsible for the decline in US equity offerings (Weild et al., 2013).[21] In particular, tick sizes as a percent of share prices for companies with a market value of below USD 500 million probably need to exceed 1% of share price to fuel investment. A one-cent tick size for all shares reduce the

economic incentives of intermediaries who facilitate small company IPOs and new capital formation, while also supporting their aftermarket activity. Higher tick sizes could incentivise market-making especially for smaller shares, which in turn would improve liquidity. According to the study, the possibility of allowing small companies to choose their tick size could potentially boost investment in SME equities by driving liquidity, while higher commissions to market stocks to retail investors could incentivise broker/dealers. Interestingly, the study also suggests that GDP growth only predicts 10% of small IPO activity while economic incentives explain 70%. The impact of tick sizes on the supply of IPOs illustrates the pitfalls of one-size-fits-all regulation for every stock irrespective of size, liquidity and other characteristics.

The declining provision of equity research on small and mid-sized companies (but also across the board) reduces their visibility and attractiveness among professional investors. Equity research plays a key role in equity markets, assisting investors in making informed investment choices, providing absolute and relevant evaluation of the attractiveness of an individual stock or a whole industry or market, and of the expected operating performance of the underlying company. Equity research is of particular importance in the case of small high-growth companies where information is scarce and harder to assess. It is argued by market participants that equity research assists capital formation by potentially lowering the cost of capital for growth companies, as they balance short-term losses and risks with long-term company valuation estimates in their evaluation exercises. Good equity research coverage improves public awareness of listed companies and of the capital markets overall and promotes them to institutional and other investors.

Equity research coverage of small and mid-sized equities is constrained because of cost considerations, inherent characteristics of small companies and regulatory changes in some markets. The relative size of small company IPOs and secondary trades renders equity research provision for small companies economically challenging, if not unviable. The "transparency barrier" resulting from the reluctance to share sensitive information by even the most successful and best managed SMEs in order to protect their strategic position is another impediment to their research coverage (Altenburg, 2013). Limited coverage of small floated companies by equity research analysts inhibits the wider participation of institutional investors, restraining liquidity. A large part of professional investors would reportedly not engage in a trade on either primary or secondary markets without relevant research being available. Lack of equity research for small quoted companies **adds to the information deficit around SMEs, a prominent structural impediment to their access to finance across financial instruments and markets.**

Recent regulation in Europe (MIFID II), proposing the restructuring of the compensation model for research, is seen by the industry as a potential risk for the provision of equity research on SMEs. Under the proposals, dealing commission will no longer be able to pay for sell-side investment research with a view to completely unbundling the way dealing commission may be used to pay for the provision of research. In practical terms, dealing commissions that are attributed to equity research will need to be identified separately and no portion of the dealing commission will be allocated to research provision. The buy-side would have to determine which research they wish to purchase and for how much. While this is intended to avoid conflicts of interest, investors have expressed concerns about the impact this fundamental change will have on the

availability of equity research in Europe, in particular for the smaller end of the floated company spectrum.

Pure for-profit stock exchange models could sometimes cause perverse incentives to the detriment of the respective ecosystem. For example, the replacement of quote-driven markets, supported by market-makers, by electronic order books could be more profitable for the exchange itself but could at the same time deprive the marketplace of some of the most liquid stocks that feed the ecosystem. At the same time, profits are potentially siphoned off the ecosystem and market-makers would then be left with only the most thinly traded stocks of the market.

The proliferation of electronic markets and recently expanding market practices, such as high-frequency trading (HFT), have a profound negative effect on small equities. The shift from quote-based markets to electronic order book markets has had a major impact on US IPO activity, since they resulted in a collapse of dealer incentives by as much as 87.5% (Weild et al., 2013). Despite the potential of HFT and other low-cost trading techniques to add value to the efficiency of price discovery in larger and more liquid markets, in SME markets they may curb the economic incentives necessary for the ecosystem of the market to create value and sustain market activity. Given the idiosyncrasies and usually short trading history of SME equities, there may also be a threshold below which HFT techniques cannot be meaningfully applied and where liquidity has to be generated by traditional trading.

