



SELECTED GOOD PRACTICES FOR RISK ALLOCATION AND MITIGATION IN INFRASTRUCTURE IN APEC ECONOMIES

OECD Report in cooperation with the
Global Infrastructure Hub and the Asian
Development Bank

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Consistent with the objectives of the APEC Cebu Action Plan (CAP to mobilise further investment), this report provides an overview of the types of risks in infrastructure and the tools available to policymakers and regulators to help effectively manage and allocate risks amongst the various stakeholders, with the objective of facilitating the engagement of investors in infrastructure projects through the judicious use of risk mitigation and allocation instruments and techniques.

The OECD coordinated this report on “*Selected good practices for Risk mitigation and allocation in infrastructure, including PPPs, in APEC economies*” in cooperation with the Global Infrastructure Hub (GI Hub) and the Asian Development Bank (ADB). It is part of a policy package on diversifying financing sources and fostering private sector involvement in infrastructure investment in APEC economies, to be delivered under the Vietnamese presidency in 2017. It builds on the *G20/OECD Guidance Note on Diversifying Sources of Finance for Infrastructure and SMEs*, endorsed by G20 Leaders in September 2016, the GI Hub *Report on Allocating Risks in PPP Contracts*, the WB/IMF/OECD report *on capital market instruments to mobilize institutional investors to infrastructure and SME financing in emerging market economies* and the World Bank *Guidance on PPP Contractual Provisions*.

While circulated under the responsibility of the OECD Secretary General, this report is also building in large part on discussions held by the APEC members at the APEC Seminar on Long Term Investment in Infrastructure held under the aegis of the APEC Senior Finance Officials’s Meeting on 17-19 may 2017, Ninh Binh.

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About this paper¹

In 2013, APEC Finance Ministers adopted the Multi-Year Plan on Infrastructure Development and Investment² to further support economic growth and to help address the enormous infrastructure needs facing the region. The plan emphasized the importance of mobilising investment for infrastructure, particularly through the private sector, capital market channels, and Public-Private Partnerships (PPPs). Well-designed, sustainable, and resilient infrastructure enhances economic growth, boosts productivity, and provides significant positive flow-on effects including improved access to markets, job creation and economic growth across sectors.

Following this plan, the Cebu Action Plan (CAP)³, approved in September 2015, provides a detailed and operational roadmap across four key pillars to support strong, sustainable, inclusive, and balanced growth throughout the region. Concerning the objectives specifically related to “long-term investment in infrastructure”, a priority of the Vietnamese APEC Presidency in 2017, the CAP refers (under item 4E) explicitly to the need to improve PPP knowledge and models, and develop infrastructure as an asset class for institutional investors.

Consistent with these objectives to mobilise further investment, this report provides an overview of the type of risks in infrastructure and the tools available to policymakers and regulators to help effectively manage and allocate risks amongst the various stakeholders, with the objective of facilitating the engagement of investors in infrastructure projects through the judicious use of risk mitigation instruments and techniques.

The OECD coordinated with the Global Infrastructure Hub (GI Hub) and the Asian Development Bank (ADB) in cooperation with other IOs to produce this report on “*Selected good practices for Risk mitigation and allocation in infrastructure, including PPPs, in APEC economies*”. It is part of a policy package on diversifying financing sources and fostering private sector involvement in infrastructure investment in APEC economies, to be delivered under the Vietnamese presidency in 2017. It builds on the *G20/OECD Guidance Note on Diversifying Sources of Finance for Infrastructure and SMEs*, endorsed by G20 Leaders in September 2016, the *GI Hub Report on Allocating Risks in PPP Contracts*, the *WB/IMF/OECD report on capital market instruments to mobilize institutional investors to infrastructure and SME financing in emerging market economies* and the *World Bank Guidance on PPP Contractual Provisions*.

The report is building in large part on discussions held at the APEC Seminar on Long Term Investment in Infrastructure part of the APEC Senior Finance Officials’ Meeting on the 17-19 May 2017, Ninh Binh, Viet Nam. In addition this work has benefited from two recent OECD reports covering APEC and ASEAN economies:

¹ This report was prepared by Raffaele Della Croce, Lead Manager, Joel Paula, Economist and Abderrahim Assab Policy Analyst, part of the OECD long-term investment project (www.oecd.org/finance/lti). The views contained herein may not necessarily reflect those of the APEC, G20 and OECD Members. Major inputs were provided by Morag Baird and Jack Handford policy advisers at the Global Infrastructure Hub and Alexander N. Jett Public-Private Partnership Specialist at the Asian Development Bank. The authors are also grateful for inputs received by participants to the APEC Seminar on Long Term Investment in Infrastructure on the 17 May 2017, Ninh Binh, Viet Nam.

² See: “https://www.apec.org/Meeting-Papers/LeadersDeclarations/2013/2013_aelm/2013_aelm_annexB.aspx”

³ See: “https://www.apec.org/Meeting-Papers/Sectoral-Ministerial Meetings/Finance/2015_finance/annexa.aspx”

- the OECD (2015) report on “*Private Infrastructure Investment – Availability of Risk Mitigation Instruments in the ASEAN Member States*” focusing on Political Risk insurance in the ASEAN member states
- the OECD 2017 (*forthcoming*) report on “*Availability of Risk Mitigation Instruments for Private Infrastructure Investment - Country studies on three APEC Member States: Chile, Mexico and Peru*” focusing on Chile, Mexico and Peru.

1. INTRODUCTION

Infrastructure investment gaps impose fundamental impediments on sustainable economic growth and social development across developing countries in the APEC region. With real GDP increasing from 16 trillion USD in 1989 to 20 trillion USD in 2015, the region has outperformed global growth generating 59% of worldwide GDP and 50% of global trade (APEC, 2017). The 21 APEC economies represent half of the world's population building a young and dynamic workforce and creating a large demand for infrastructure.

In meeting the growing demand for infrastructure investment, the private sector is expected to have a major role. As different types of private investors are willing to take on different types of risks, the structuring of risks and returns is a crucial factor in determining the pool of willing investors. Increasing levels of private investment and financing will entail certain risk transfers to the private sector, with appropriate risk allocation being crucial for long-term viability. A deep understanding of risk allocation principles, measures and government support arrangements is a precondition to attract private sector capital. Consequently, risks need to be clearly classifiable, measurable and contractually allocated to the party best able to manage them.

New and alternative funding and financing models, including Public Private Partnerships, can potentially align public and private sector interests in infrastructure provision and management in APEC economies. Also by using risk mitigation measures and combining different sources of finance through 'blended finance', governments and Development Finance Institutions (DFIs) can employ development finance catalytically to mobilise additional investment towards sustainable development in developing countries⁴. This is particularly important in APEC developing countries where investment is sometimes further hindered by weak policy frameworks and governance.

To attract private sector financing and alternative sources of finance such as institutional investors, effective transaction design of PPPs and forms of collaboration beyond traditional instruments such as direct equity stakes and bank loans may be needed. This can make infrastructure as an asset class more accessible to a broader group of investors and help to diversify the large risks of infrastructure projects - currently shouldered to a large extent by the banking and public sectors through guarantees - across many groups of investors through the capital markets.

Several APEC governments have introduced various mechanisms to support private capital funding public assets, changing the risk allocation between the private sector, taxpayer and consumer. To attract more private sector finance into infrastructure projects, policy makers will need to consider how material residual risks or other constraints can be mitigated so that potential transactions are seen as investable opportunities

⁴ OECD, forthcoming, "Making Blended Finance work for the SDGs", OECD Publishing, Paris. The OECD Development Assistant Committee is currently developing principles for Blended Finance.

2. ANALYSIS OF RISKS IN INFRASTRUCTURE FINANCING⁵

Investors' perceptions of the risks associated with infrastructure and the ability to effectively mitigate these risks will play a key role in determining private financing flows. Financing is influenced by the risks involved in infrastructure investment - both due to the infrastructure development phase and other risk factors such as being located in less creditworthy countries, or facing market risks that are difficult to quantify and mitigate. The transparency, soundness, and predictability of the regulatory framework are prerequisites to the involvement of private investors, along with the financial viability of an infrastructure project.

Recent OECD surveys and reports in the APEC and ASEAN region have identified some key barriers to infrastructure investments in the region. These include 'Limited Market opportunities', 'Unreliable policy and legal environment', and 'Bribery and corruption' and the need for investment related policies. According to the WEF report on '*Risk Mitigation Instruments Infrastructure Gap Assessment*' (July 2016)⁶, 'top deterring factors' in emerging market infrastructure finance are changes in laws, currency risks and construction risks.

Figure 1 - Main constraints for private infrastructure investments in Mexico, Peru and Chile – (1) low constraint to (5) high constraint



Source: OECD 2017 (Forthcoming)

⁵ See also work contributed to the G20 by the GI Hub on allocating risks in PPP contracts, and WBG work on standard contract terms. In Europe, the United Nations Economic Commission for Europe (UNECE) has also launched a programme for international PPP standards. Furthermore, the Public-Private Infrastructure Advisory Facility (PPIAF) has also developed framework PPP policies.

⁶ http://www3.weforum.org/docs/WEF_Risk_Mitigation_Instruments_in_Infrastructure.pdf

Several factors determine the risks – real and perceived – associated with infrastructure investment: these investments are typically of long-term nature, involve high upfront costs, differ from project to project and thus cannot reach economies of scale, and usually involve different stakeholders and non-standardised financing structures (OECD 2015c). As a result, infrastructure investments are commonly associated with different types of risk, some of which are further exacerbated in the case of low-carbon infrastructure projects (OECD 2012; OECD 2015d, OECD/World Bank 2015, CPI 2013). In recent work developed for the G20 by the OECD⁷, infrastructure risks are classified by their main source, as shown in Figure 2 below.

Figure 2 - Risks linked to infrastructure assets over the project lifecycle

Risk Categories	Development Phase	Construction Phase	Operation Phase	Termination Phase
Political and regulatory	Environmental review	Cancellation of permits	Change in tariff regulation	Contract duration
	Rise in pre-construction costs (longer permitting process)	Contract renegotiation		Decommission
		Currency convertibility		
	Change in taxation			
	Social acceptance			
	Change in regulatory or legal environment			
	Enforceability of contracts, collateral and security			
Macroeconomic and business	Prefunding	Default of counterparty		
	Financing availability		Refinancing risk	
			Liquidity	
			Volatility of demand/market risk	
	Inflation			
	Real interest rates			
Exchange rate fluctuation				
Technical	Governance and management of the project			Termination value different from expected
	Environmental			
	Project feasibility	Construction delays and cost overruns	Qualitative deficit of the physical structure/ service	
	Archaeological			
	Technology and obsolescence			
	Force majeure			

Source: OECD Taxonomy of Instruments (2015)

Box 1 - OECD infrastructure project risk mitigation surveys takeaways

The ‘**OECD infrastructure project risk and mitigation**’ project aims at fostering infrastructure development by improving the understanding of major risks, risk mitigation strategies and the availability of financial risk mitigation instruments. The project resulted in two reports adopting complementary approaches and targeting different regions:

- the OECD (2015) report on “Private Infrastructure Investment – Availability of Risk Mitigation Instruments in the ASEAN Member States” focusing on Political Risk insurance in the ASEAN member states <http://rmid-oecd.asean.org/>
- the OECD 2017 (forthcoming) report on “Availability of Risk Mitigation Instruments for Private Infrastructure Investment - Country studies on three APEC Member States: Chile, Mexico and Peru” focusing on Chile, Mexico and Peru.

⁷ <http://www.oecd.org/finance/private-pensions/Infrastructure-Financing-Instruments-and-Incentives.pdf>

Among the main findings of these reports:

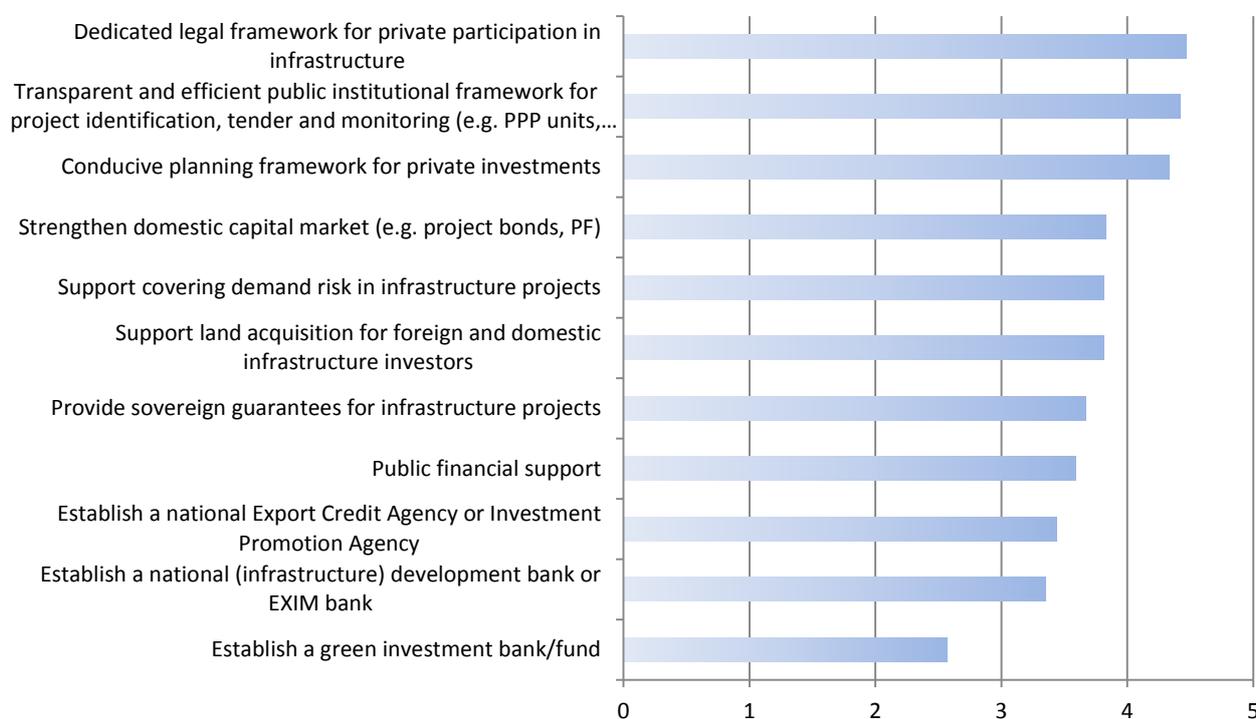
- The 'non-enforceability of judicial decisions and arbitration award' as well as the 'adverse regulatory changes' are the two political risks causing the main concerns to the survey respondents. The demand for political risk insurance is high in Chile, Mexico and Peru and in the ASEAN member states; however, the access to the instrument is constrained by the reportedly high premiums.
- In terms of commercial risks, construction risk is the main concern for survey respondents followed by social and environmental risks. Construction risk is mitigated through contractual arrangement and specific risk mitigation instruments. Demand risk is also highly important for survey respondents and sometimes reported as the highest risk during the interviews conducted for the report. Respondents report equally using contractual arrangement, public support, and insurance when mitigating demand risk.
- The most concerning environmental risks in private infrastructure financing are the physical risks of the assets as well as their impact on the habitat, biodiversity, and the local communities. Respondents expressed concerns over the treatment of environmental issues both at the regulatory and corporate side. 'Changes related to government support schemes and incentives' and 'Corporate governance' are the most concerning risks after the physical environmental risks.

2.1 Actions to reduce risk in infrastructure investment

Once the risks of a project are analysed and understood, the risk management process should identify the strategies to mitigate the impact of risks on project cash flows. This process is important for all infrastructure assets and sectors, but in particular, in project finance, as lenders' security packages are often non-recourse against equity investors, and so are only collateralised against project equity. This means revenue is based solely on the ability of the project asset(s) to generate cash flows.

Priority actions to be implemented in order to reduce risks and catalyse infrastructure investments are linked to the soundness of the legal and institutional framework for infrastructure. In this context, strengthening domestic capital markets, providing sovereign guarantees, and demand risk mitigation instruments were found to be the most efficient risk reduction actions in Chile, Mexico and Peru (OECD 2017)

Figure 3 - Actions to reduce risk in private infrastructure investment in Chile, Mexico, Peru - (1) not effective to (5) very effective



Source OECD 2017 (Forthcoming)

In order to attract larger volumes of private capital into infrastructure projects, governments can retain certain risks or influence the magnitude of certain risks and/or reduce the probability of their occurrence.

First, governments can influence **political and regulatory risks** (Chan et al., 2010; Hwang et al., 2013) by creating a **more conducive institutional environment**, including making credible commitments to honour the terms of the agreement, and develop clear and reliable estimates on development and construction costs, tariff and demand definition and trends. This may entail:

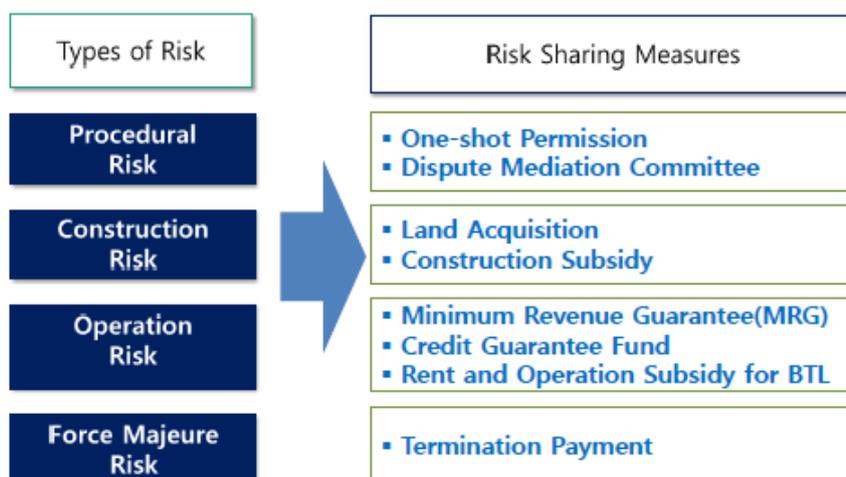
- A stable long-term plan for infrastructure development: enhanced certainty and acceptance of innovative approaches to infrastructure development (for example PPP, privatization or pure private development); enhanced transparency and accuracy of the infrastructure pipeline; reliability of feasibility studies; credible commitment to providing necessary permissions.
- The creation of confidence in rules about, inter alia, public procurement, permits, expropriation, taxation, litigation and tariffs. Improving the institutional environment will assist in further attracting private capital into infrastructure investment. According to the *OECD Principles for Public Governance of Public-Private Partnerships* three elements are useful to define government support for PPPs and therefore create a suitable institutional environment: i) establish a clear, predictable and legitimate institutional framework supported by competent and well-resourced authorities⁸

- ; ii) ground the selection of public-private partnerships in value for money; and iii), use the budgetary process transparently to minimise fiscal risks and ensure the integrity of the procurement process. The enabling environment is fundamental in attracting private sector investment, with the rule of law, enforcement of contracts and regulatory quality found to be of key importance to infrastructure markets⁹.