Policy makers have a role in facilitating the infrastructure element of the ecosystem around SME public equity markets and support its network of participants. Appropriate economic and other incentives could be allowed to enable a fully functional ecosystem that can support SME listings. Stock exchanges can also provide such incentives, as with the example of the mandatory requirement for an assigned market maker and lower trading fees for market makers in return for minimum requirements in order to build deeper markets (e.g. the NewConnect market at the Warsaw Stock Exchange[22]).

The existence of healthy and active ecosystems can also be useful as a springboard for the development of other, non-traditional SME equity instruments that could rely on that same ecosystem. Such instruments could include equity private placements, equity crowdfunding, listed funds (with potential co-funding and risk sharing between the private and public sector), and corporate venturing. A lack of vibrant SME IPO markets and aftermarkets could ultimately create negative feedback loops that risk stunting the development and growth of such instruments and other innovations.

H. Addressing issues of possible fiscal bias against equity

Some asymmetries in the tax treatment of equity and debt can, in some tax systems, **create biases against equity,** favouring debt**.** Both debt and equity finance have an important role to play in the sustainable financing of the real economy. The fact that there is no equivalent of the tax deductibility of interest payments for equity investments across jurisdictions is thought by market participants to be a clear disadvantage for equity investment.

A potential reduction of some asymmetric treatment of tax for debt and equity, for the demand as well as the supply side, could potentially support the development of equity markets. On the demand side, entrepreneurs are likely to include tax considerations in their choice of financing instruments. Different instruments are needed

depending on the different stages of the life and characteristics of an SME. If the tax system somehow distorts the choice in favour of debt this may potentially lead to suboptimal outcomes. Such potential distortions are typically introduced through tax deductibility of interest payments, but also through double taxation of equity in some jurisdictions.

On the supply side, **tax considerations play an important role in institutional and retail investors' portfolio allocation** (provided that they choose among investments of equal risk-return characteristics). Investment-driven tax reliefs, perhaps by providing tax incentives, could induce long-term investment into SMEs. Tax relief is indeed the most commonly cited incentive by market participants, and examples of such practices have proven to accelerate the development of respective equity markets for SMEs. In the United Kingdom, a number of tax-advantaged venture capital schemes and tax reliefs incentivise individual investors in the UK to invest in small growing businesses which would otherwise struggle to access finance (British Business Bank, 2015). These are the Enterprise Investment Scheme, Seed Enterprise Investment Scheme, Venture Capital Trusts, relief for losses on investment, but also the abolition of stamp duty on purchases of shares made on equity growth markets and eligibility of SME equity shares in ISA accounts, as mentioned above. The abovementioned French PEA-PME savings accounts also provide tax incentives for retail investors.

Nevertheless, tax incentives cannot overcome the structural cost disadvantage of small-sized deals (whether they are debt or equity), might introduce distortions with unintended consequences (e.g. underpricing of risk) and create vested interests by providing benefits that go directly to the beneficiaries' profits. It is doubtful whether tax reliefs and other across the board regulatory reliefs are sustainable and efficient to resolve structural SME problems. "Smarter" deal-oriented solutions could more effectively address the structural cost disadvantage of small-sized deals, as with the example of the EIF's European Angels Fund co-investment scheme.[23] Wealth investors and investors with SME expertise and successful SME entrepreneurs can apply for core EIF funding. Their qualification in terms of expertise is examined based on prior equity investments and the resulting group of investors has the ability to judge their peers and undertake successful equity investments. More than a public equity co-investment vehicle, the scheme could be described as a form of peer-to-peer investing and could be an effective way to overcome the structural cost disadvantage of smaller companies.

I. A lack of equity culture and the SME educational gap

The lack of equity culture and awareness has a significant negative impact on both the demand and the supply side of SME equity markets, limits their depth and breadth and restricts participation by SMEs and investors alike.

On the demand side, SMEs are often restricted by an educational gap; unawareness of public equity financing or the lack of appropriate financial education and skills does not allow them to access equity financing. Financial education and skills are necessary for SMEs to be aware of their financing options through capital market instruments, be able to assess the appropriateness of risk finance for their business model, access their options and respond to listing and market requirements. Such a skillset consists of financial reporting, business planning, forecasting and budgeting, investor relations capabilities, tax planning and other. Educational and awareness limitations reinforce the reluctance of some SMEs to raise public equity financing for fear of losing control of the business or discouraged by previous rejections on other financing instruments.

On the supply side, the lack of equity culture in parts of the world is an important obstacle to the provision of a sustainable flow of investment into equities (Schuller, 2014). Indicatively, the percentage of German-speaking investors directly or indirectly exposed to the public equity markets stands at 13.8% and 6.7% respectively, while almost 50% of their US counterparts are invested in public equities. Besides the stigmatisation of the equity markets following the bursts of the dot-com and subprime crisis bubbles, educational attainment of individual investors is also responsible for such startling differences.

Financial education of both SMEs and (mostly retail) investors is clearly the best, but not the only way, to induce participation in quoted SMEs. The affinity to an equity home bias could also be used to intrinsically motivate investors to participate in public equities (Schuller, 2013). An investor is more likely to identify with a local business and such home bias could act as an entry point for changing the equity culture in parts of the world lagging behind. The ability and willingness of retail investors to place savings or allocate part of their pension funds in capital markets can be promoted through the use of mutual funds, exchange-traded funds, and retail brokerages specialised in small public equities. Robust consumer financial education would need to accompany the sale of such products, explaining the risks of such instruments and the benefits of diversified savings portfolios.

There is a role for governments and regulators to promote awareness around public SME equities and make equity a prominent part of the SME finance discussion. The debate on access to finance tends to concentrate on the importance of loans and guarantees, with the equity markets being often an afterthought. Even if public equity markets are perhaps not suitable for all types of SMEs or for all types of investors, as was argued above, the promotion of public SME equity markets in public opinion can help foster innovation and job creation. Companies need to be educated so as to construct demand by SMEs for risk finance,[24] particularly in an environment of below-trend bank lending. Investors need to be motivated and incentivised to seek exposure in SME equity instruments. For pension fund investments, for example, default pension plan solutions could include appropriate shares of SME equity in the equity portfolio part as long as the risk-return profile is beneficial for pension plan members.[25] Governments can induce further participation of SMEs in public equity markets by bridging the educational gap of small companies when it comes to capital market financing, raising their awareness of public financing options available and appropriate to them and equipping them with the skills necessary to tap the capital markets.

IV. Concluding remarks and policy implications

The contribution of SMEs to economic growth and job creation depends to a large extent on their ability to grow. Equity markets provide appropriate financing for high-growth, innovative SMEs, where unpredictable cash flows and lack of track record renders bank lending unsuitable, if at all possible. A number of **policy actions that may mitigate constraints facing equity capital market financing for SMEs and enhance its potential** can be distilled from the analysis in this paper. The policy implications raised and actions proposed here are intended to provide some guidance for policy makers when designing actual measures to support public equity financing for SMEs. Governments should have discretion as to the adoption of any these policy actions, taking into account their domestic circumstances and other policy approaches.

Equity markets are better suited for young, fast-growing SMEs, with the proportion of younger companies (under 2 years of age) tapping the equity capital markets being consistently higher than that of older companies (15 years or more). **However, current standard SME definitions are perhaps less appropriate to describe the relevant target group when it comes to public equity markets,** potentially rendering policy making around SME equities less effective.

A **risk finance gap is often and erroneously being attributed to the banking sector** but loan finance is normally not suitable to provide risk capital. However, mezzanine finance could be a way to close the risk capital gap through the use of bank lending, attempting to provide *de facto* equity in *de jure* loan structures.

Trends on the deal flow for small IPOs indicate a drop in small IPO issuance and an upward shift of offering size. A number of specialised growth markets are being developed across the globe, although listing activity has yet to pick up. Given the strong interdependence between the various types of SME financing, **healthy and vibrant IPO markets are important for the functioning of the entire funding spectrum of SMEs.** For example, healthy public equity markets stimulate PE/VC activity by providing fast and profitable exit opportunities or venues for further rounds of capital raising.

Accessibility of public equity markets by SMEs is mainly impeded **by listing and compliance costs** which are disproportionately high for small issuers. **One-size-fits-all regulation and stock market structures** on main markets cannot equally serve large and small stocks. A dearth of investors is partially due to the **lack of equity culture** in certain parts of the world, particularly when it comes to retail investors. SMEs themselves are faced with an **educational gap** that is prominent when it comes to tapping the equity markets. **Institutional and retail investors may be dissuaded by inadequate liquidity**, particularly in specialised growth markets. **The lack of SME-specialised ecosystems** that can support small offerings on their listing and in the aftermarket impede the fostering of SME equities. For example, the existence of well-functioning market-making systems is critical for the participation of professional and institutional investors in these markets, and without liquidity, institutional investors shift assets away from SMEs into larger capitalisation stocks.