Risk transfer by means of contractual arrangements is the most often utilised risk management strategy in project finance. **Technical risks** are best mitigated by specialized operators and should therefore be shifted to the private sector in order to generate an incentive for effective project delivery (Engel et al., 2014). Private operators can then move those risks to other specialized subcontractors through separate engineering procurement and construction (EPC) and O&M (operation & maintenance) contracts. However, without compromising performance, some of these risks could be retained, even partially, by the public sector where they are external to private sector control and/or their impact on the economic case for the project is severe (Ke et al., 2010). This is particularly the case for archaeological and environmental risks.

Risk mitigation instruments such as guarantees, derivative contracts and insurance provided by either DFIs, export credit agencies (ECAs), commercial banks, or private insurers are important for structuring private investments. Private sector partners should, where possible, manage **market risks** (Li et al., 2005). However, in some circumstances, governments can introduce specific risk mitigation instruments, for instance with a temporary validity or for a specified range of assets, to make infrastructure investments more appealing and financially viable. These instruments relate to revenue, operational and capital expenditure as well as to the cost and availability of debt and equity.

Table 1 Risk sharing measures in Korea – contractual and instruments



Source Ministry of Strategy and Finance, Republic of Korea Presentation at the APEC Seminar on Long Term Investment in Infrastructure on the 17- May 2017, Ninh Binh,

⁹ GIH InfraCompass (May 2017), *Set your infrastructure policies in the right direction*.

2.2 The role of the public sector in subsidising private intervention in infrastructure and instruments and incentives for stimulating the financing of infrastructure¹⁰

Although public incentives are not perceived as essential by private infrastructure, the role of the public sector in subsidising and/or incentivising private participation in infrastructure is important, particularly in markets where the role of public entities is still dominant and the PPP model is still underdeveloped or at a very early stage of use.

Assistance could have a *direct or indirect impact* on public resources. In the case of direct impact, the public sector subsidises the private intervention with contributions or grants, whose purpose is either to reduce the private commitment or to increase the return of an otherwise unprofitable project. These contributions can take place during the construction phase or during the operational phase.

Figure 4 Transport risk sharing mechanisms in APEC economies -these mechanisms are most common in road PPPs

<u>Direct Liabilities</u>	<u>Contingent Liabilities</u>
<ul style="list-style-type: none"> ✓ Always triggered. ✓ <u>Not</u> dependent upon an uncertain future event. ✓ Can be easily budgeted 	<ul style="list-style-type: none"> ✓ May be triggered. ✓ Dependent upon an uncertain future event. ✓ More difficult to budget
<ul style="list-style-type: none"> • Availability Payment (Mexico) • Shadow Tolls (Mexico) • Capital Grant – VGF (Mexico, Korea) 	<ul style="list-style-type: none"> • Minimum Revenue/Traffic Guarantee (Korea, and Mexico Initially) • Minimum Income Guarantee-IRR (Chile) • Least Present Value of Revenues (Chile)

Source Asian Development Bank (ADB) Presentation at the APEC Seminar on Long Term Investment in Infrastructure, 17 May 2017, Ninh Binh, Vietnam

The map of possible interventions the public sector can put in action with indirect effects on public resources is huge and hard to be categorised. However, a broad classification for example can be done based on two dimensions: i) the type of instruments used and ii) the entity that intervenes in infrastructure projects (MDB, NDBS or public fund see Appendix).

Regarding the first dimension (type of instruments used), the options are often categorised as funded or unfunded.

Funded options include any form of co-investment with the private sector. The co-investment can take the form of equity, subordinated/mezzanine debt or a debt contribution provided directly to the infrastructure or indirectly via investment vehicles for infrastructure. In contrast with contributions during construction or during the operational phase that are financed by taxation and do not require any form of compensation or compensation below standard market rates of return, the co-investment agreement is

¹⁰ See also Gatti (2014) for this section

based on the assessment of the infrastructure's profitability and the final objective is to get a level of return proportional to the risk taken in the project.

Unfunded options are represented by public guarantees or back-up liquidity facilities that are provided to an infrastructure's creditors to overcome structural problems incurred [during its development] This back-up support represents a credit enhancement provided to improve the attractiveness of the project for private investors. The guarantee to creditors can include a maximum cap in percentage of the total senior debt borne by the infrastructure. Furthermore, unfunded options can include a guarantee in case of refinancing risk.¹¹

Examples of unfunded options are represented by the liquidity back-up facility of the 2020 Project Bond Initiative started by the European Commission and the EIB, and the unconditional UK Guarantee Scheme. The TIFIA (Transportation Infrastructure Finance and Innovation Act) in the USA is instead a mix of funded and unfunded options.

On the funded side, the TIFIA program can mobilise public capital in co-investment with the private sector with favourable terms as to maturity and debt repayment schedule. On the unfunded side, the program provides loan guarantees to private creditors and standby letters of credit in the first ten years of the operational life of the project. Similarly, the EIB Loan Guarantee for TEN-T projects in the EU (LGTT) provides guarantees to the private sector by means of a demand risk transfer during the early years of operations of PPP procured transportation infrastructure. If the guarantee is enforced, the EIB funds are subordinated to senior lenders and act as a typical credit enhancement mechanism.¹²

In relation to the second dimension the entity that intervenes in infrastructure projects, there are a series of actors of relevance (i.e. MDBs, ECAs, NDBS or public funds see Appendix 3 and 4).

Development finance institutions (DFIs) can use public financing (at either concessional or market terms) to enable the financial viability of infrastructure projects. By using 'blended finance' – DFIs employ the strategic use of public or donor finance to mobilise additional private investment. This is particularly important in APEC developing countries where investment is sometimes further hindered by weak policy frameworks and governance.

Given MDBs contribution to advancing the global prosperity, the G20 initiated the *Multilateral Development Banks Action Plan to Optimize Balance Sheets* in attempt to “fully utilizing MDBs” (G20, 2015). The action plan^[1] calls for MDBs to optimize the use of their balance sheets in order “to increase lending without substantially increasing risks or damaging credit ratings”. Maintaining a high credit rating is important as the ability of MDBs to realize their international development objectives is limited in practice by the need to maintain access to low cost financing in international debt markets (Perraudin, et al., 2016). It is important to understand how the MDBs can continue to deliver their mandate within this constraint and given the paramount role they have been playing so far in financing infrastructure projects in both advanced and developing economies.

¹¹ The cases of Korea and Turkey are very close to a guarantee for refinancing risk. In Korea, the Infrastructure Credit Guarantee Fund provides guarantees on the liabilities of a PPP concessionaire including repayment of bridge loans. In Turkey, the PPP legislation includes a “debt assumption clause” whereby the Treasury assumes the outstanding amount of the loan still due to creditors in case the project is terminated via a takeover of the facility by the public entity.

¹² The Cession de Créances and the Forfaitierungmodell in France and Germany respectively reach a similar goal. In these schemes, the State guarantees that the service charge it has undertaken to pay to a project sponsor during the operational phase will not fall below the level that allows them to service the debt, irrespective of project performance.

[1] The Action Plan, as well as the response from MDBs, includes measures in the following areas: capital efficiency; exposure exchange; concessional window equity; risk transfer instruments for non-sovereign operations; and, net income measures.

The G20 balance sheet optimization action plan can possibly constraint MDBs ability to provide credit enhancement products. In the case of guarantees for example, the World Economic Forum (2016) points out that a key problem limiting their use is that they must be backed by the same amount of regulatory capital (equity capital) as regular loans although they are not funded instruments. The regulatory charge makes these products expensive and the additional costs can off-set the gains in cost of capital brought by the credit enhancement mechanism. The impact of balance sheet optimization considerations on credit enhancement initiatives is yet to be explored in detail.

3. RISK TRANSFER BY CONTRACTUAL ARRANGEMENTS

Risk allocation by means of contractual arrangements between the procuring authority and the project company is the key risk management strategy in project finance and public-private partnerships (PPPs). Effective contractual arrangements align the service delivery objectives of the public sector with the private sector's objectives to generate profits at an expected level of risk (see Appendix 1 for the most common contractual schemes falling into the category of PPPs).

Risk transfer between the project company and other subcontractors is also a common risk management strategy in PPPs as well as project finance transactions more generally. Understanding how private investors approach infrastructure investing requires a preliminary analysis of main contractual structures used in the market.

The other key contracts entered into by the project company are supply and purchase agreements, EPC contracts, O&M agreements, insurance agreements and derivative agreements which further transfer risks from the project company to relevant counterparties (Table 2). These contracts can be used as risk mitigation instruments if the counterparty best able to control and manage the risk is responsible for those risks. If the risk occurs, some form of compensation must generally be paid to the project company. If a risk arises and it has been transferred to a third party, this same party should bear the cost of the risk without affecting the project company, its equity providers, the procuring authority or the project company's lenders.

Table 2 Main contractual instruments to mitigate private investor risk

Risk Categories	Development Phase	Construction Phase	Operation Phase	Termination Phase
Political and regulatory		Insurance Contracts		
Macroeconomic and business		Offtake Agreements and Availability Contracts		
		Put or Pay Agreements		
		Derivative Contracts and Hedging Arrangements		
Technical	Turnkey (EPC) Contract	Operations and Maintenance Agreements		

Box 2 - Optimal risk allocation and GIH Risk Allocation Tool

Risk allocation is at the centre of every PPP transaction, and a deep understanding of the risk allocation arrangements is a precondition to the drafting of every PPP agreement. The appropriate application of risk allocation principles is what determines whether a given PPP project will be 'bankable' (i.e. financeable), and whether it will be long-lasting (i.e. able to remain viable though to the end of a long-term contract)

From an economic perspective, the central case for the use of private financing models rests on whether they can lead to efficiency benefits by harnessing the skills and know-how of private partners combined with commercial incentives. Private finance can represent value for money if the additional cost of finance is offset by benefits of risk transfer to the private sector.

The underlying economic principle involves allocating risks to the party best able to manage them (both in terms of managing the likely occurrence of risks and their effects). Optimal risk allocation is more obvious for some types of risk than others. Market factors will also determine the appropriate allocation of a certain risk. For example, demand risk is currently a contentious issue in many countries, following experiences with overoptimistic private traffic forecasts on toll road PPPs which has led to financiers in certain markets are to no longer be willing to take demand risk for certain projects, or will take demand risk but only by charging a risk premium which does not represent value for money. Certain commercial risks can be controlled and thus should be covered by the private sector. Political and legal risks, however, cannot be directly influenced by the private sector and so often remain with the public sector.

Experience with PPPs has shown that there are a number of challenges that need to be considered with respect to risk allocation. These include, the capability of, and incentives for, the public sector to design, negotiate and enforce well-designed contracts and the transaction costs (e.g. negotiating and monitoring costs) associated with using different models.

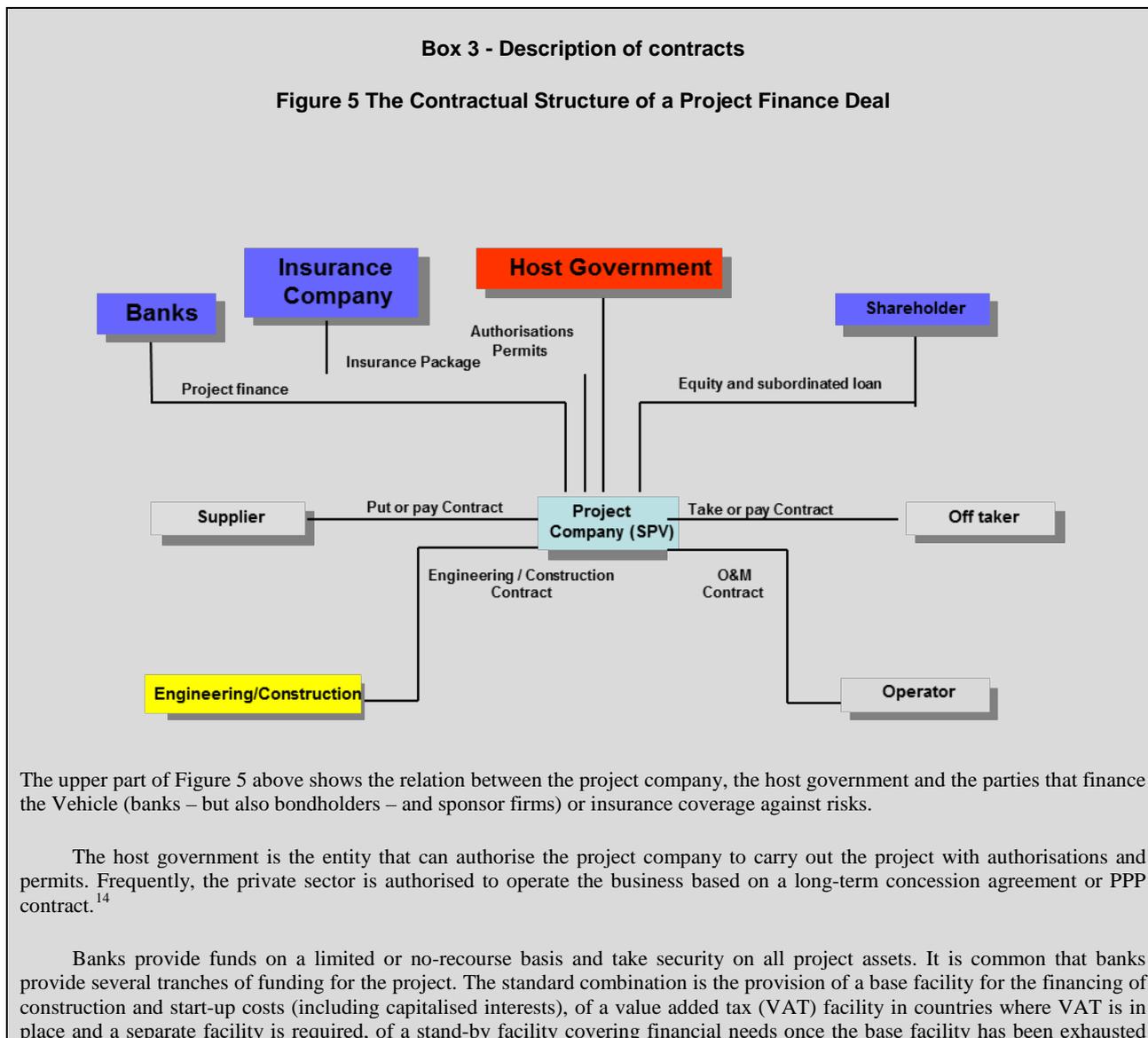
The GI Hub's Report on Allocating Risks in PPP Contracts (the "GI Hub PPP Risk Allocation Tool") contains matrices showing the allocation of risks as between the public and private sectors in typical PPP contracts for 12 designated types of projects within the transport, energy and water and sanitation sectors. It also considers related information on mitigation measures and typical government support arrangements.

The PPP Risk Allocation Tool can be used to provide guidance to countries that wish to develop a programme of PPP transactions. The primary focus is on those countries with limited or no prior experience of PPPs, and the desired outcome of the tool is that those countries will have a useful reference guide to assist with their understanding of typical PPP risk allocation arrangements.

3.1 The transaction design of a project finance deal

The typical contractual structure of a project finance transaction is well established. The underlying driver to structure a transaction as a project finance transaction is to isolate the financial risks of a project from the balance sheets of its financiers (and the procuring authority in the case of a PPP transaction). This is ordinarily done through the setting up of a "special purpose vehicle", a company holding only project specific assets (the "project company") with initial funding coming through debt and equity contributions.

In a standard project finance deal, the shareholders of the infrastructure set up a project company as a special purpose vehicle (SPV) that becomes the centre of a complex network of contracts¹³. An example is provided in Figure 5.



¹³ Bonetti, Veronica, Stefano Caselli and Stefano Gatti, 2010 Offtaking agreements and how they impact the cost of funding for project finance deals: A clinical case study of the Quezon Power Ltd Co., *Review of Financial Economics*, 9, 60-71. Dailami Mansoor and Robert Hauswald (2007). Credit spread determinants and interlocking contracts: A study of the Ras Gas Project, *Journal of Financial Economics* 86, 248-278

¹⁴ Väilä Timo (2005). How Expensive Are Cost Savings? On The Economics of Public-Private Partnership, in *EIB papers*, vol. 10, n. 1, pp. 95-145.

and finally a working capital facility for the day-by-day needs once the construction has been completed¹⁵.

Project sponsors provide equity to the project company based on an equity contribution agreement. Frequently, the funds are not provided upfront for the whole amount but in proportion to the selected debt/equity ratio for the deal on a pro-rata basis. In addition to pure equity, project sponsors also at times provide subordinated loans.

Regarding insurance coverage, it is an important contractual risk mitigation tool on a par with the other key contracts depicted in the lower part of Figure 5. Banks often require the coverage of some risks of the project company as a pre-condition for their debt financing. The different insurance products available on the market are coordinated and linked to the project's contractual structure in order to protect the project company against the risks that none of the counterparties involved are able to control and manage.

The lower part of Figure 5 shows the key nonfinancial contracts (NFCs) underpinning the deal.¹⁶ Numerous NFCs can be drafted in a project finance deal¹⁷ but four are particularly important to the soundness of the venture. Construction contracts and engineering, procurement and construction (EPC) contracts are closed on a turnkey basis to make plant and equipment available to the project company, usually at predefined prices, times of delivery, and standards of performance. These contractual features are useful to shift the construction risk from the project company to the contractor¹⁸. Purchasing agreements stipulated with raw material suppliers guarantee input to the vehicle at predefined quantities, quality, and prices on a put-or-pay basis, meaning that the supplier unconditionally guarantees the needed input or pays liquidated damages to the vehicle. Selling agreements, often known as take-or-pay or off-taking agreements, enable the project company to sell part or all of its output to a third party (off taker) that commits to buy unconditionally, again at predefined prices and for a given period of time (a common example being a power purchase agreement for a power project). In this way, market risk is shifted to a third party. Operation and maintenance (O&M) agreements are designed to provide the project company with efficient and effective plant maintenance

Source: OECD 2014

The project company will generally be restricted from undertaking any activities which are not related to the project, i.e. the project company cannot acquire substantial additional assets, sell assets or expand its business outside of the construction, maintenance and operation of the relevant project asset or assets.

For a PPP, as one of the key drivers for the procuring authority is often to bundle the construction, maintenance, operation and financing of a project together, there will ordinarily be one main “concession agreement” between the procuring authority and the project company. The project company will then separately contract financing agreements and specific service agreements (for example through equity subscription agreements, debt facility agreements, design and construct contracts and operation and maintenance contracts).

3.2 Selected business risk in infrastructure – revenue/demand risk

Revenue risk is a chief risk in modelling infrastructure performance and valuation. Contract design can be effective at mitigating commercial risks such as the business cycle, fluctuations in demand, and sometimes inflation risk if payments are linked to prices or indexed to a measure of inflation. Contracted payments are a method to reduce this risk which would benefit both debt and equity holders in a project. While availability payments are mostly discussed in the project finance context, corporations that build and operate infrastructure can also benefit from such arrangements.