Recognising the need for better access of SMEs to equity capital markets, there is **a role for policy makers to catalyse institutional long-term investor participation** in SME quoted markets. A more **supportive tax framework,** which reduces asymmetric treatment of debt and equity, could perhaps be a quick and effective fix for inducing private participation, **although it would not address the fundamental structural disadvantages** of SME deals. High monitoring costs, absence of track record and other information asymmetries which are prominent across the board of SME financing can be addressed though measures and tools that improve transparency that may also involve the public sector.[26] Governments can **bridge the educational gap of SMEs when it comes to financial markets**, raising their awareness of capital market financing options for SMEs and equipping them with the skills required for them to tap the public markets. A co-ordinated approach on regulation can help avoiding distortions in risk pricing and stimulate investor appetite. Besides patient capital, **retail participation can be further encouraged** provided that financial consumers are well informed on the respective risks.

Improved economic incentives for participants in SME equity markets might help to foster healthy ecosystems dedicated to small firms. The cost of going public needs to be

reasonable and tailored to the size of the SME. **Proportionate regulatory and listing requirements** are a way to ensure that the cost of public listing is reasonable and appropriate for SMEs. The entire **market infrastructure for growth equity markets needs to be adapted** to the inherent characteristics of SMEs (which is the case with growth markets in Europe under MIFID II). The promotion of equity markets for SMEs should not be done at the expense of financial market stability, which is why regulatory requirements for this segment need to be proportionate and not necessarily lower.

Promotion of equity finance for SMEs does not disengage banks from SME financing, but rather complement bank lending and other financing alternatives. But equity finance should be available as a possibility to be drawn upon in cases where this is more suitable and appropriate from a risk perspective. The role of SME specialised banks or house banks could be broadened so as to facilitate public equity issuance for SMEs by acting as advisors and as educators raising their SME clients' awareness of such tools. It is difficult to build a functioning equity market for SMEs without a functioning debt market, hence the importance of a healthy and vibrant ecosystem overall. In the context of a closely interconnected SME financing environment, **a holistic and coordinated effort by all market constituencies involved (investors, intermediaries, advisors, policy makers and SMEs) is required to support investment in the SME asset class** and allow SMEs to fully benefit from capital market financing when and as appropriate, without posing a risk to financial stability.

Policy makers also need to acknowledge that **SME finance is, like SMEs themselves are, exceptionally diverse and complex, and faces unique challenges.** As such, there is no "magic bullet" for SME finance and it is only by pushing different ideas, avenues and instruments that the different constraints and predicaments can be tackled in developing a healthy non-bank debt market for SMEs. To achieve this, a joint effort may be needed, involving all constituents concerned: investors, issuers, intermediaries, regulators and public policymakers. Governments and regulators can provide valuable support for developing the necessary infrastructure for new financing instruments for SME financing and incentivise investment in securitisation and other non-bank debt instruments suitable for SMEs. Such financing, when used properly, can play a significant role in the recovery of the real economy by unlocking resources and capacity for further lending, broadening the SME investor base and diversifying their portfolios, as well as assisting in the creation of a sounder financial system through better risk sharing within the economy.

Notes

1. Nassr and Wehinger (2014, 2015).
2. OECD (2015b).
3. According to a study by Barclay's (unpublished) and Freeman (2013).
4. The set of global IPOs in this and the following figures comprises of listings on: Abu Dhabi Securities Exchange, Aktie Torget, Alberta Stock Exchange, Alternext Paris, Athens, Australian Securities Exchange, Bahrain (Manama), Bangkok, Barcelona Stock Exchange, BATS Exchange, Belgrade Stock Exchange, Berlin, Berne Stock Ex-change, BM&F Bovespa SA, Bogota, Bolsa Mexicana de Valores, Bombay, Borsa Istanbul, Borsa Ital-iana S.P.A., Budapest, Buenos Aires, Cairo, Canadian Securities Exchange, Casablanca, Colombo, Copenhagen, Cyprus Stock Exchange, Dhaka Stock Exchange Ltd, Dubai Financial Market, Dublin, Euronext Amsterdam, Euronext Brussels/ Lisbon/Paris, Frankfurt, Gretai Securities Market, Hanoi Stock Exchange, Helsinki, Hong Kong (China), Indonesian Stock Exchange, JASDAQ, Johannesburg, Jordan (Amman), Korea Stock Exchange, Kuala Lumpur, London Alternative Market, London Stock Exchange, Malta, Moscow,

NASDAQ, NSE, NYSE, Oslo Bors, Plus Markets (London), Prague, Qatar Exchange, Reykjavik, Riga, Romania (Bucharest), Santiago, Sapporo (JP), Saudi Stock Exchange, Shanghai, Shenzhen, Singapore, SIX Swiss Exchange, Sofia, Taiwan (Chinese Taipei) Stock Exchange, Tel Aviv, Tokyo, Toronto, TSX Venture Exchange, Vietnam Stock Market, Warsaw Stock Exchange, Wellington, Zagreb.

Footnote by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Footnote by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

5. For an extensive analysis of seed and early-stage finance see Wilson and Silva (2013), on business angel financing see OECD (2011).
6. This is also being recognised in OECD's work on institutional investors and long-term investment (*www.oecd.org/finance/lti*), a project that also feeds into efforts at G20 level in this area. Besides infrastructure, SME financing is an important component of this work.
7. See Nassr and Wehinger (2014, 2015).
8. These include relatively small size of deals no matter what kind of financing is involved, limited resources, unsophisticated structures and management, absence of financial and other reporting, etc.
9. The US and the UK markets have been noted as exceptions to this phenomenon with active support to non-bank lending to all types of enterprises.
10. High-leverage models for PE/VC investment may anyway be inappropriate for small growth companies due to their lack of predictable high cash flow generation required to support such leverage streams.
11. For more on equity crowdfunding, see OECD (2015c).
12. Note, however, that the numbers shown in the chart are not fully comparable for Japan where they include primary issuance only.
13. Similar to credit assessment limitations found in SME market-based debt and SME securitisation in particular, for more see Nassr and Wehinger (2015).
14. SMEs are defined as companies fulfilling at least 2 out of the 3 abovementioned criteria. Extract of Article 2 of the Annex of Recommendation 2003/361/EC.
15. Companies without calculable public equity float qualify when their revenues are below USD 50 million in the last fiscal year. Foreign companies are also eligible under certain requirements.
16. Adopted by the SEC on 25 March 2015 and become effective on 19 June 2015 (SEC, 2015).
17. Article 4 of Directive 2010/73/EU (EC, 2010). Admission of securities to trading in multilateral trading facilities (MTFs) is not currently subject to a prospectus requirement.
18. See *http://ec.europa.eu/finance/capital-markets-union/index_en.htm* and the consultation document EC (2015b).
19. PEA-PME: *Plan d'Épargne en Actions destiné au financement des PME et ETI*.
20. Conglomerates (such as Berkshire Hathaway) or large multinationals may provide a natural ecosystem for SMEs in the broader context of equity (including private equity) although this is not applicable to all SMEs.
21. This study led by David Weild, former vice chairman of the Nasdaq Stock Market, reviewed Weild and co-author Edward Kim's involvement in events leading up to the JOBS Act in the United States, providing their views on IPO markets throughout the world, and was sponsored by Grant Thornton LLP.
22. See *www.newconnect.pl/index.php?page=1125*.
23. *www.eif.org/what_we_do/equity/eaf/index.htm*.

24. The ELITE platform by the London Stock Exchange Group (e.g. at Borsa Italiana) is an interesting example of an educational programme that can both enhance financial capabilities and also induce cultural change for participating SMEs, by building relationships with the wider ecosystem and fostering organisational changes that allow the company to benefit from a potential equity listing further down the line. The Deutsche Börse Venture Network launched on 11 June 2015 is another interesting example of a programme designed to connect growth companies with professional investors.

25. This could, for example, be further developed on the basis of the OECD roadmap for the good design of defined contribution pension plans; see *www.oecd.org/daf/fin/private-pensions/designingfundedpensionplans.htm*.

26. Similar conclusions as the ones in this paragraph apply with regard to market-based debt finance and were put forward in Nassr and Wehinger (2015).

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