¹⁵ Gatti Stefano (2012), *Project Finance in Theory and Practice*, Academic Press, 2012; Finnerty, John .D. 2007. *Project financing: asset-based financial engineering*, 2nd edition. John Wiley & Sons, New York

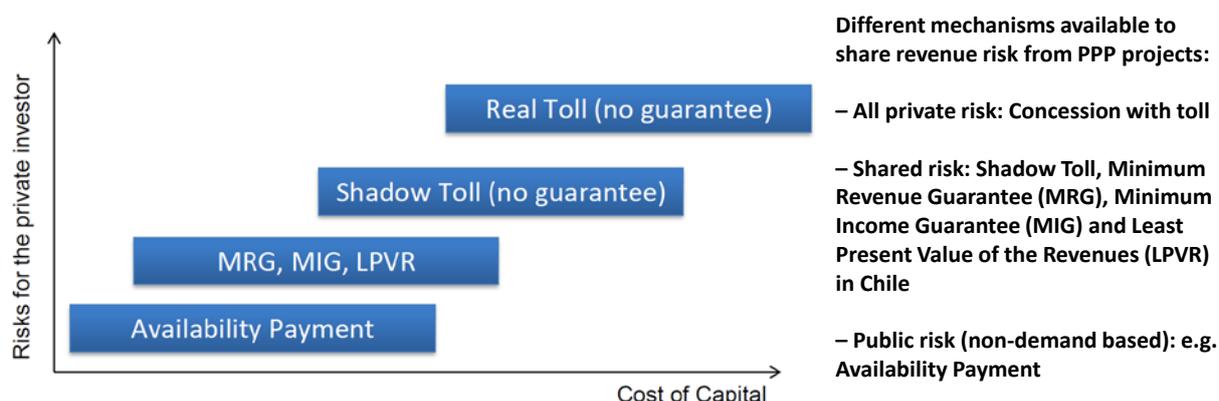
¹⁶ Corielli F., Gatti S, Steffanoni A. (2010), "Risk Shifting through nonfinancial contracts. Effects on loan spreads and capital structure of project finance deals", *Journal of money, credit and banking*, vol. 42, No. 7, 2010.

¹⁷ Esty, B.C., 2003. *The economic motivations for using project finance*. Working paper, Harvard Business School, Boston

¹⁸ Blanc-Brude, Frederic, Hugh Goldsmith and Timo Valila. 2006. *Ex ante construction costs in the European road sector: a comparison of public-private partnerships and traditional public procurement*, Economic and Financial Report EIB, 01/2006, Luxembourg

There are several mechanisms available to share revenue risk in PPP projects. Different mechanisms will have a different impact on the cost of capital which in Figure 6 is inversely related to the level of risks borne by the private sector.

Figure 6 Level of risk affects the cost of capital and the project cost in transport sector



Source Adapted from Asian Development Bank (ADB) Presentation at the APEC Seminar on Long Term Investment in Infrastructure on the 17- May 2017, Ninh Binh,

Availability payments are used by governments in cases where the underlying infrastructure asset does not offer predictable direct revenue; for example when end users do not pay for the use of public facilities via a user fee, but rather via a broader tax pool. Instead, the contracting authority pays the counterparty for the provision of the facility. In cases where the private entity is contracted to maintain and operate the facility or provide additional services, the availability payment can be complemented by fees paid by the public entity to ensure the delivery. Both the availability payment and eventual fees can be tied to quality requirements as a performance incentive for the private contractor in an effort to reduce moral hazard risk.

Output and performance measures are defined in the contract, while the means to achieve this output (design, construction and maintenance specifics) is usually left to the private contractor, which is thus accountable for any deficiencies in design or delivery of the facility. The public sector thus transfers construction and other risks related to the physical nature of the facility to the private sector, while taking on the demand risk through the availability payment.

Availability payments are common in the social infrastructure sector, such as schooling, social housing or hospitals, and can also be used for economic infrastructure when the end user does not pay a usage fee (some roads, railways, tunnels, or bridges). The public authority thus assumes demand risk from the private partner (Gatti 2014). The term “shadow tolls” designates a payment agreement where the user does not pay directly for the usage of a facility, but the private company responsible receives payment from a public authority based on usage volume - demand risk is thus not fully transferred to the public sector (this structure has been used in the transport sector). Availability payments can be complemented by other forms of payment such as financial incentives to provide quality service to mitigate moral hazard risk.

Offtake contracts are common in power generation and infrastructures that “produce” outputs (water included). Such contracts allow the project company to supply output at a pre-agreed price, which can help to reduce future revenue uncertainties. The regulation of public utilities companies is similar: in order to deal with the monopoly position of utilities, regulated prices limit monopoly power. Offtake contracts both

limit the monopoly power of certain projects, but also lock-in an agreed upon rate with regulators. Offtake contracts are signed with contracting authorities. Limiting exposure to market risk has the effect of lowering cash flow volatility and can lead to better credit rating (providing that leverage is not too high).

Throughput contracts are another way to limit revenue volatility. Users of infrastructures such as pipelines agree to use the infrastructure to carry not less than a certain agreed volume, and would pay a minimum price for the usage (Yescombe 2014).

3.3 Selected macroeconomic risks in infrastructure - exchange and interest rate risk

Exchange rate risk

For project companies, exchange rate risks arise where mismatches exist between cash flows in differing currencies, for example financing flows of debt payments in foreign currencies and revenues in a differing local market currency. This is particularly an issue where there is a lack of liquidity in local currency markets with limited access to foreign exchange, and where exchange rate volatilities are high and unpredictable.

Other balance sheet currency mismatches can occur, for example, where certain inputs are imported and paid for in foreign currencies from local currency revenues, leading to foreign exchange exposure.

The procuring authority is generally not expected to bear exchange rate risks nor assist the project company in mitigating such risks and the project company would generally look to mitigate this risk through hedging arrangements, to the extent possible. In certain countries hedging may not be possible due to a lack of hedging instruments, such as derivative contracts. This is particularly an issue in countries lacking developed financial markets.

In some circumstances, the procuring authority may need to retain the risk of devaluation of the local currency to the extent that such devaluation impacts the economic viability of the project. An example in many emerging markets is where a power purchase agreement is denominated in USD or another foreign currency or subject to indexation in a foreign currency to protect the exposure of the project company.

Interest rate risk

Similar to exchange rate risk, the procuring authority is generally not expected to take on interest rate risks nor assist the project company in mitigating such risks but, in some circumstances, the procuring authority may seek to retain interest rate risk if it feels it can bear the risk more efficiently than the private sector.

The project company would generally look to mitigate this risk through hedging arrangements under the finance documents, to the extent possible or necessary in that market. In certain countries hedging may not be possible due to a lack of hedging instruments.

However there are ways that an authority can efficiently share this risk with the private sector. In Canadian P3 projects the interest rate risk is shared through a credit spread refresh mechanism whereby the authority covers any changes in the underlying base rate (sovereign curve) and the private sector covers changes to their credit spread. This can reduce the mitigation measures (hedging etc.) employed by the private sector to account for these changes and reduce interest costs

3.4 Selected technical risk in infrastructure - disruptive technology risk

Disruptive technology risk is the risk that a new or emerging technology unexpectedly displaces an established technology used in that sector. Such technological changes can cause significant disruption to a project over the term of the concession. For example: advances in alternative sources of energy and changes in ICT technologies may supersede existing technologies, lowering costs of battery storage may affect the demand for extensive transmission networks, driverless cars may affect demand for car travel and increase in digital communications may reduce business travel.

This risk is not always expressly addressed in a concession agreement. In a PPP project, there is often a tension between “continuous improvement” obligations and variations. A project company may be obligated to perform service which seeks for continuous improvement for minor changes. However, for major changes, these would require a variation.

The GI Hub’s Risk Allocation Tool considers the appropriate allocation of disruptive technology projects for its 12 types of projects. Provided below are the risk allocations with respect to disruptive technologies recommended by the GI Hub’s Risk Allocation Tool for a power transmission project, a solar PV project and a road project.

Power transmission project

For a power transmission project, the procuring authority generally bears the risk of a power transmission asset becoming obsolete. For this reason, it is suggested the procuring authority mitigates the risk by being cognisant of potential disruptive technologies, such as battery storage and off-grid developments, that may impact long term demand for the asset.

Road project

The risk of a new emerging technology unexpectedly displacing an established technology used in the road sector is generally retained by the procuring authority. The procuring authority may also consider imposing obligations on the project company to adopt and integrate new tolling technologies or to allow for other foreseeable developments, such as driverless vehicles.

The project company may seek to mitigate potential exposure through agreed cost and improvement parameters or, beyond that, they will generally be entitled to relief through a scope variation.

Solar PV project

The risk of disruption to solar PV projects is increasing due to higher efficiency modules, new inverter technology and a general trend towards "smarter" renewable energy generation.

Power purchase agreements don’t typically contemplate a change of the tariff in the case of a new technology emerging, which reduces the costs of power generation, and the change of technology is not typically permitted under the power purchase agreement. Therefore, neither the project company nor the procuring authority will be entitled to require a change in the tariffs under the power purchase agreement.

This may affect the procuring authority where it is contracted to pay prices for power which, due to declining prices in power production, means the contracted prices are “out-of-market”. For this, regulation can be used to manage the extent to which the costs of obsolete power production is passed on to end users, spread over a longer period or subsidised. At the stage in which the cost of keeping the project going becomes higher than the termination compensation, termination of the power purchase agreement may be the best option for the government.

In addition, procuring authorities may impose requirements on the project company to incorporate new technology into the project as it becomes available, particularly where this reduces overall systems costs.

4. RISK MITIGATION INSTRUMENTS AND BLENDED FINANCE APPROACHES TO FACILITATE PRIVATE INVESTMENT

Enabling a pipeline of bankable projects and crowding-in private capital will require efforts to mitigate the risks that investors face. The public sector, and development banks and development finance institutions in particular, can play an important role in this context. Governments, development banks and DFIs utilise a range of tools including guarantees, insurance and hedging, as well as syndication and debt subordination to crowd in private capital for infrastructure projects. Each of these mitigate different types of risks - for example, guarantees can be useful in protecting investors from the risk of governments not honouring their obligations, while currency hedging can reduce exposure to fluctuations in foreign currencies.

Table 3 Existing instruments to mitigate private investor risk

Risk Categories	Development Phase	Construction Phase	Operation Phase	Termination Phase
Political and regulatory		Political Risk Insurance		
Macroeconomic and business	Capital Market Credit Guarantees	Co-Financing Instruments & Asset Management		
		Hedging Instruments		
Technical	Project Preparation	Guarantees & Other Credit Enhancements		

Source: Authors

In addition, many of the approaches shown are supported by 'blended finance' i.e. the strategic use of public or donor capital - either concessional or non-concessional - to mobilise additional investment from the private sector. For example, in some subordinated debt approaches, transactions can be structured in a way such that public capital can take a 'first loss' position so as to attract private capital to the project. While useful in engaging private capital, particularly for technologies that are yet to mature or in countries where the perceived risk of investment is high, there is a need to balance blended finance interventions – and more broadly risk mitigation tools - against issues of moral hazard¹⁹ and market distortions²⁰. MDBs are increasingly working together to develop common guidelines in the use of concessional finance in

¹⁹ Instances where certain risks are transferred from the private sector to the public sector; therefore dis-incentivising the private sector to manage risks. For example, a public wrap guarantee on project debts may dis-incentivise debt holders to monitor the project entity.

²⁰ Any risk mitigation instruments, particularly examples where concessional financing is provided, should try to limit potential distortionary effects on market competition.

private sector operations, and similar efforts are underway among members of the OECD Development Assistance Committee²¹.

Furthermore, public support for project preparation and development also plays an important role in the context of infrastructure financing. Dedicated project preparation and development facilities can provide support targeted to different stages of the project cycle, such as advisory support on design and conceptualisation, prefeasibility and feasibility studies, and identifying potential investors (Nassiry et al, 2016). In addition to project development, project preparation facilities also provide support targeting the broader enabling environment such as technical assistance and capacity building which are major barriers to project development in developing countries. Such approaches should be scaled up, and in the case of facilities with a multi-country or regional focus, these should be better coordinated to maximise their impact and avoid duplication or overlap.

4.1 Approaches to mitigate risks and mobilise private capital

Described in the following section are specific policy actions and tools that may be employed by governments and DFIs to mitigate risks (principally business risks) and attract capital into infrastructure investments (external private sector risk mitigants are also described where appropriate). These actions are grouped into 4 main categories and are specifically oriented to reduce or eliminate the demand risk, increase and/or stabilize free cash flows, and sustain the projects' bankability or may be targeted toward specific finance instruments (Hellowell et al. 2014). Each measure can then be articulated in specific instruments. Table 3 summarizes these types of measures and instruments. These policy actions and tools may have potential costs and side effects, which should be taken into account and may require some form of compensation.

- **Guarantees and insurance:** It mainly includes political risk guarantees, capital markets guarantees, and other types of guarantees and credit enhancement mechanisms.

These mechanisms play a catalytic role in attracting investors, particularly institutional investors (See following section). For instance, the inability of capital markets in certain economies to mobilize local savings is a detriment to financing infrastructure. MDBs can provide sovereigns with partial credit guarantees when those countries are issuing sovereign bonds, to improve the credit worthiness of those issuances.

- **Currency hedging instruments:** Currency risk is often identified as one of the main concerns of infrastructure investors when financing projects in emerging and developing economies (WEF, 2016).

MDBs have a limited range of currency and interest rate hedging instruments, designed to offer investors some protection against currency or interest rate movements. Existing MDB instruments tend to be concentrated in middle income countries and more liquid currencies.

- **Co-financing instruments and asset management** include: Co-investment vehicles that pool investor capital to deploy directly in infrastructure projects, by passing intermediaries; Blended finance funds to pool public and private capital to mobilise additional capital; Loan syndication mitigating business risks for private investors and building on due diligence capacity of development banks; Debt subordination diversifying risks through structuring and facilitating private investment.

²¹ The OECD Development Assistance Committee is currently developing OECD Blended Finance Principles

Co-financing instruments can additionally include credit enhancements to improve the terms under which an outside investor participates. Most MDBs provide co-financing facilities that allow an investor to invest alongside the MDB and on the same terms as part of an A/B loan. Given the preferential treatment afforded to multilateral loans, partnering with an MDB on equal terms is a form of risk mitigation itself.

These two types of structures provide institutional investors with access MDB financed projects on a single name and portfolio basis. Examples of these two co-financing structures are developed in the case studies section of the report.

- **Project development facilities and technical assistance** that aims at raising a project's financing odds, or bankability, through a better preparation and structuring.

Table 4 Approaches to mitigate risks and mobilise private capital

Instrument / approach	Example
Guarantees and Insurance	Guarantee provided by MIGA against risks related to expropriation, war and civil disobedience, among other risks, to a Dutch solar company (SunE Solar) to cover investment in the development of three solar power plants in Honduras.
	The World Bank and African Development Bank offer partial credit guarantees as one approach for building local capital markets, allowing domestic investors to participate in projects in local currency terms.
	MDBs are able to offer a range of guarantees and credit enhancements to private sector investors. Credit enhancements can take a number of different forms, including subordinated or first loss positions, coverage for targeted risks and longer tenures. For example, the EIB offers credit enhancements for their project bonds, providing a tranche of funding that is subordinated to the senior bond holders, but senior to equity.
Currency hedging Instruments	The Currency Exchange Fund (TCX) - supported by the German and Dutch governments - is a currency hedging fund. One example of TCX's work is private fund manager ResponsAbility Investments' provision of local currency indexed loans to M-Kopa, a Kenya-based solar home company that provides decentralised solar solutions in Kenya, Tanzania and Uganda. ResponsAbility is able to do this through a hedging contract with a specialist currency hedging provider, that either passes on the currency risks to commercial counterparties or to TCX, if the former do not exist.
Co-financing instruments and asset management	One example of a co-investment platform is the Marguerite / 2020 European Fund for Energy, Climate Change and Infrastructure which brings together several NDBs and financing institutions, including CDC, CDP, EIB, KfW and PKO Banco Polski to co-invest in renewable energy and sustainable transport infrastructure in Europe, with a focus on greenfield projects (minimum 65% of the fund) (Della Croce and Sharma, 2014).
	Climate Investor One, launched by FMO and Phoenix InfraWorks and supported by funding from the government of the Netherlands, is a new fund of funds structure designed to invest at the development, construction and refinancing stage of large scale solar, wind and hydro projects, with initial projects financed in Rwanda and Zambia.
	MDBs usually take the role of lead arrangers, and the private sector steps in to provide additional capital. The division of the loan amount leads to risk diversification, and it builds on the due diligence capabilities and reputation of the public sector (MDB) arrangers i.e. by doing this the MDBs boost investor confidence and reduce transaction costs
	An example is the Green for Growth fund which was launched by the German KfW and the European Investment Bank (EIB) with the financial support of the European Commission, the German Federal Ministry for Economic Cooperation and Development (BMZ), and the EBRD ²² . The fund is directed to

²² Please see <http://www.ggf.lu/about-green-for-growth-fund/institutional-structure/>

	investments in energy efficiency projects as well as projects increasing renewable energy sources in Southeast Europe. The public donors are invested in the most junior tranche, while private institutional investors invest in the most senior tranches, thereby benefiting from the risk cushion provided by the public (donor) investment.
Project development facilities and technical assistance.	The Asia Pacific Project Preparation Facility - a grant-funded by Australia, Canada, and Japan - is directed to supporting Asian Development Bank (ADB) member country governments and their public sector agencies in preparing and structuring PPP transactions for infrastructure, with a priority towards infrastructure which includes climate change and sustainable development elements. ADB itself will provide the technical assistance, i.e. preparation, structuring and market placement of the PPPs ²³ .

Source: Adapted from OECD (2017 a)

4.2 Attracting institutional investors and enabling transactions through diversified financial instruments, and techniques

Governments use different mechanisms to overcome constraints and barriers for higher institutional investor involvement, including fiscal incentives, capital pooling platforms and risk mitigation mechanisms (guarantees, insurances, credit enhancement, currency risk protection, and other instruments) (OECD 2014, OECD 2014b²⁴). Similar mechanisms are tried for renewable energy and green infrastructure (Kaminker and Stewart 2012, OECD 2015). Therefore, attracting institutional investor's capital to finance infrastructure projects is about intelligently using and orchestrating the previously mentioned risk mitigation instrument in order to: (i) enhance the credit quality of the projects and entities seeking financing in order to meet investors' risk requirement; (ii) structure innovative vehicles and financial instruments that match investor's appetite.

Attracting institutional investors in PPP projects through credit enhancement

Instruments can successfully mitigate the main infrastructure financing risks, insuring an investment grade rating and potentially attracting international institutional investors. It is a way to broaden the financing sources for the project, to develop local capital markets, and mobilise investors that do not usually invest in infrastructure projects

For example credit enhancement may enable the use of bonds in the primary stage of project financing. Scaling credit enhancement mechanisms has the potential to crowd those investors that are comfortable with investment grade fixed-income products, such as pension funds and insurance companies, in the financing of new built infrastructure projects. In this area, projects are opting for unfunded instruments with partial risk guarantees playing a central role. The intervention of MDBs is needed at this level when projects are located in countries with a *sub* or *low investment grade* rating.

Credit support could be used to mitigate sovereign and macroeconomic risks as well as project-specific risks. It could benefit PPP projects which are higher risk in stable creditworthy countries, as well as PPP projects in countries with weak or challenging credit profiles. Many such credit enhancement tools are already available for this purpose from multilateral and bilateral institutions and their use is being gradually mainstreamed and increased. Credit support can also overcome basic unfamiliarity with non-bank funding for infrastructure even in more developed financing markets (e.g. the first Belgian project bond was an EIB Project Bond Credit Enhancement Programme²⁵ (PBCE) pilot project)²⁶.

²³ See <https://www.adb.org/site/funds/funds/asia-pacific-project-preparation-facility>.

²⁴ Inderst, G (2009), Pension Fund Investment in Infrastructure. OECD Working Paper on Insurance and Private Pensions No. 32.

²⁵ See next section for more details

Credit enhancement usually has the effect of taking the “first loss”, insulating bondholders against a certain level of loss in a default or termination scenario, and/or providing liquidity in times of cash flow stress. This can provide reassurance to potential investors as well as potentially resulting in a higher credit rating. Depending on the form of credit enhancement, it may also result in the credit provider being the controlling creditor for decision-making purposes²⁷ ..

The World Bank, MIGA and IFC have a long track record in providing guarantees for bonds. These guarantees generally focus on specific risks which the private sector is unable to manage (such as adverse government action) and are available to World Bank and IDA countries. MIGA insurance focuses on political risk. More generally, since the financial crisis, organisations such as the EIB and the Asian Development Bank have been considering ways to boost liquidity and incentivise capital markets investors to invest in infrastructure in both developed and emerging markets. Multilateral funding agencies and development banks are the ideal channel for this type of support because they have both the credit quality and the political influence to stimulate investor appetite.

Risk mitigation through instruments – co-financing instruments

While different organisational forms have been increasingly used that would permit more private sector involvement, several new forms of collaboration involving institutional investors have been launched in recent years (i.e. pension funds partnering with pension funds, industrial partners as utilities establishing joint companies with financial institutions).

On the debt side, the originate-to-distribute model sees commercial banks cooperating with institutional investors through different means (e.g. partnership between banks and institutional investors, securitisation models, direct lending and debt/credit fund vehicles) in order to channel higher lending volumes to infrastructure. On the equity side, initiatives such as the establishment of the African PAIDF, the Philippine PINAI fund and the Marguerite fund in Europe provide examples of how funds can be set up with government involvement to help attract institutional investment to emerging economies and greenfield infrastructure. MDBs can play a role in facilitating investment by establishing equity investment funds, debt funds, by co-investing with other institutional investors, and through the deployment of various risk mitigation techniques. Two OECD reports delve into a number of new models to access infrastructure debt and equity (See Della Croce and Sharma 2014 and Gatti 2014).

These instruments build off of previous recommendations endorsed by the G20 in the *G20/OECD Guidance Note on Diversification of Financial Instruments for Infrastructure and SMEs*. For developing countries, the formation and deepening of local capital markets – both debt and equity – is essential in order to attract both domestic and foreign investors, along with other important pre-conditions drawn from the Guidance Note which can strengthen the financing environment for infrastructure.

2016 saw the emergence of an innovative co-financing vehicle that intends to cross investment barriers by combining the syndication process with credit enhancement tools and MDBs expertise in loan origination in emerging and developing economies.

²⁶ See World Bank Guidance on PPP Contractual Provisions <https://ppp.worldbank.org/public-private-partnership/library/guidanceon-ppp-contractual-provisions-2017-edition>

²⁷ See World Bank Guidance on PPP Contractual Provisions <https://ppp.worldbank.org/public-private-partnership/library/guidanceon-ppp-contractual-provisions-2017-edition>

5. SELECTED GOOD PRACTICES AND CASE STUDIES

Figure 7 - Examples of risk mitigation through contractual arrangements and risk mitigation instruments

Risk Categories	Development Phase	Construction Phase	Operation Phase	Termination Phase
Political and regulatory		MIGA Political Risk Insurance		
Macroeconomic and business		MIGA / EBRD Project Bond Credit Enhancement – Combining risk mitigation instruments		
			EIB Project Bond Credit Enhancement – Pioneering project bond credit enhancement	
			ADB Green Project Bonds Credit Enhancement – Credit enhancement for the green projects	
			IFC Managed Co-Lending Portfolio Program – Combining co-financing and credit enhancement	
			IDB A/B loan structure – Taking advantage of MDBs unique status	
			Chile Least Present Value of Revenues – Reducing costs to limit the impact of swings in demand	
	Mexico's Road PPP Models - Diversifying concession models to accommodate different sources of financing			Chile Minimum Income Guarantees – Insuring a stable revenue for projects
		Peru RPI – CAO – Attracting international institutional investors		
Technical				

Source: Authors.

Note: The blue boxes are guarantee and credit enhancement instruments, the purple boxes are co-investment instruments, and orange boxes contact-based risk mitigation measures.

Practical approaches have been implemented by governments and the multilateral community²⁸ in recent years to mitigate infrastructure risks and crowd-in private sector financing. This section describe these mechanisms in detail focusing on both contract-based measures and risk mitigation instruments as presented earlier in the report. Effective contractual arrangements and mechanisms can allow the private sector participants to mitigate some of the main infrastructure risks such as currency, demand or construction risks. Risk mitigation instruments such as credit enhancement and co-financing instruments can attract alternative sources of finance to infrastructure projects.

²⁸ http://www.bundesfinanzministerium.de/Content/DE/Downloads/G20-Dokumente/principles-on-crowding-in-private-sector-finance-april-20.pdf;jsessionid=BCCD435665773450A924EC5CD7AF2264?__blob=publicationFile&v=2

5.1 Risk mitigation through contractual arrangements

Attracting private participation in Mexico's road sector

Although peso devaluation in 1994 was commonly cited as the main contributing factor for the termination of the road concessions, the concession model and conditions in the local financial market also contributed to the exit of the private sector. Projects with investment commitments totalling US \$7.86 billion were cancelled from 1989 to 1994.

The first concession program required construction firms to submit only a basic engineering design before bidding. In practice, these studies did not properly assess construction risks, leading to delays and cost overrun in project execution. The bidding criterion stipulated that contracts were awarded to the concessionaire that offered the shortest concession term, with an average of ten years and a maximum of fifteen years. This award modality, in practice, put pressure on the concessionaire to recover their costs in a short period. Concessionaires had to secure the right of way to build their road, which often led to delays in construction, and consequently, costs had to be recovered quickly through tolls. Once tolls were charged, they were often high to pay the debt in the time allocated. Tariffs were adjusted on a semi-annual basis and linked to the consumer price index. The presence of mandatory free roads in Mexico made demand elastic enough to respond to the high rates, and concessionaires often found themselves with lower traffic levels than projected.

In the early 1990s, long-term debt in pesos was not available in Mexico's banking system. As a result, much of the debt of road concessionaires was denominated in US dollars. When the peso devalued against the US dollar by almost 90% in 1994, many concessionaires found themselves unable to service debt in US dollars with revenue in Mexican pesos. Equity in the concessions was often granted to local construction companies in exchange for performing works, and was lost in those concessions unable to service their debt. From a financing perspective, local banks were limited to offering debt financing with tenors averaging seven years. The early concessions had a guaranteed level of traffic volume that allowed for contract extension if traffic fell below the pre-established levels, but also shortened the contract if traffic went above this level, which reduced incentives for investors to provide risk capital.

After a hiatus of private activity from 1996 to 2002, Mexico attracted private investment in road projects through three BOT contracts in 2003–04. As of 2014, the program had awarded 28 concessions, 3,112 km with a value of USD 6.8 billion. These contracts have been implemented under one of three new public private partnership models launched by Mexico's Secretariat of Communications and Transport (SCT): the new concession model for highways, the private service contract model (PPS) and the asset utilization model. All three models give concessionaires longer periods to recover costs by lengthening the maximum concession period to 30 years, and eliminating the shortest concession period as bidding award criteria. Contracts are awarded through international competitive tender processes. The three models are outlined in the table below.

Mexico's Road PPP Models			
	<u>New Concession Model</u>	<u>PPS</u>	<u>Asset Utilization</u>
Description	SCT secures the right of way for the concessionaire, so construction will not be delayed after the awarding of a concession. Additionally, SCT provides a detailed engineering design of the road to all bidders at the time a concession is tendered to reduce delays and cost overruns associated with the old model. The new model mandates a minimum equity contribution of 25%, which can be reimbursed by the government in the case of early contract termination. Concessionaires are also mandated to acquire insurance to cover force majeure events, such as earthquakes.	The private service contract model or Modelo de Proyectos de Prestación de Servicios (PPS) is primarily used to operate, expand and modernize existing roads or brownfield assets which by law cannot be tolled. The length of the contract ranges from 15 to 30 years and on average tends to be shorter than the other models.	Through an international, competitive tender, the contract is awarded to the bidder who meets the legal, technical and financial requirements and pays the highest lump-sum payment to the government. Proceeds from the private sector are earmarked for further transport development in Mexico.
Type of Asset	✓ Greenfield Projects	✓ Primarily Brownfield	✓ Brownfield and Greenfield
Project Revenue	✓ Tolls and/or fixed government payments	✓ Fixed and/or variable government payments	✓ Tolls
Type of Government Support	✓ Construction Subsidy (CAI)	✓ Shadow Toll ✓ Availability Payment	✓ None

Source: Asian Development Bank, Alexander N. Jett September 2017

Demand risk mitigation in Chile's infrastructure projects

Demand risks can be addressed through Minimum Income Guarantees (MIG) referred to as traffic guarantees in the context of transport infrastructure.

In Chile for instance, MIGs are the primary risk mitigation mechanism. They are designed to mitigate risk and lower projects financial costs through covering up to 70 percent of the investment cost as well as the operation and maintenance costs. A lower band is defined every year, which trigger compensation if real revenues fall below. Similarly, if traffic is higher than the expected level the private partners have the obligation to share the benefits – the obligation can be triggered if the Internal Rate of Return (IRR)

exceeds 15 percent in a given year or if the revenues are above a pre-defined level. For its New Highway Concession Program, the Mexican government also initially offered MIGs; however, these guarantees are no longer given as financial institutions are more familiar and comfortable with the risk.

Mitigating demand risk can also be through minimising project costs. Demand is ultimately a risk because weak demand can result in a shortfall in revenue and therefore the inability to cover operating cost or service debt. Mechanisms such as MIGs are intended to boost revenues; the other way to limit the impact of swings in demand on a project's financial sustainability is through reducing costs. The Least Present Value of the Revenues (LPVR) for example is a mechanism by which the government is granting the concession for an infrastructure project to the bidder that requires the lowest Net Present Value (NPV) to cover its cost. This system that reduces the likelihood of the renegotiation of the concession terms is used in Chile.

In this model, the concessionaire bids on the total amount of revenue throughout the concession (with the lowest bid winning). Bids are controlled for inflation by discounting at a fixed or floating rate depending on the preference of the bidder.

This model has several advantages. It lowers probability of bankruptcy and renegotiation as well as the demand for government guarantees, putting fewer burdens on the host government. It is also easy to calculate and mitigates the winner's curse (bidding lower than needed in a cost-based bid). It also makes it difficult to renegotiate in an opportunistic manner saving government time and resources.

One criticism is that the model does not control for fluctuations, but this is also true in a normal road concession. The model can also be difficult for bankers since there isn't a fixed concession length by which to base a loan tenor. In Chile, however, it seems that market has adjusted as the table below shows the extensive track record of projects awarded under this modality.

Figure 8- Projects awarded under the Least Present Value of Revenues mechanism in Chile

<i>Project</i>	<i>Month/year auctioned</i>	<i>Winning bid (MM USD)</i>
Ruta 68, Santiago-Valparaíso-Viña	02/1998	513
Diego Aracena Airport	11/2007	15
Route 160, Coronel-Tres Pinos	04/2008	342
Access AMB airport	07/2008	56
Melipilla-Camino de la Fruta Connection	08/2008	46
Route 5, Vallenar-Caldera	11/2008	288
Aerop. Carlos Ibáñez, Punta Arenas	11/2009	9
Aerop. de la Araucanía	03/2010	20
Ruta 5, Puerto Montt-Pargua	05/2010	31
Concepción-Cabrero	01/2011	318
Alternative access Iquique	01/2011	167
Aerop. El Loa, Calama	01/2011	4
Aerop. Cerro Moreno, Antofagasta	10/2011	11
Ruta 5, La Serena-Vallenar	12/2011	345
Aerop. La Florida, La Serena	11/2012	4
Rutas El Loa	12/2012	286
Ruta 43, La Serena-Ovalle	05/2013	223

Source: ¹ *The Economics of Public-Private Partnerships: A Basic Guide*, Engel, Fischer and Galetovic, Cambridge University Press, 2014.

Attracting institutional investment in Peru infrastructure projects

Peru offers an interesting example of governments' use of measures to encourage private sector investment in infrastructure that simultaneously mitigate currency, demand and operating risks.²⁹

In the year 2000, the Peruvian government put in place a series of updates to its Build, Operate, and Transfer (BOT) concession structure including several innovative risk mitigation mechanisms. First the structure granted a project lender with “step-in”³⁰ right, named lenders as direct beneficiaries of a portion of termination compensation, and provided US dollar-indexed and inflation-adjusted rates to enhance projects return profile (Chadbourne, 2012).

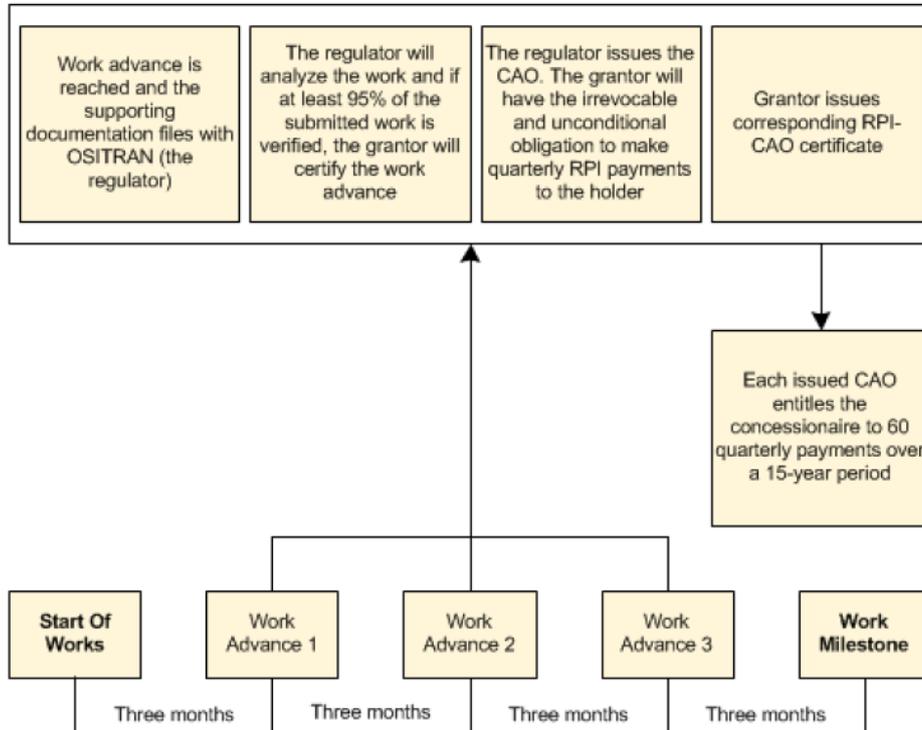
However, these initial arrangements did not mitigate construction and performance risks rising from the uncertainty over the demand for services in a country with low population density. In 2005, Peru enhanced its BOT concession structure with a financing mechanism by which the government provides financial support to mitigate construction and performance risks. The *Remuneracion por Inversiones segun Certificado de Avance de Obra* (RPI-CAO) is a mechanism that grants a concessionaire the right to receive a compensation that covers construction costs upon the completion of a construction milestone and the submission of a construction progress report (*certificado de avance de obra*) – these payment are sometimes referred to as milestone payments. The RPI-CAO can be denominated in local or hard currency, and are issued by a government agency or a state owned company³¹.

²⁹ Although it has been common in Peru for payments to be promised on, effectively, a sovereign credit guaranteed basis, at construction milestones for PPP concessions, the Peruvian government is moving toward other payment mechanisms, like availability payments and functional milestones, which are more aligned with international best practices in PPP. Considering its investment grade sovereign rating and recent adherence to the OECD Principles for Public Governance of PPP (since March 2016), the Peruvian government is moving toward other payment mechanisms when structuring PPPs. Source Peru Ministry of Economy and Finance

³⁰ A common contractual arrangement in finance deals that grants lenders the right to intervene in the special purpose vehicle (SPV) in order to ensure that key contracts entered into by the SPV are completed successfully.

³¹ The RPI-CAO is not a certificate but a collection right that was specified in the contract. The grantor is the entity that makes the payments. Although the PPP Law (Legislative Decree 1224) applies to all public entities, only Ministries, Regional Governments and Local Governments can act as grantors. Peru's public health insurance system, ESSALUD, has a special status and can act as a grantor. If state-owned companies, such as the water and sewage company in Lima, SEDAPAL, want to develop a PPP, they have to ask a Ministry to sponsor it. Source Peru Ministry of Economy and Finance

Figure 9- Example of milestone payment structure for the Lima Metro Line 2 project



Source: Standard and Poor’s Presale report “Lima Metro Line 2 Finance Ltd. (Series 2015-1)”, 2015

RPI-CAO is unconditional, irrevocable, and transferable payment rights to deferred streams of fixed payments. Once earned the payment rights remain regardless of the completion of the rest of the construction milestones³². Therefore, these payment rights can be securitized and therefore allow a project to diversify its financing sources by targeting local and international institutional investors through local and international capital markets.

The bonds backed by USD-denominated RPI-CAO do not incorporate currency risk; and operating and demand risk are mitigated since the payments are not contingent to operating performance or the success of the project (Moody's, 2016). The notes were rated ‘BBB’ by Standard & Poor’s (2015), one notch below the foreign currency rating on Peru, which reflects the rating of the RPI-CAOs. As mentioned in the previous analysis, a simple model for currency risk hedging is to structure projects so as they support hard currency debt by insuring that the offtake agreement for the delivery of the infrastructure service (delivering power or water for example) is denominated in hard currency. The risk is therefore assumed by corporate entity or the government-utility operating the infrastructure³³.

³² Completion risk is allocated to the government when it is usually assigned to the private party. This is now considered a bad practice in PPP. Peru had to resort to this payment mechanism because the macroeconomic and political context was different almost two decades ago.

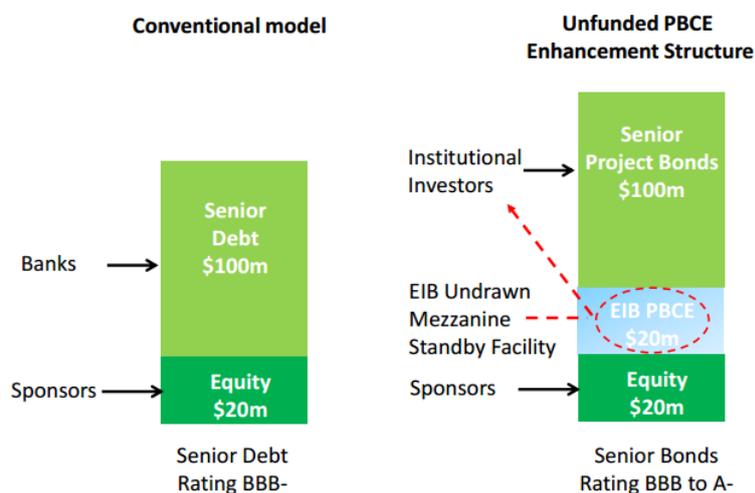
³³ Another alternative is for the developer of the project to sell a portion or all of the output to a country with the same currency as its liability. For instance, the Nam Theun 2 hydropower project in Laos is partially financed by Thai banks through Thai baht-denominated loans and the part of the energy production is sold to Thailand. Therefore, the Thai baht-denominated loans are not exposed to currency risk.

5.2 Risk mitigation through instruments – credit enhancement

The EIB's Project Bond Credit Enhancement Program

The ability of DFIs and MDBs to provide a credit enhancement that lifts a project's rating to equal or above the sovereign was illustrated by the European Investment Bank's (EIB) project bond credit enhancement program (PBCE). The EIB offered an unconditional and irrevocable letter of credit the projects can use in the circumstances of pre-completion cash shortfalls, shortfalls in scheduled debt servicing, or payment following acceleration³⁴. Under this initiative the *Concessioni Autostradali Venete* project issued a USD 830 million project bond in April 2016 including the EIB's unfunded project bond credit enhancement (PBCE) facility. For this project, the PBCE mainly contributed to mitigate demand risk as the assets were fully operational. Although the traffic performance is positive, the relatively weak macroeconomic trends in the context of recovery introduce the demand risk (Moody's, 2016). The credit enhancement allowed the project bond to be rated A3 *stable*, a rating uplift of one and a half notches, above Italy's sovereign rating of Baa2 *stable*.

Figure10 EIB's Europe 2020 Project Bond Initiative - Impact Leveraging.



Source: Frederic Thomas, September 2016

Note: The figure is not to scale; it was design for illustration only. The usual capital structure for an infrastructure project is a simple split between an equity and senior debt tranche. Each tranche reflects a different level of risk. The figures shows that the EIB PBCE's support scheme changes the financing's capital structure, creating a Senior debt tranche with a lower risk, and a higher rating, more suitable for institutional investors' risk appetite.

The ADB's green project bond credit enhancement

In the emerging and developing economies context, successful examples of project bonds credit enhancement via partial credit guarantees are also present. Replicating some aspects of the EIB facility, the Asian Development Bank (ADB) provided three noticeable transactions during the last few years.

The ADB provided two partial credit guarantees through the credit enhancement of project bond facility; an initiative developed with the India Infrastructure Finance Company Ltd. (IIFCL). The facility first guaranteed the ReNew Power project bond issuance that served to refinance bank loans backed by a wind power plant in India. The second partial credit guarantee was provided to Hindustan Power project

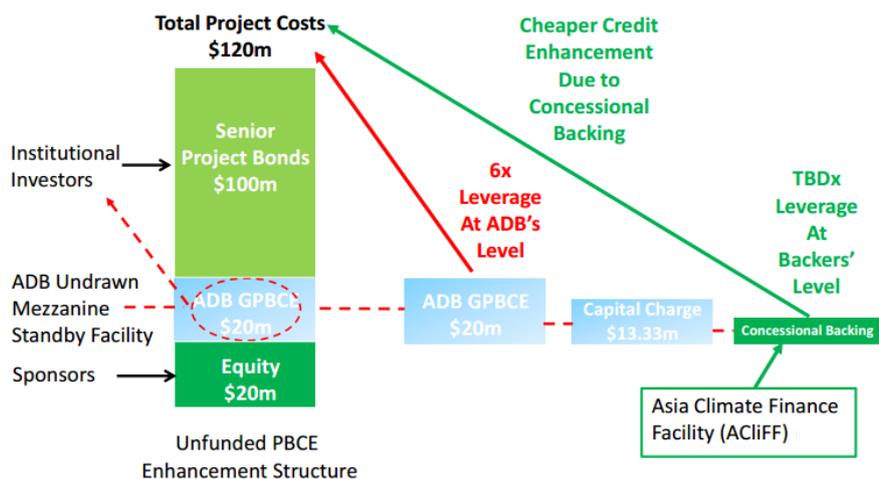
³⁴ Unscheduled payments, outside of the amortization schedule, intended to an early pay-off of a loan.

for the issuance of RS1.3 billion (USD 19.6 million) project bond; the bond’s proceeds were targeted to the refinancing of a solar power plant in Gujarat, India.

In 2016, the ADB also supported the Tiwi-MakBan geothermal project refinancing in Philippines through a partial credit guarantee and a project loan that enabled the issuance of pesos-denominated project bond Ps 8.025 billion (USD 175 million) – the bond was 75 percent guaranteed by the ADB. The bond specifically targeted the refinancing of AP Renewables Inc.’s (APRI) capital expenditure; it was the first Climate Bond certified bond in Asia-Pacific and the first local currency project bond in the Philippines. The Tiwi-MakBan project bond included a particular project risk: steam supply risk. Steam supply risk is one of the key risks associated with geothermal projects. This was however deemed moderate as the Tiwi-MakBan steam field has a long operating histories and a diversified supply.

All the three projects credit-enhanced by the ADB project bond facility are brownfield projects with bonds denominated in local currencies and targeted to local institutional investors. The scalability of project bond model in the Asia-Pacific region will depend on the breadth and depth of local capital markets. In Malaysia for instance where capital markets are developed, a third of infrastructure projects are financed with Islamic Sukuk bonds (Thara-Stubbs, 2016).

Figure 11 Proposed ADB’s Green Project Bond Credit Enhancement for the Tiwi MakBan project



Source: Frederic Thomas³⁵, September 2016

Note: The figure is not to scale; it was design for illustration only. Similarly to the EIB’s PBCE, the ADB’s GPBCE changes a project’s financing capital structure in order to create a senior, “enhanced”, tranche more suitable for institutional investors’. The additional particularity of the ADB’s GPBCE is that it leverages donor financing (AClIFF) in order to generate the credit enhancement.

However, innovative credit enhancement techniques are already allowing greenfield projects to issue project bonds targeted to international institutional investors.

Combining risk mitigation instruments for credit enhancement: MIGA’s political risk insurance and EBRD’s liquidity facility

In November 2016 the market saw a notable project bond issuance that perfectly illustrates the role collaboration between International Financial Institutions (IFIs) can play in the specific context of emerging economies, mitigating both currency and project risk. MIGA and the European Bank for

³⁵ <http://eurocham.org.sg/wp-content/uploads/2016/09/Market-Innovation-Case-Study-Climate-Finance-and-Green-Project-Bonds-in-Asia.pdf>

Reconstruction and Development (EBRD) worked together to provide the credit enhancement while other IFIs subscribed to the bond issued.

The Turkish Elizig Integrated Health Campus' EUR 208 million senior secured project bond issuance was assigned a Baa2 rating two notches above Turkey's Ba1 sovereign bond rating. The project is a "greenfield construction project in a priority social sector with no major constraints on the works or schedule and a construction security package at the stronger end of rated precedents" (Moody's, 2016). The rating rationale emphasises the strong multilateral support for the transactions. The Multilateral Investment Guarantee Agency (MIGA) provided a political-risk insurance (PRI) policy designed to cover currency risk, as well as the risk of expropriation and breach of contract. The political-risk insurance is complemented by a liquidity facility provided by the European Bank for Reconstruction and Development (EBRD) during construction and operation.

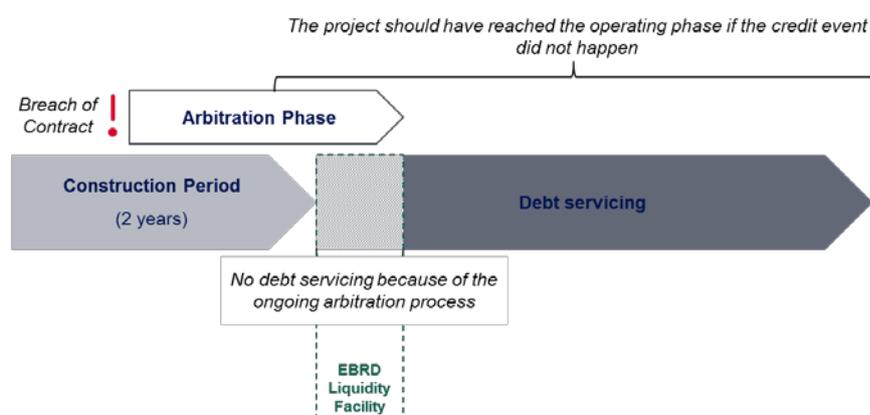
Box 4 - Political risk Insurance and Arbitration Process

The quality of the cover of a project by a PRI will depend on the likelihood of a political event and the likelihood of the PRI responding in a timely manner (Moody's, 2017). In particular the timeline and process for making claims can vary according to the project documentation and terms of the insurance policy. In the Elizig project case, the process for claiming under the PRI policy is a six steps process:

- The government fails to pay availability payments
- Dispute resolution under the policy agreement
- The project terminates with a termination compensation due from Authority
- Arbitration following government non-payment of termination compensation
- A final, non-appealable is awarded and binding arbitral award against the government

Such an arbitration process can expose lenders to liquidity constraints. Indeed, debt servicing might start during the arbitration process if the process takes more time than the initially scheduled construction period. In the case of the Elzig Hospital project, the EBRD's subordinated liquidity facility provides nearly 4 years of debt service.

Figure 12 - The role of a liquidity facility in the case of a protracted arbitration



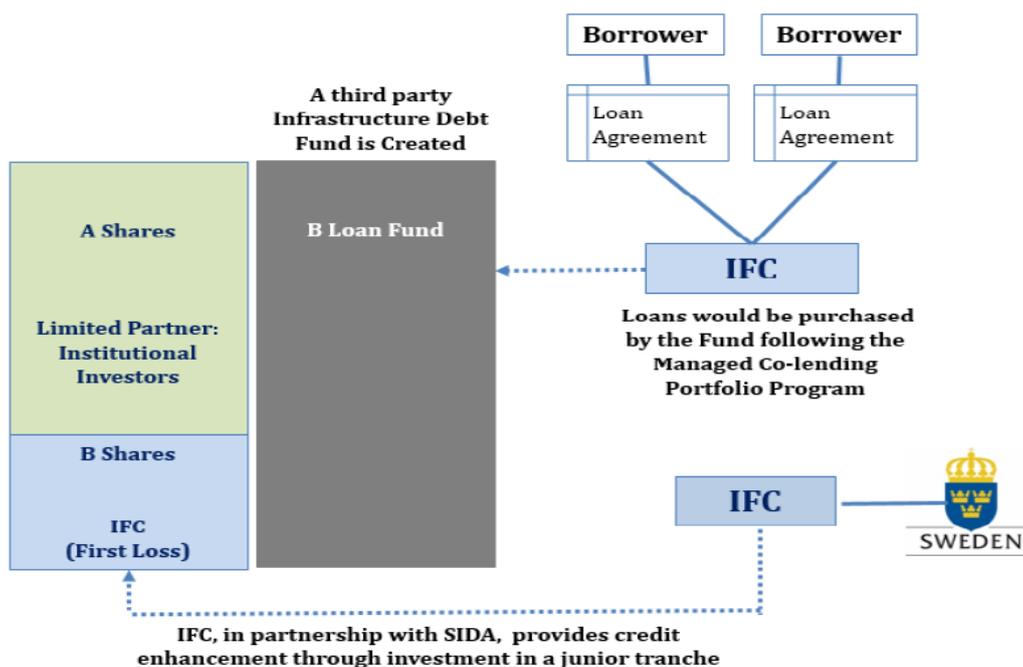
Source: Authors.

The bonds were acquired by development finance institutions and banks (IJGlobal, 2016) **including the International Finance Corporation (IFC), the French development finance institution Proparco, and Japan's MUFG**. The IFC invested EUR 80 million in the project, and emphasised that the project bond provided funding at **tenors that are not commonly available in Turkey's project finance market**. The transaction was pioneering in many regards. It is the first project bond financing for a hospital under a public-private partnership (PPP) in Turkey.

5.2 Risk Mitigation through Instruments – Co-financing instruments

IFC Managed Co-lending Portfolio Program: a blended finance vehicle for developing countries infrastructure

Figure 13- IFC Managed Co-lending Portfolio Program - Structure



Source: IFC EM Compass, “Mobilizing Institutional Investment into Emerging Market Infrastructure”, April 2017.

The International Finance Corporation (IFC) designed the Managed Co-lending Portfolio Program³⁶ (MCP), an infrastructure debt fund structure created to scale up IFC’s debt mobilization from institutional investors. Through the MCP, institutional investors are able to invest on a syndication basis in a portfolio of bankable projects originated by the IFC and on the same conditions as the Bank. The IFC invests in a subordinated, *first loss*, tranche of the vehicle which allows a credit enhancement of the infrastructure debt fund; this way, institutional investors have access to an investment grade profile. The *first loss* position of the IFC is guaranteed by the Swedish International Development Cooperation Agency (SIDA). This mechanism makes the best use of IFIs resources to meet institutional investors risk profile expectations and mobilise private sector financing.

The Inter-American Development Bank’s A / B loan: giving institutional investors access to developing countries infrastructure

MDBs are also creating innovative risk mitigation techniques targeting institutional investors seeking exposure on a single project in emerging and developing countries – as opposed the portfolio approach one when investing in a fund. The Inter-American Development Bank (ADB) has been successfully using the innovative A and B loan approach to reach this objective.

³⁶ http://www.ifc.org/wps/wcm/connect/2baa8f8e-f08a-43e1-b1e0-9095d5c085ac/MCPP+Infrastructure_FINAL_10-5-2016.pdf?MOD=AJPERES

The structure is simple; the IDB³⁷ provides an “A” portion of the loan from its own resources and a “B” portion where it partners with other financial institutions. The IDB acts as the lead lender and administrative agent for the entire loan – the A and B portions – which allows its co-investors to benefit from its preferred creditor status. The IDB used this structure in an innovative way to finance the *Reventazon* hydro-electrical plant in Costa Rica. The Bank provided a USD 200 million non-sovereign guaranteed loan and partnered with private investors through B-bond to mobilise additional USD 135 million. The B-bond is a way to attract institutional investors in capital markets and a way for borrowers to access long tenors they cannot secure through commercial banks.

³⁷http://www.bundesfinanzministerium.de/Content/DE/Downloads/G20-Dokumente/principles-on-crowding-in-private-sector-finance-april-20.pdf;jsessionid=BCCD435665773450A924EC5CD7AF2264?_blob=publicationFile&v=2

APPENDIX 1: MAPPING OF INSTRUMENTS AND VEHICLES FOR THE FINANCING OF INFRASTRUCTURE

Table 5 sorts instruments based on several dimensions. The left hand margin describes modes of investment, recognizing that there are broad asset categories (fixed income, mixed, equity), followed by principal instruments. Besides the fact that investors can be creditors or equity-holders, some investments, particularly PPP contracts and concessions, may have debt-like characteristics due to contracted cash flows. Thus for consistency, categories are defined by their nature, with the distinction drawn from whether an investor receives priority claims in corporate or project cash flows (creditor), mixed (creditor with equity participation rights), or residual claims to cash flows (equity). Further along the top of Table 5 are the finance instruments followed by market channels.

Table 5 Instruments and vehicles for infrastructure financing

Modes		Infrastructure Finance Instruments		Market Channels
Asset Category	Instrument	Infrastructure Project	Corporate Balance Sheet / Broader Entities	Capital Pool
Fixed Income	Bonds	Project bonds	Corporate bonds, Green bonds	Bond indices, Bond funds, ETFs
		Municipal, Sub-sovereign bonds		
		Green bonds, Sukuk	Subordinate bonds	
	Loans	Direct/Co-investment lending to Infrastructure project, Syndicated project loans	Direct/Co-investment lending to infrastructure corporate	Debt funds (GPs)
Syndicated loans, Securitized loans (ABS), CLOs			Loan indices, Loan funds	
Mixed	Hybrid	Subordinated loans/bonds, Mezzanine finance	Subordinated bonds, Convertible bonds, Preferred stock	Mezzanine debt funds (GPs), Hybrid debt funds
Equity	Listed	YieldCos, Closed-end funds	Listed infrastructure & utilities stocks, Closed-end funds, REITs, IITs, MLPs	Listed infrastructure equity funds, Indices, Trusts, ETFs
	Unlisted	Direct/Co-investment in infrastructure project equity, PPP	Direct/Co-investment in infrastructure corporate equity	Unlisted infrastructure funds (GPs)

Source: OECD (2015c)

Political and regulatory risks: Depend on the activities of the state at various levels of governance (government at the central or regional levels or the contracting authority), and can include changes in policies or regulations that adversely impact infrastructure investments. Such actions may be broad in nature (like currency convertibility risk, or the legal environment) or linked to specific industries or PPP contracts. In some cases, this risk may emerge from the behaviour of government contracting authorities or the behaviour of public interest groups. For example, public authorities have a key role in the environmental review process and also in working with communities regarding the social acceptance of an infrastructure asset (i.e. onshore windfarms that face opposition from local community groups). Political risks can be highly subjective, difficult to quantify, and therefore difficult to price into infrastructure finance.

Based on OECD survey results of investors in renewable energy, the most significant risks in this category are related to retroactive changes to remuneration schemes, subsidies (taxes) and tariffs. Permitting (administrative risk) is another top concern, along with land acquisition, which can be critical for the deployment of wind and solar generation facilities. For investment in operational infrastructure projects, these risks arise due to potential retroactive changes to regulation, subsidies and remuneration schemes, underscoring that commitments by policymakers remain the key concern for investors in infrastructure.

Macroeconomic and business risks: Arise from the possibility that the industry and/or economic environment is subject to variation. These include macroeconomic variables like inflation, real interest rates and exchange rate fluctuations. An asset's exposure to the business cycle, namely, shifts in demand is a principle business risk of the asset. Finance risks (such as debt maturity) are also a major part of business risk.

According to the OECD survey of investors in renewable energy, the interest rate environment, state of the economy and (global) energy prices are the most often cited risks by investors for energy sector projects in the construction phase. Counterparty and sovereign default and currency convertibility risk were also mentioned by survey respondents. With respect to investment in the operational phase of infrastructure, for projects with commercial risk, results indicate that a decline in prices and demand are the most concerning macroeconomic and business risks for investors.

Technical risks: Determined by the skill of the operators, managers and related to the features of the project, project complexity, environmental impact, construction and technology. OECD survey results indicate that for investors, the most important of these during construction are related to the reliability of cost and time forecasts, as well as uncertainties related to the deployment of new technologies, while for renewable generation projects in the operating phase, connectivity problems (grid, offshore transmission) are mentioned, as well as technical failure or reliability issues. The current value and future performance of an infrastructure asset can also be negatively impacted by climate change affecting the frequency and intensity of natural disasters - hence the importance of questioning the extent to which access to climate risk insurances influences the cost of capital for infrastructure projects

Box 5 - Risks specifically related to emerging markets and low income countries

Sovereign and macroeconomic risk

- A broad category, sovereign risk can be described as the creditworthiness of a government, or the general risk of investing in a country. Traditional country analysis involves balance of payments (in particular, foreign exchange reserves), macroeconomic policy, and the supportive institutions (such as rule of law, freedom from corruption, stable political system), that lead to a strong investment climate. This risk can be distinguished from the political and credit risks that may be attributed to specific infrastructure projects.
- Counterparty risk (State Owned Enterprises). Investors are concerned that the counterparties, often state-owned enterprises, with whom they work on global infrastructure projects may not honour their obligations. Investors have limited options, beyond MIGA's non-honouring of obligations insurance, to mitigate the risk of counterparties not following through on their agreements.
- Inflation can be a chief concern in certain LICs – this includes not just high inflation but the overall volatility of inflation and the central bank's ability to control it, and to successfully telegraph policy to market participants.
- Exchange rate risks: in LICs, foreign exchange can be a scarce resource. Exchange rate policy (free float, managed float, fixed) can impact macroeconomic risks ('sudden stops'), and convertibility risks. Exchange rate fluctuations can also impact risk.
- Market based instruments, such as sovereign bond yields and credit default swaps, are useful indicators to measure the market's perceived levels of country and macroeconomic risk.

Business risks

- Business risks include risks arising from the business cycle, credit cycle, and the overall health of the financial system. The transparency and availability of information in order to forecast revenue (and costs), and to effectively manage operations, is a paramount consideration to correctly pricing the business risks of an infrastructure investment.
- Local capital market non-sovereign guarantee issuances. The extent of business risk also depends upon the depth and breadth of capital markets, both in equity and debt; access to external sources of financing; the strength of the domestic banking system; and the ability for banks to act as intermediaries, where necessary. Domestic savings should be a major source of infrastructure capital for any country, including from local banks and investors. If capital markets are not sufficiently developed to support sovereign or commercial bond issuances, however, then local savings are largely inaccessible to fund infrastructure. .

Infrastructure project-specific risks

- Breach of contract and regulatory issues remain amongst the most important political risk concerns for investors in developing economies, particularly in the infrastructure sector. The quality of regulation and the incidence of regulatory disputes are indicators of investor willingness to bear risks. LICs need to pay particular attention to ensuring adherence to the rule of law and the protection of property rights. Other key factors include the need for a strong regulatory environment, transparent and competitive procurement processes, and effective contract enforcement arrangements

APPENDIX 2: MAIN PPP CONTRACTUAL SCHEMES

Type of PPP	Contractual Description	Main fields of application
O&M (Operations and Maintenance)	The public body (<i>contractor</i>), usually a municipality or a local public contractor, negotiates with a private partner (<i>operator</i> , one single firm or a consortium) the management and maintenance of a public infrastructure	Local public services: water and sewerage services, waste management, green parks maintenance, road maintenance, parking lots management
DB (Design-Build)	The public body negotiates with private partners the design and construction of a facility that must be compliant with minimum performance standards set by the public party. Once the construction is completed, the public body retains the ownership of the facility and manages it.	Public infrastructure: roads, toll roads and highways, water and sewerage, leisure facilities (sport centres) and public utility works.
TK (Turnkey)	The public sector provides funding for the project but involves private counterparties for the design, construction and management of the facility for a predefined period of time (usually long-term). The public entity requires the private partner to be compliant with minimum performance standards and is the owner of the facility.	Public infrastructure where the government has the interest to maintain ownership but also wants to get private involvement for the construction and management services (water and sewerage, public buildings, sport facilities and stadiums)
Wraparound Addition	A private partner builds and finances an add-on facility to an existing one and manages the new facility for a predefined period.	Similar to the TK scheme but in this case the public entity does not provide funding which is in charge to the private sector.
Lease-Purchase	The private sector provides funding and builds a new facility that is then leased to the public entity. The public party makes periodic leasing payments to the private party and has the right to acquire the facility at the end of the leasing contract.	Public buildings, water and sewerage, waste management, IT and hardware.
Temporary Privatisation	Similar to the wraparound addition. However, in this case the ownership of a public facility is transferred to a private partner in order to be restructured or expanded. The facility is managed by the private party until the public sector hasn't completely repaid the investment.	Public infrastructure: roads, water and sewerage, parking lots, public buildings, sport facilities, airports.
DBO (Design-Build-Operate)	The private partner stipulates with the public body a single contract whereby it provides design, construction and management of a public facility. The public sector retains the facility ownership.	Similar to temporary privatisation
BDO/LDO (Buy/ Lease-Develop-Operate)	The private party leases or buys a facility from the public sector in order to modernise or expand it. Then, it manages the facility for a period of time that is sufficient to repay the investment and get a sufficient rate of return.	Similar to temporary privatisation

<p>BOT (Build-Operate-Transfer)</p>	<p>The private partner builds a facility compliant with the standards agreed with the public entity. Then, it manages it for a given period of time and transfer the facility at the end of the concession period. The project should repay the investment made by the private sector during the concession period.</p>	<p>Similar to temporary privatisation</p>
<p>BOOT o DBFO³⁸ (Build-Own-Operate-Transfer)</p>	<p>The private sector stipulates a concession agreement with the public body and obtains the ownership of the facility. It is entitled to design, build and operate/maintain the facility. Funding is provided by the private partner who has the right to retain the revenues coming from the management of the facility during the concession period. The concession period must be sufficiently long so to enable private partners to pay back the investment and get an adequate return on investment. At the end of the concession, the facility ownership is returned to the public sector.</p>	<p>This is the most used form of Private Finance Initiative (PFI) in UK and involves a wide range of public infrastructure: water and sewerage, sport and leisure facilities, airports, public buildings, parking lots, waste management</p>
<p>BOO/LOO (Build-Own-Operate)</p>	<p>The public sector transfers to the private sector ownership and management of an existing facility or negotiates with the private partner the construction and management of a new facility that will not be transferred by the private sector (as it happens under a BOOT scheme). The provision of funding is in charge to the private sector.</p>	<p>Similar to the BOOT scheme, although this contractual arrangement looks more like a privatisation</p>

³⁸ DBFO (Design-Build-Finance-Operate) is the term used in the US to identify BOOT schemes.

APPENDIX 3: EXAMPLES OF INTERVENTION OF NATIONAL DEVELOPMENT BANKS

Country	Institution	Activities
Argentina	Investment and Foreign Trade Bank (BICE)	Funded options
Brazil	Brazilian Development Bank (BNDES – Banco Nacional de Desenvolvimento Econômico e Social)	Funded options and unfunded options
China	China Development Bank (CDB)	Funded and unfunded options for infrastructure development
France³⁹	Caisse de Dépôts and consignations (CDC)	Operates in “public interest investments” including infrastructure
Germany	Kreditanstalt für Wiederaufbau (KfW)	Operates in funded and unfunded schemes for infrastructure investments
India	National Bank for Agriculture and Rural Development (NABARD)	Funded options at reduced cost for the development of rural infrastructure projects
Italy	Cassa Depositi e Prestiti (CDP)	Funded and unfunded options for infrastructure development
Russia	Vneshekonombank (VEB)	Funded and unfunded options and consulting for infrastructure projects development
Saudi Arabia	Saudi Industrial Development Fund (SIDF)	Funded options and consulting for the development of industrial projects
South Africa	Development Bank of Southern Africa (DBSA)	Funded and unfunded options for infrastructure development
Spain	Instituto de Crédito Oficial	Funded and unfunded options for infrastructure development

³⁹ CDC, CDP, ICO and KfW participate also in EIB-sponsored infrastructure equity funds, among others the Marguerite Fund (transportation, Energy and environment) and InfraMed (Energy, environment, transportation and social infrastructure).

APPENDIX 4: EXAMPLES OF INTERVENTION OF INVESTMENT FUNDS

Country	Institution	Activities
Argentina	Sustainable Guarantee Fund (FGS)	Invests resources of the pension system, including investments in infrastructure
India	India Infrastructure Finance Company Ltd. (IIFCL)	Invests resources in private infrastructure projects via loans, refinancing of loans granted by financial institutions, subordinated loans.
Indonesia	Asian Development Bank ASEAN Infrastructure Fund	ASEAN infrastructure fund is a regional pool of resources dedicated to infrastructure investment
Italy	Fondo Strategico Italiano	Operates in a number of sectors, including investments in listed infrastructure/utilities
Mexico	National Infrastructure Fund (Fonadin – Fondo Nacional de Infraestructura)	Operates in the field of infrastructure PPPs and provided funded and unfunded options to projects
Spain	Fond-Instituto de Crédito Oficial (FOND-ICO)	Operates in the investment of equity and hybrid debt/subordinated debt in infrastructure development

APPENDIX 5: GIH PPP RISK ALLOCATION TOOL

In 2016, the GI Hub engaged Norton Rose Fulbright, a global law firm, to develop a PPP risk allocation tool on allocating risks in PPP contracts, or concession agreements (the “PPP Risk Allocation Tool”), which contains matrices showing the allocation of risks as between the public and private sectors in typical concession agreements, along with related information on mitigative measures and typical Government support arrangements. Separate matrices are developed for 12 designated types of projects within the transport, energy and water and sanitation sectors.

The PPP Risk Allocation Tool should be used to provide guidance to countries that wish to develop a programme of PPP transactions. The primary focus is on those countries with limited or no prior experience of PPPs, and the desired outcome of the tool is that those countries will have a useful reference guide to assist with their understanding of typical PPP risk allocation arrangements.

Each matrix is accompanied by annotations, explaining the rationale for the allocations, mitigative measures, any Government support arrangements, and describing alternative measures for countries with differing levels of PPP market maturity.

It should also be noted that the matrices in the tool reflect positions reached in actual projects that have reached financial close. However, it should be emphasized that the solution found in one project may not necessarily be right for another. For that reason, a full and informed risk identification, assessment and allocation process should be undertaken based on the underlying risk allocation principles identified in the Risk Allocation Tool.

The risks identified in tool focus on the risks that can be legislated, allocated and mitigated between the public and private sectors and are risks addressed primarily through the concession or project agreement. It considers risks that are entirely allocated to one party, and risks that are better shared between the parties.

Risks such as Government procurement risk, private sector financial and performance risk, third party intervention/delay and specific risks arising in unsolicited projects, are outside the scope of the tool. Certain risks sit outside of the terms of a concession agreement and cannot be contractually allocated between the parties.

The risks addressed by the Risk Allocation Tool are as set out below:

Land purchase and site risk
Demand risk
Environmental & social risk
Completion (including delay and cost overrun) risk
Exchange and interest rate risk
Force majeure risk

Insurance risk
Performance/price risk
Disruptive technology risk

Maintenance risk
Inflation risk
Design risk
Political risk

Resource or input risk
Early termination (including any compensation) risk
Strategic risk
Construction risk
Regulatory/change in law risk

APPENDIX 6: DESCRIPTION OF RISKS

Description of risk linked to infrastructure assets

(See Table 2 above)

Political and regulatory risk

- **Procurement of permits (land, construction, environmental):** Obtaining the necessary land, construction or environmental permits might prove more costly or take longer (and thus increase costs) than expected.
- **Cancellation of permits:** The risk of a public authority cancelling necessary permits.
- **Contract renegotiation:** The risk of a public authority forcing renegotiation of contracts, thereby changing the financial arrangements of the original project.
- **Change in tariff regulation:** The risk of a price change in regulated markets due to a political decision.
- **Contract duration:** The length of the contract is appropriately matched to the length of the useful lifespan of the asset.
- **Decommission:** Risk related to the disposal of the asset at the end of the contract agreement, or useful life of the asset. This risk is especially related to large assets that may generate toxic wastes or environmental risks that need to be cleaned up before the asset may be retired.
- **Asset transfer:** The feasibility and cost of transfer of the asset at the end of the contract agreement. The risk that an asset could become “stranded” due to changing government regulation or policy
- **Enforceability of contracts, collateral and security:** This risk is closely related to the legal environment that is associated with infrastructure finance such as PPP frameworks, and the enforceability of leases, concessions, and other contracted payment schemes.
- **Changes in wider regulatory or legal environment:** Any modification of the regulatory or legal environment can have widespread consequences on affected companies. This risk can be differentiated through the range of affected entities. A general change in law applies to all businesses in the country, a specific change in law to a defined industry and a discriminatory change in law singles out one company. The ability to cope with or even anticipate such changes can be important for the continued economic viability of a project.
- **Changes in taxation:** Changes in taxation of company or project revenues, output delivered by the project, financial transactions or any other element of the project structure including taxation levied on investors themselves. Changes might be categorised similarly to changes in regulatory or legal environment.
- **Currency convertibility:** sufficient amounts of requested foreign currencies are available at the time needed to repay foreign debt or repatriate dividends and principal. This risk generally does not apply to developed economies with stable and developed foreign-exchange markets.
- **Social acceptance:** This risk applies specifically to large-scale public infrastructure projects and is explained by the condition when the general population does not support the project. Consequences can impact all phases of the project. Protest might lead to a delay in construction or hamper proper operation leading to a loss of revenue; official bodies supporting the project might come under pressure from public opinion translating into political action.

Macroeconomic and business risk

- **Default of counterparty:** default of any party involved in the project agreement including government, suppliers, lenders, and insurers.

- **Availability of Prefunding:** The availability of funds to perform viability and feasibility studies. Prefunding is a sunk cost thus making it difficult to raise from private sources before commercial viability can be established.
- **Exchange rate fluctuation:** If liabilities and revenues are in different currencies from one-another, project participants can be exposed to exchange rate risk due to the volatility of exchange rates over time.
- **Liquidity risk:** The risk that assets will generate enough cash flow to service debt payments and any other obligation. Also the risk associated with pricing assets where market prices are not observable.
- **Refinancing risk:** if a project is initially financed via agreements with shorter duration than the project life itself, there is a risk of an inability to refinance loans at maturity due to performance issues or unfavourable market conditions (liquidity, interest rates).
- **Inflation risk:** The risk that aggregate prices increase in an economy, and the asset is exposed to rising prices in a detrimental manner. The risk that the replacement cost of the asset increases over time. Interest rates tend to be correlated with inflation, thus inflation risk can be thought of as interest rate risk.
- **Real interest rate risk:** A component of nominal interest rates, an increase in real interest rates translates to an increase in the real cost of finance, which can strongly affect profitability.
- **Volatility of demand/revenue risk:** The risk that the project company might fail to generate sufficient demand (usage of facilities or service) at the projected price of usage, ultimately leading to a lower level of revenue than projected. Profitability can also be affected by an unforeseen increase in costs.

Technical risk

- **Archaeological:** Additional costs might arise if archaeological discoveries (historical sites, fossils) are discovered on the land intended for construction.
- **Obsolescence:** The technology might become outdated and lose its economic appeal, or become the subject of constraining regulation rendering it uncompetitive in the market. This is true for established technologies but is also applicable to new technologies, where unintended consequences might lead to higher costs or removal from the market.
- **Technology risk:** A (new) technology might not perform as projected or have unforeseen consequences, for example on the environment. Lenders are more reluctant to lend against a project using novel technologies due to a lack of performance benchmarks and increased uncertainty of risks. Yescombe (2014) notes that project finance is more suitable for projects using established technologies.
- **Governance and management of the project:** Failure to deliver and operate the project to the standards agreed due to poor management or poor risk control procedures.
- **Reliability of forecasts for construction costs and delivery time:** The risk that the construction authority fails to deliver the project on time and on budget. The reasons can be due to a performance deficit of the construction contractor, unexpected events leading to a longer construction period or the failure of third parties to provide auxiliary services necessary for operation. The consequences could be a rise in financing costs, including interest payments during a prolonged construction period, loss or deference of project revenue, as well as financial penalties payable to the contracting authority. A delay in construction thus very often leads to the need for additional funding, responsibilities for which should be allocated in the contract signed between the relevant parties.
- **Qualitative deficit of physical structure/service:** The risk that the project might not deliver the agreed output at agreed conditions.
- **Force Majeure:** Risk of forces outside the control of any project participant and affecting the proper delivery, operation and termination of the project. This includes direct (physical damage) and economic (loss of revenue) consequences from natural disasters, as well as economic (strike) and political (war) developments. Force Majeure events might be defined in insurance or risk transfer agreements.
- **Environmental risk:** A project's impact on the environment does not only have significant financial implications, but is also an increasingly important factor for potential investors operating under ESG

guidelines. The direct, quantifiable impact on the environment such as the production of waste and carbon emission may be reflected in the form of permits or additional taxes, thus creating a cost factor which needs to be estimated and managed. Indirect risks stemming from a project's impact on the environment include public opposition to construction or operation, as well as negative image effects for involved sponsors or lenders. Legislation and regulation defining environmental requirements and standards might substantially change, in extremis rendering a technology obsolete. New technologies might have unintended negative consequences on the environment, exposing projects to a possible surge in costs and endangering the business model. Since infrastructure assets are built for long operation phases, this risk is especially relevant for them. An Environmental Impact Assessment might help quantifying the exposure to environmental risk and establish compliance with current laws, but does not protect from unforeseen events. On the financing side, environmental factors become increasingly important to potential investors, illustrated by the spread of guidelines and principles they are adhering to.

- **Termination value:** Since infrastructure assets are long-lived, any issues with forecasting, particularly related to salvage values and depreciation of assets over time can affect the expected termination value of an investment. For PPP contracts where the terminal value is zero, this is less of an issue. This risk can be greater for direct equity owners such as corporate balance sheets or direct equity sponsors.

REFERENCES

- ADB (2015), Frequently Asked Questions: Enhancing ADB's Financial Capacity by Up to 50% for Reducing Poverty in Asia and the Pacific: Combining ADB's ADF OCR Resources, ADB, [\\main.oecd.org\sdataDCD\Data\ENVIRONET\6 External meetings and projects\G20\G20 2017 Low Carbon Transition project\Content\www.adb.org\news\features\frequently-asked-questions-enhancing-adbs-financial-capacity-50-reducing-poverty-asia](http://main.oecd.org/sdataDCD/Data/ENVIRONET/6%20External%20meetings%20and%20projects/G20/G20%202017%20Low%20Carbon%20Transition%20project/Content/www.adb.org/news/features/frequently-asked-questions-enhancing-adbs-financial-capacity-50-reducing-poverty-asia)
- ADB (2014a), "Climate Risk Management in ADB Projects", Asian Development Bank, <http://www.adb.org/sites/default/files/publication/148796/climate-risk-management-adb-projects.pdf>.
- ADB (2014b), "Real-Time Evaluation of ADB's Initiatives to Support Access to Climate Finance", Asian Development Bank, <http://www.adb.org/sites/default/files/evaluation-document/111028/files/in109-14.pdf>.
- Aghion, B.A. (1999), "Development Banking", *Journal of Development Economics*, Vol.58, pp. 83-100.
- APEC, 2017. www.apec.org. [Online] Available at: <https://www.apec.org/About-Us/About-APEC/Achievements-and-Benefits> [Accessed 29 09 2017].
- AODP (2016), "World's Biggest Investors Step Up Action to Protect Millions of Pensions from Climate Risk", Asset Owners Disclosure Project, May 2, 2016
- Allen & Overy (2009), "Global Infrastructure Development and Delivery - The Stimulus for Debate", Allen & Overy Global Survey.
- Abadie R., (2012), "The Future of PPP Financing", Presentation to the Joint EC-EIB/ EPEC Private Sector Forum, Brussels, 6th June.
- American Society of Civil Engineers (2013), *2013 Report Card of America's Infrastructure*, March.
- Bacchiocchi, G. (2012), "The Project Bond Evolution: Port of Paita Case Study", *Latin Infrastructure Quarterly*, Issue 4.
- Bachher, J.S. and Monk, A.H.B. (2013), "Platforms and Vehicles for Institutional Co-investing", *Rotman International Journal of Pension Management*, Volume 6 (1).
- Bhattacharya, A., J. Oppenheim and N. Stern (2015), "Driving Sustainable Development through Better Infrastructure: Key Elements of a Transformation Program", *Global Economy & Development Working Paper*, No. 91, The Brookings Institution, Washington, <http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2015/07/Bhattacharya-et-al.-2015.pdf>.
- Bielenberg, A. et al. (2016), "Financing change: How to mobilize private-sector financing for sustainable infrastructure," McKinsey Centre for Business and Environment,

<http://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/next-generation-of-infrastructure>.

Birdsall, N., Morris, S. and E. Rueda-Sabater (2015), The ADB's Bold Move and What It Can Mean for the MDBs, Center for Global Development, main.oecd.org/sdataDCD/Data/ENVIRONET\6 External meetings and projects\G20\G20 2017 Low Carbon Transition project\Content\www.cgdev.org\publication\adbs-bold-move-and-what-it-can-mean-mdbs.

Blackrock (2016), “Exploring ESG: A Practitioner’s Perspective”, June 2016

BNDES (2016), “Annual Report 2015”, Banco Nacional de Desenvolvimento Econômico e Social, June.

Bradlow, D. and C. Humphrey (2016), “Sustainability and Infrastructure Investment: National Development Banks in Africa”, Global Economic Governance Initiative Working Paper, No. 04, July, http://www.bu.edu/pardeeschool/files/2016/07/Bradlow.Final_.pdf.

Bruck, N. (1998), “The role of development banks in the Twenty-First Century”, *Journal of Emerging Markets*, Vol 3, pp. 39-67.

Buchner, B., C.Trabacchi, F. Mazza, D. Abramskiehn, and D. Wang (2015), “Global Landscape of Climate Finance 2015”, Climate Policy Initiative, <http://climatepolicyinitiative.org/wp-content/uploads/2015/11/Global-Landscape-of-Climate-Finance-2015.pdf> Beeferman, L. and Wain, A. (2012), “Infrastructure. Defining Matters”, Harvard University.

Bitsch, F., Buchner, A. and Kaserer, C. (2010), “Risk, Return and Cash Flow Characteristics of Infrastructure Fund Investments”, EIB Papers, Vol. 15, 1.

Blackrock (2014) iShares Global Infrastructure ETF Fact Sheet.

Blommestein, H.J., Keskinler, A. and Carrick, L. (2011), “Outlook for the Securitisation Market”, OECD Journal, *Financial Market Trends*, 2011/1, pp. 1-18.

Berwin, L. and Paisner/Prequin (2013), *Mid-Term Infrastructure Market Review*, London, September.

Blanc-Brude, F., Goldsmith, H. and Vällilä, T. (2006), “Ex Ante Construction Costs in the European Road Sector: A Comparison of Public-Private Partnerships and Traditional Public Procurement”, *Economic and Financial Report*, EIB, 01/2006, Luxembourg.

Blanc-Brude, F., Hasan, M., and Ismail, O., (2014) “Unlisted Infrastructure Debt Valuation and Performance Measurement”, EDHEC Risk Institute, July 2014

Blanc-Brude, F. (2013), “Towards Efficient Benchmarks for Infrastructure Equity Investments”, EDHEC Risk Institute, 2013

Bonetti, V., Caselli, S. and Gatti, S. (2010), “Offtaking Agreements and How They Impact the Cost of Funding for Project Finance Deals: A Clinical Case Study of the Quezon Power Ltd Co.”, *Review of Financial Economics* 19; pp.60–71.

Borgonovo, E. and Gatti, S. (2013), “Risk Analysis with Contractual Default. Does Covenant Breach Matter?”, *European Journal of Operational Research*, no. 230; pp. 431-443.

- Buscaino, V., Corielli, F., Gatti, S. and Caselli, S. (2012), “Project Finance Collateralised Debt Obligations: An Empirical Analysis of Spread Determinants”, *European Financial Management*, Vol. 18, No. 5, 950–969
- Burger P., Tyson J., Karpowicz, I., Delgado Coelho M. (2009), “The Effects of the Financial Crisis on Public-Private Partnerships”, *IMF Working Paper: WP/09/144*. (Washington DC: IMF).
- Chadbourne & Parke, 2012. <http://www.nortonrosefulbright.com>. [Online]
Available at: <http://www.nortonrosefulbright.com/knowledge/publications/151289/new-debt-instrument-helps-infrastructure-financings-in-peru>
- Chan, Edward and Matthew Worth (2011), “Basel III and Project Finance”, *Project Finance International*, Issue 460, July 2011
- Chan, A. P. C. *et al.* (2010), Critical success factors for PPPs in infrastructure developments: Chinese perspective. *Journal of Construction Engineering and Management*, 136, 5, pp. 484–494.
doi: 10.1061/(ASCE)CO.1943-7862.0000152
- Cai, L and C. He (2014), “Corporate Environmental Responsibility and Equity Prices”, *Journal of Business Ethics*, 125: 617-635.
- CDB (2015), “Annual report”, China Development Bank.
- CDB (2014), “Annual report”, China Development Bank.
- Chandrasekhar, C.P. (2014), “National Development Banks in a Comparative Perspective”, unpublished background paper prepared for UNCTAD.
- CIF (2014), “Greenhouse Gas Analysis and Harmonization of Methodology”, Meeting of the CTF Trust Fund, Climate Investment Fund Administrative Unit, https://www-cif.climateinvestmentfunds.org/sites/default/files/meeting-documents/ctf_14_inf_2_greenhouse_gas_analysis_and_harmonization_of_methodolgy_1.pdf
- Clark, G. *et al.* (2015), “From the Stockholder to the Stakeholder: how sustainability can drive financial outperformance”, March 2015.
- CBI (2016), “Bonds and Climate Change: The state of the market in 2016”, Climate Bond Initiative, <https://www.climatebonds.net/resources/publications/bonds-climate-change-2016>.
- CPI (2013), “The Risk Gap: A Map of Risk Mitigation Instruments for Clean Investments”, Climate Policy Initiative.
- Cochran, I. *et al.* (2014), “Public Financial Institutions and the Low-emission Transition: Five Case Studies on Low-emission Infrastructure and Project Investment”, *OECD Environment Working Papers*, No. 72, OECD Publishing, <http://dx.doi.org/10.1787/5jxt3rhpgn9t-en>.
- Cornel, B. and L. Seabrooke (2016), “Investing in Integrity? Transparency and Accountability of the European Investment Bank”, Transparency International, EU Office, http://www.bu.edu/pardeeschool/files/2016/08/EIB_report_digital-version.Ban_.pdf.
- City UK (2013), Sovereign Wealth funds report March 2013

- Clark, G.L., Monk, A.H.B., Orr, R. and Scott, W. (2011), “The New Era of Infrastructure Investing”, Dealogic (2015), Dealogic Project Finance Review. Full Year 2014.
- Della Croce, R. (2012), “Trends in Large Pension Fund Investment in Infrastructure”, *OECD Working Papers on Finance, Insurance and Private Pensions*, No.29, OECD Publishing, Paris.
- Della Croce, R. and J. Yermo (2013), “Institutional Investors and Infrastructure Financing”, *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 36, OECD Publishing, Paris.
- Della Croce, R. and Sharma, R. (2014), “Pooling of Institutional Investors Capital, Selected Case Studies in Unlisted Equity Infrastructure”, *OECD Working Papers on Finance, Insurance and Private Pensions*, No.38, OECD.
- Della Croce, R (2011), “Pension Funds Investment in Infrastructure: Policy Actions”, *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 13, (OECD: Paris).
- Dewatripont, M. and Legros, P. (2005), “Public-Private Partnerships: Contract Design and Risk Transfer”, *EIB Papers*, 10 (1): 120-145.
- Dagong (2016), Dagong Global Infrastructure Credit Rating Methodology, Dagong Global Credit Rating Co., March 2016
- Diacore (2016), “The Impact of Risks in Renewable Energy Investments and the role of Smart Policies”, Diacore, February 2016
- Drysdale, D. “Why the OECD Arrangement Works (even though it is only soft law)”, Global Policy magazine, 19 December, <http://www.globalpolicyjournal.com/blog/19/12/2014/why-oecd-arrangement-works-even-though-it-only-soft-law>.
- Deloitte, “Project Bonds: An Alternative Source of Financing Infrastructure Projects” report on Project Bonds: An Alternative Source of Financing Infrastructure Projects”, <http://www2.deloitte.com/za/en/pages/finance/articles/project-bonds-an-alternative-to-financing-infrastructure-projects.html>
- Dow Jones (2008, 2015) Dow Jones Brookfield Infrastructure Indexes Fact Sheet.
- Ehlers, T (2014), “Understanding the Challenges for Infrastructure Finance”, *BIS Working Papers*, No 454, BIS, Basel.
- Esty, B. (2004), “Why Study Large Projects? An Introduction to Research in Project Finance”, *European Financial Management*, no. 10; pp. 213–224.
- European Commission (2011), Stakeholder Consultation Paper on the Europe 2020 Project Bond Initiative, Commission Staff Working Paper, February.
- EPEC (2009), “The Financial Crisis and the PPP Market: Potential Remedial Action”. (Luxembourg: European Investment Bank).
- EPEC (2011), “State Guarantees in PPPs: A Guide to Better Evaluation, Design, Implementation and Management”. Luxembourg: European Investment Bank.

- European Investment Bank (2014), “The Europe 2020 Project Bond Initiative – Innovative Infrastructure Investment Financing”, <http://www.eib.europa.eu/products/project-bonds/index/htm>
- EIB (2015), “Mainstreaming climate action within financial institutions”, webpage, <http://www.eib.org/about/global-cooperation/climate/fi-climate-mainstreaming.htm> (accessed 12 December 2016).
- Eccles, R. and G. Serafeim (2013), “The Performance Frontier: Innovating for a Sustainable Strategy”, Harvard Business Review, May 2013.
- EIOPA (2015), Final Report on Consultation Paper no. 15/004 on the Call for Advice from the European Commission on the identification and calibration of infrastructure investment risk categories, EIOPA, September 2015
- European Commission (2014), “Resource Efficiency and Fiduciary Duties of Investors”, European Commission, DG Environment, ENV.F.1/ETU/2014/0002
- FEBRARAN (2014), “The Brazilian Financial System and the Green Economy”, report prepared for UNEP and FEBRARAN in the framework of the Inquiry into the design of a sustainable financial system, September, http://unepinquiry.org/wp-content/uploads/2015/10/brazilianfinancialsystemgreeneconomy_febraban-gvces_april2015.pdf.
- Fuerst, Franz (2015), “The Financial Rewards of Sustainability: A Global Performance Study of Real Estate Investment Trusts”, University of Cambridge, June 2015
- Friends of the Earth (2016), “Emerging Sustainability Frameworks: The Brazilian National Development Bank”, January, <http://webiva-downton.s3.amazonaws.com/877/0c/0/7222/2/emerging-sustainability-frameworks-BNDES.pdf>.
- Friends of the Earth (2016), “Emerging Sustainability Frameworks: China Development Bank and China Export-Import Bank”, January, <http://webiva-downton.s3.amazonaws.com/877/00/5/7226/2/emerging-sustainability-frameworks-CDB-ChinaExim.pdf>.
- Friends of the Earth (2014), “A review of the Environmental and Social Policies of National Development Banks in Brazil, China and India”, working draft prepared for the “Advancing sustainable and accountable finance: National development banks and their emerging role in the global economy” conference, Hong Kong, China, http://www.ghub.org/wp-content/uploads/2014/02/1.1Appendix_A-Review-of-the-Environmental-and-Social-Policies-of-National-Development-Banks.pdf.
- GCF (n.d.), “Accredited entities”, webpage, Green Climate Fund, <http://www.greenclimate.fund/partners/accredited-entities/ae-directory> (accessed 12 October 2016).
- FSB (2015), “Proposal for a disclosure task force on climate-related risk”, Financial Stability Board, http://www.fsb-tcfd.org/wp-content/uploads/2016/01/FSB_Disclosure-task-force-on-climate-related-risks.pdf
- FSB (2016), Recommendations of the Task Force on Climate-related Financial Disclosures, Financial Stability Board Task Force on Climate-related Financial Disclosures, December 14, 2016
- Fitch (2015) “Infrastructure Sukuk Challenge Significant but Achievable”, Fitch Ratings, April 2015

- Fitch (2011), Fitch Comments on EU Project Bonds Initiative, EMEA Special Report, 27th April. New York.
- Fitch (2012), EU scheme could help catalyse European project bonds, EMEA Special Report, 24th May. New York.
- Fitch (2014), “Private Infrastructure Investment in Developed Economies”, Special Report, FitchRatings, December 2014
- Frisari G. (2013), “Risk Gaps: A Map of Risk Mitigation Instruments for Clean Investments”, Climate Policy Initiative
- Flannery, S. and Rickerson, W. (2014),” Expanding the Investor Base and Lowering the Cost of Capital for Renewable Energy through Master Limited Partnerships”, Prepared for the Union of Concerned Scientist, April 2014.
- Flyvbjerg, B. (2009), “Survival of the Un-fittest: Why the Worst Infrastructure Gets Built - and What We Can Do about It”, *Oxford Review of Economic Policy*, volume 25 (3), pp. 344–367,
- FTSE (2007, 2015) FTSE Macquarie Global Infrastructure Index Fact Sheet.
- FTSE (2007, 2015), FTSE IDFC India Infrastructure Index Factsheet.
- FTSE (2008) Macquarie Global Infrastructure Index Research Report.
- G20 (2013) Communiqué of the G20 Finance Ministers and Central Bank Governors Meeting, February, Moscow.
- G20 (2014), Communiqué of the G20 Finance Ministers and Central Bank Governors Meeting, April, Washington D.C.
- G20 (2014), Issue Note – Global Infrastructure Initiative (GII) G20 Investment and Infrastructure Working Group, August, Jakarta.
- G20/OECD (2013), *High-Level Principles on Long-Term Investment Financing by Institutional Investors*, September 2013. <http://www.oecd.org/finance/private-pensions/G20-OECD-Principles-LTI-Financing.pdf>
- (<http://www.oecd.org/daf/fin/private-pensions/G20-OECD-Support-Note-Diversification-Financial-Instruments.pdf>)
- G20/OECD (2016), “Support Note on Diversification of Financial Instruments for Infrastructure”
- Gründl , Helmut, Ming Dong, and Jens Gal (forthcoming), “Evolution of Insurer Portfolio Investment Strategies – Opportunities and Constraints for Long-term Investing”, OECD forthcoming
- Griffith-Jones, S. (2016), “National Development Banks and Sustainable Infrastructure; the case of KfW”, Global Economic Governance Initiative, No. 06, July, http://www.bu.edu/pardeeschool/files/2016/07/GriffithJones.Final_.pdf.
- Gutierrez, E. et al. (2011), “Development Banks: Role and Mechanisms to Increase Their Efficiency”, World Bank Policy Research Working Paper, No. 5729.

- Gatti, S. (2012a), *Project Finance in Theory and Practice*, II Edition, Academic Press, San Diego.
- Gatti, S. (2012b), “Fueling European Union Growth: Financing and Investing in Infrastructure”, *Working Paper*, Carefin Bocconi.
- Gatti, S., Hellowell, M. and Vecchi, V. (2013), “Does the Private Sector Receive an Excessive Return from Investments in Health Care Infrastructure Projects? Evidence from the UK”, *Health Policy*, 110-2; pp. 243-270.
- Gatti, S. (2014), “Private Financing and Government Support to Promote Long-term Investments in Infrastructure”, OECD Publishing, Paris.
- Gatti, S. and Della Croce, R. (2015). “International trends in infrastructure finance”, in Caselli S., Corbetta G., Vecchi V. (2015), *Public Private Partnership for infrastructure and business development*, Palgrave Macmillan, New York.
- Gatti S., Vecchi V., Borgonovo E., Cusumano N., Amadio S. (2014). “Do Public Guarantees to Infrastructure Investments Engender Moral Hazard of Private Bidders? A Multiple Agents Based Simulation”. Paper Laboratorio ASPI – Bocconi.
- Grout, P. A. (2008), “Private Delivery of Public Services”, *Working Paper*, Centre for Market and Public Organisation, University of Bristol.
- Hammami, M., Ruhashyankiko, J.F. and Yehoue, E.B. (2006), “Determinants of Public-Private Partnerships in Infrastructure”, *IMF Working Paper*, Washington, D.C.
- Helm, D. and Tindall, T. (2009), “The Evolution of Infrastructure and Utility Ownership and its Implications”, *Oxford Review of Economic Policy*, Vol. 25, No. 3, 2009
- Haščič, I., N. Johnstone and N. Kahrobaie (2012), "International Technology Agreements for Climate Change: Analysis Based on Co-Invention Data", *OECD Environment Working Papers*, No. 42, OECD Publishing, Paris.
DOI: <http://dx.doi.org/10.1787/5k9fgpw5tt9s-en>
- Humphrey, C. (2015a), “National Development Banks and Infrastructure Provision: A comparative Study of Brazil, China and South Africa”, *Infrastructure Finance in the Developing World Working Paper Series*, the Global Green Growth Institute and the Intergovernmental Group of Twenty Four on Monetary Affairs and Development (G-24), <http://g24.org/wp-content/uploads/2015/07/WP07-National-Development-Banks.pdf>.
- Humphrey, C. (2015b), “Challenges and Opportunities for Multilateral Development Banks in 21st Century Infrastructure Finance”, *Infrastructure Finance in the Developing World Working Paper Series*, Global Green Growth Institute and Intergovernmental Group of Twenty Four on Monetary Affairs and Development (G-24), <http://g24.org/wp-content/uploads/2016/05/MARGGK-WP08.pdf>
- Humphrey et al. (2015), “Multilateral development banks in the 21st century - Three perspectives on China and the Asian Infrastructure Investment Bank”, Overseas Development Institute, [\FS-CH-1.main.oecd.org\Users\crishnamorgado_n\Desktop\www.odi.org\sites\odi.org.uk\files\odi-assets\publications-opinion-files\10097.pdf](http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/10097.pdf)
- Hellowell M., Vecchi V., Caselli S. (2015), “Return of the State? An Appraisal of Policies to Enhance Access to Credit for Infrastructure-based PPPs”, *Public Money Management*, 35 (1): 71-78

- Helm, d. and Tindall, T. (2009), “The Evolution of Infrastructure and Utility Ownership and its Implications”, *Oxford Review of Economic Policy*, Vol. 25, No. 3, 2009
- Holton, G. A. (2004) “Defining Risk”, *Financial Analysts Journal*, Vol. 60, No. 6,, 2004
- HM Treasury (2004), “Credit Guarantee Finance Technical Note and Draft Documentation”, (London: The Stationery Office).
- HM Treasury (2013), “A New Approach to Public Private Partnerships: Consultation on the Terms of Public Sector Equity Participation in PF2 Projects”, (London: The Stationery Office).
- Hwang, B.-G., Zhao, X. and Mindy Gay, M. J. S. (2013), Public private partnership projects in Singapore: factors, critical risks and preferred risk allocation from the perspective of contractors. *International Journal of Project Management*, 31, 3, pp. 424–433. doi: 10.1016/j.ijproman.2012.08.003
- IDFC (2014), “IDFC Green Finance Mapping For 2014”, International Development Finance Club, http://www.idfc.org/Downloads/Publications/01_green_finance_mappings/IDFC_Green_Finance_Mapping_Report_2015.pdf.
- IEA (2016), World Investment 2016, International Energy Agency
- IISD (2015), *Greening China’s Financial System*, International Institute for Sustainable Development (IISD) and the Development Research Center for the State Council, 2015
- Inter-American Development Bank (2010), IDB Sustainability Report 2015, <https://publications.iadb.org/handle/11319/7532?locale-attribute=en>.
- Inderst, G. (2009), “Pension Fund Investment in Infrastructure”, *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 32, OECD Publishing, Paris.
- Inderst, G. (2010), “Infrastructure as an Asset Class”, *EIB Papers*, 15 (1), pp. 70-105.
- Inderst, G. and Stewart, F. (2014), “Institutional Investment in Infrastructure in Emerging Markets and Developing Economies”, PPIAF, World Bank Group.
- Inderst, G. (2015 forthcoming), “Financing Infrastructure Investment in the UK and Europe”.
- Industry Funds Management (2013) Infrastructure Investment Process. Retrieved August 12th 2013 from <http://www.industryfundsmanagement.eu/ifm-infrastructure-funds/long-term-approach-to-infrastructure-investment-2/>
- International Finance Corporation (IFC) (2016), How to make infrastructure climate resilient, Note 14, accessed at <https://www.ifc.org/wps/wcm/connect/5f53054c-d88a-4700-9d16-69a552a4ec6c/Note-14-EMCompass-How-to-Make-Infrastructure-Climate-Resilient.pdf?MOD=AJPERES>
- Kaminker, C., and Stewart, F. (2012), “The Role of Institutional Investors in Financing Clean Energy”, *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 23, OECD Publishing, Paris.
- Irwin T. (2012), “Accounting Devices and Fiscal Illusions”, IMF Staff Discussion Note, (Washington DC: IMF).

- IOSCO (2014), “Market-Based Long-Term Financing Solutions for SMEs and Infrastructure”, Report to G20 Finance Ministers and Central Bank Governors.
- Knight, Frank J. (1921) “Risk, Uncertainty, and Profit”, New York: Hart, Schaffner, and Marx
- Kraemer-Eis, H., Schaber M., and Tappi, A. (2010), “SME Loan Securitisation. An Important Tool to Support European SME lending”, *Working Paper* 2010/007, EIF Research & Market Analysis, European Investment Fund, Luxembourg.
- KfW (2015), “Annual report 2015; Taking responsibility”,
- Kumar, N. (2016), “National Development Banks and Sustainable Infrastructure in South Asia”, Global Economic Governance Working Paper, No. 03, July, http://www.bu.edu/pardeeschool/files/2016/07/NDBSandSouthAsia.Final_.pdf.
- Krüger, P (2015), “Climate Change and Firm Valuation: Evidence from a Quasi-Natural Experiment”, Swiss Finance Institute, Research Paper Series N°. 15-40.
- Lazzarini, S. et al. (2011), “What Do Development Banks Do? Evidence from Brazil, 2002-2009”, Harvard Business School Working Paper, No. 12-047, December.
- Levit, J.K. (2011), “The Dynamics of International Trade Finance Regulation: The Arrangement on Officially Supported Export Credits”.
- Levy Yeyati, E., A. Micco and U. Panniza (2004), “Should the Government Be in the Banking Business? The Role of State-Owned and Development Banks” Inter-American Development Bank Working Paper, No. 517, November, Inter-American Development Bank Publishing, Washington, D.C.,
- Leigland, J and Russell, H. (2009), “New Needs for Technical Assistance: Responding to the Effects of the Financial Crisis on Private Participation in Infrastructure”, Technical Note n. 42, (Washington DC: World Bank).
- Li, B. *et al.* (2005), Critical success factors for PPP/ PFI projects in the UK construction industry. *Construction Management and Economics*, 23, 5, pp. 459–471.
doi: 10.1080/01446190500041537
- Luna-Martínez, J. and C.L. Vicente (2012), "Global survey of development banks", *World Bank Policy Research Working Paper*, No. 5969, <http://dx.doi.org/10.1596/1813-9450-5969>.
- Macquarie (2009) Infrastructure Sector. Macquarie Equities Research.
- Martin-Oliver, A. and Saurina, J. (2007), “Why do Banks Securitize Assets?”, Banco de España, Mimeo.
- McKinsey Global Institute (2013), Infrastructure Productivity. How to save \$1 trillion a year, January 2013.
- Moody’s (2010), “Default and Recovery Rates for Project Finance Bank Loans, 1983-2008”.
- Moody’s (2013), Rating Action: Moody’s assigns an A3 rating to Ruwais Power Company PJSC.
- Moody’s (2015), “Infrastructure Default and Recovery Rates, 1983-2014”, Moody’s Investor Services, March 2015.

- Morgan Stanley (2014) “Municipal Bond Monthly”, December 2014
- McKinsey Global Institute (2013), “Infrastructure Productivity. How to Save \$1 trillion a Year”, January 2013.
- Meltzer, J.P. (2016), “Financing low carbon, climate resilient infrastructure: The role of climate finance and green financial systems”, Global Economy & Development Working Paper, No. 96, Brookings, Washington.
- MIGA (2016), “MIGA Annual Report 2016: Insuring investments, ensuring opportunities”, <http://www.miga.org/Lists/Feature Stories/CustomDisp.aspx?ID=113>
- MIGA (2015), “MIGA Strategic Directions FY15-17”, http://www.miga.org/documents/MIGA_FY15-17_Strategy.pdf
- Miyamoto, K. and E. Chiofalo (2016), “Official Development Finance for Infrastructure: With a Special Focus on Multilateral Development Banks”, *OECD Development Co-operation Working Papers*, No. 30, OECD Publishing, Paris.
- Moody's (2015), "2016 Outlook - Solar Securitisation Market to Grow in 2016 as Rooftop Solar Costs Continue to Drop", Moody's Investor Service, 8 December 2015
- Matsukawa T (2014), “Risk Mitigation Instruments for Infrastructure Financing”, World Bank Background Paper.
- Matsukawa, T. and Habeck, O. (2007), “Review of Risk Mitigation Instruments for Infrastructure Financing and Recent Trends and Developments”, Trends and policy options No. 4, PPIAF and the World Bank, Washington, D.C.
- Mirabile, M., Sangaré, C. and Schmerler, C. (2014), “Using Financial Instruments to Mobilise Private Investment for Development”, in OECD (2014), *Development Co-operation Report 2014: Mobilising Resources for Sustainable Development*, OECD Publishing, Paris.
- Moszoro M., Araya G., Ruiz-Nuñez F., Schwartz J. (2015), “What Drives Private Participation in Infrastructure in Developing Countries?” In Caselli S., Corbetta G., Vecchi V. (2015), *Public Private Partnerships for infrastructure and enterprise funding. Principles, Practices and Perspectives*, Palgrave, New York..
- Nassr, I. and Wehinger, G. (2015), “Unlocking SME Finance through Market-Based Debt: Securitisation, Private Placements and Bonds”, OECD Journal. *Financial Market Trends* 2014/2, OECD Publishing, Paris.
- National Audit Office (2015), UK National Guarantees scheme for infrastructure. <http://www.nao.org.uk/wp-content/uploads/2015/01/UK-Guarantees-scheme-for-infrastructure.pdf> .
- Nakhooda, S., Watson, C., and Schalatek, L., (2016), *The Global Climate Finance Architecture, Climate Finance Fundamentals*, ODI, London, UK, available at <https://www.odi.org/sites/odi.org.uk/files/resource-documents/11021.pdf>
- Nassiry, D., Nakhooda, S. & Barnard, S., 2016. *Finding the pipeline: Project preparation for sustainable infrastructure*, s.l.: ODI.

- NCE (2016), *The Sustainable Infrastructure Imperative: Financing for Better Growth and Development*, report, the New Climate Economy, the Global Commission on the Economy and Climate, <http://newclimateeconomy.report/2016/>.
- NCFA (2015), “Integrating Water Stress into Corporate Bond Credit Analysis”, Natrual Capital Finance Alliance, et. al., September 2015
- OECD (2007), “Infrastructure to 2030: Main Findings and Policy Recommendations”, OECD Publishing.
- OECD (2008), “Public-Private Partnerships In Pursuit of Risk Sharing and Value-for-Money”
- OECD (2009), “Infrastructure Investment: Links to Growth and the Role of Public Policies”, *OECD Economics Department Working Paper*, No. 686, (with S. Araujo, B. Egert and T. Kozluk).
- OECD (2013a), “The Role of Banks, Equity Markets and Institutional Investors in Long-term Financing for Growth and Development”, Report for G20 Leaders (February), available at <http://www.oecd.org/finance/private-pensions/G20reportLTFinancingForGrowthRussianPresidency2013.pdf>.
- OECD (2013b), “Annual Survey of Large Pension Funds and Public Pension Reserve Funds”, OECD Publishing, Paris..
- OECD (2014) “Annual Survey of Large Pension Funds and Public Pension Reserve Funds. Report on Pension Funds’ Long-Term Investments”, OECD Publishing, Paris.
- OECD (2015a), “New Approaches to SME and Entrepreneurship Financing: Broadening the Range of Instruments”, OECD Report to G20 Finance Ministers and Central Bank Governors.
- OECD (2015b), “Mapping Channels to Mobilise Institutional Investment in Sustainable Energy, Green Finance and Investment”, OECD Publishing, Paris.
- OECD 2015 DAC “Survey on Amounts Mobilised from the Private Sector by Official Development Finance Interventions”.
- OECD (forthcoming), *Exploring Blended Finance for Sustainable Development*, OECD Publishing, Paris, forthcoming.
- OECD (2015a), “Overcoming Barriers to International Investment in Clean Energy, Green Finance and Investment”, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264227064-en>
- OECD (2015b), “*Infrastructure Financing Instruments and Incentives: a Taxonomy*”, *OECD Publishing, Paris. Available at* <http://www.oecd.org/finance/private-pensions/Infrastructure-Financing-Instruments-and-Incentives.pdf>
- OECD (2015c), “Policy Guidance for Investment in Clean Energy Infrastructure”, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264212664-en>
- OECD (2015d), “Regulation of Insurance Company and Pension Fund Investment, OECD Report to G20 Finance Ministers and Central Bank Governors”, September 2015

OECD (forthcoming), “Investment Governance and the Integration of ESG Factors”, OECD Publishing

OECD (2016), Quantifying Private and Foreign Investment in Transport Infrastructure, OECD Publishing

OECD (2016a), Institutional Investors and Green Infrastructure Investment, OECD Publishing, Paris

OECD (2016b), Green Bonds: Mobilising the debt capital markets for a low-emission transition, OECD Policy Perspectives, Bloomberg Philanthropies, OECD Publishing, Paris.

OECD (2016c), Climate-Related Development Finance in 2015, [\\FS-CH-1.main.oecd.org\Users\crishnamorgado_n\Desktop\www.oecd.org\dac\environment-development\rioconventions.htm](http://www.oecd.org/dac/environment-development/rioconventions.htm)

OECD (2017b), "Green Investment Banks: Innovative Public Financial Institutions Scaling up Private, Low-carbon Investment", *OECD Environment Policy Papers*, No. 6, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/e3c2526c-en>

OECD (2017a) [“Investing in Climate, Investing in Growth”](#) - See chapter 7 on “Mobilizing financing for the transition, OECD Publishing

OECD (2015a), Infrastructure Financing Instruments and Incentives, OECD Publishing, Paris.

OECD (2015b), Mapping Channels to Mobilise Institutional Investment in Sustainable Energy, Green Finance and Investment, OECD Publishing, Paris, available at <http://dx.doi.org/10.1787/9789264224582-en>

OECD (2015c), “Climate finance in 2013-14 and the USD 100 billion goal”, a report by the Organisation for Economic Co-operation and Development (OECD) in collaboration with Climate Policy Initiative (CPI), [\\FS-CH-1.main.oecd.org\Users\crishnamorgado_n\Desktop\www.oecd.org\environment\cc\OECD-CPI-Climate-Finance-Report.htm](http://www.oecd.org/environment/cc/OECD-CPI-Climate-Finance-Report.htm)

OECD (2012), Towards a green investment policy framework: The case of low-emission, climate-resilient infrastructure, OECD Publishing, Paris.

OECD/World Bank (2015), Risk and Return Characteristics of Infrastructure Investment in Low-income countries

Orr, R.J. (2009), Global Infrastructure Investment Indices.

Preqin Infrastructure Online Database

Preqin (2013) Infrastructure Spotlight. May 2013.

Preqin (2015a), Infrastructure Spotlight, January 2015.

Preqin (2015b), Infrastructure Spotlight, March 2015.

Probitas Partners (2010) Infrastructure Market Review and Institutional Investor Survey.

Probitas Partners (2012), *Investing in infrastructure*.

Probitas Partners (2013), Infrastructure Survey and Trends.

- Rothballer, C., and Kaserer, C. (2012), “The Risk Profile of Infrastructure Investments: Changing Conventional Wisdom”, *The Journal of Structured Finance*, Volume 18(2), pp. 95-109.
- RBC (2014), *Green Bonds: Fifty Shades of Green*, RBC Capital Markets, March 26, 2014
- RREEF Research (2011), “A Compelling Investment Opportunity. The Case for Global Listed Infrastructure Revisited”.
- Samuels, B. (2016), “Unlocking Actions to Mobilize Institutional Investment for Infrastructure: Focus Africa, Preliminary”, Discussion Report, Global Clearinghouse for Development Finance
- Smallridge, D. et al. (2013), “The role of National Development Banks in Catalyzing International Climate Finance”, Inter-American Development Bank, publication code: IDB-MG-148, https://unfccc.int/files/cooperation_and_support/financial_mechanism/standing_committee/application/pdf/jj_gomez.pdf.
- Smallridge, D. et al. (2012), “The role of National Development Banks in Intermediating International Climate Finance To Scale Up”, Inter-American Development Bank, publication code: IDB-DP-249, <http://www.i-financialconsulting.com/documents/The-Role-of-National-Development-Banks-in-Intermediating-International-Climate-Finance.pdf>.
- Spencer, T. and J. Chen. (2016), Mainstreaming climate finance into international public financial flows: What role for the G20?, IDDRI Issues Brief No. 7, [\\main.oecd.org\sdataDCD\Data\ENVIRONET\6 External meetings and projects\G20\G20 2017 Low Carbon Transition project\Content\www.iddri.org\Publications\Collections\Syntheses\IB0716 TS et al. G20.pdf](http://main.oecd.org/sdataDCD/Data/ENVIRONET/6_External_meetings_and_projects/G20/G20_2017_Low_Carbon_Transition_project/Content/www.iddri.org/Publications/Collections/Syntheses/IB0716_TS_et_al_G20.pdf)
- Studart, R. and K.P. Gallagher (2016a), “Infrastructure for Sustainable Development: The role of National Development Banks”, Global Economic Governance Initiative Policy Brief, No. 07, October, http://www.bu.edu/pardeeschool/files/2016/08/Infrastructure.Sustainable.Final_.pdf.
- Studart, R. and L. Ramos (2016b), “Financing Sustainable Infrastructure in the Americas”, Global Economic Governance Initiative Working Paper, No. 07, July, http://www.bu.edu/pardeeschool/files/2016/07/Studart.New_.Version.FINAL_.pdf.
- Studart, R. (2015), “National development banks as platforms for green financing”, presentation, the Rio Climate Challenge – Rio Clima, 27 October.
- Torres, E. and R. Zeidan (2016), “The life-cycle of national development banks: The experience of Brazil’s BNDES”, *The Quarterly Review of Economics and Finance*, Vol 63, pp. 97-104.
- Sawant, R.J. (2010), “Emerging Market Infrastructure Project Bonds: Their Risks and Returns”, *The Journal of Structured Finance*, 15, 4, pp. 75-83.
- SEC (2012), “Report on Municipal Securities Market”, U.S. Securities and Exchange Commission, July 2012
- Standard & Poors (2007, 2015a), S&P Global Infrastructure Index Fact Sheet.
- Standard and Poor’s (2013), “Why UK University Student Accommodation Projects are Satisfying Investors Appetite for Long-term Infrastructure Debt”, August 2013.
- Standard & Poors (2015b), S&P Emerging Markets Infrastructure Index Fact Sheet.

- Standard & Poors (2015c), “Lessons Learned From 20 Years of Rating Global Project Finance Debt”, S&P, *CreditWeek*, Volume 35 (3), January.
- Schwartz, J. Z., Ruiz-Nuñez, F., & Chelsky, J. (2014). „Closing the Infrastructure Finance Gap: Addressing Risk”. *Financial Flows Infrastructure Financing*, 141.
- Standard & Poor’s (2009), Summary of Standard & Poor's Criteria Methodology for Refinancing risk In PPP/PFI Projects. (London: Standard & Poor’s).
- Standard & Poor’s (2011), “How Europe’s Initiative to Stimulate Infrastructure Project Bond Financing Could Affect Ratings over the next Decade”, Credit FAQ. (London: Standard & Poor’s).
- Torres, E and L. Macahyba (2012), “O Elo Perdido: O Mercado de Títulos de Dívida Corporativa no Brasil: Avaliac, ão e Proposta”, São Paulo, IEDI.
- TSKB (2015), “Sustainability report 2015”, Industrial Development Bank of Turkey.
- Towers Watson (2014), Global Alternative Survey 2014
- Towers Watson (2015), Global Pension Assets Study 2015. Available at:
<http://www.towerswatson.com/en/Insights/IC-Types/Survey-Research-Results/2015/02/Global-Pensions-Asset-Study-2015>
- Tung, F., Xue, W. and Subramanian, K. (2008), “Law, Agency Costs and Project Finance”, *Working Paper*, Emory University.
- Tuck (2002) “Note on Leveraged Buyouts”, Tuck School of Business at Dartmouth, Center for Private Equity and Entrepreneurship, 2002
- Watson Wyatt (2009), Improving Fees in Infrastructure.
- Vecchi V., Casalini F. and Gatti S., (2015). “Attracting Private Investors: the EU Project Bond Initiative and the Case of A11 Motorway”, in Caselli S., Corbetta G., Vecchi V. (2015), *Public Private Partnership for infrastructure and business development*, Palgrave Macmillan, New York.
- Vecchi V., Gatti S., Hellowell, M. (2015 forthcoming), “Government Policies to Mitigate the Risks of Infrastructure Projects: A framework for Classification and Analysis”
- Verhoest, K., Petersen, O. H., Scherrer, W., & Murwantara Soeipto, R. (2014). “Policy Commitment, Legal and Regulatory Framework, and Institutional Support for PPP in International Comparison: Indexing Countries' Readiness for Taking up PPP”. *Working Papers in Economics and Finance*, (No. 2014-03), University of Salzburg.
- Venugopal, S., A., Srivastava, C. Polycarp, and E. Taylor. 2012. “Public Financing Instruments to Leverage Private Capital for Climate-Relevant Investment: Focus on Multilateral Agencies.” Working Paper. World Resources Institute, Washington, DC. Available online at [\\FS-CH-1.main.oecd.org/Users1/crishnamorgado_n/Desktop/www.wri.org/project/climate-finance-private-sector](http://FS-CH-1.main.oecd.org/Users1/crishnamorgado_n/Desktop/www.wri.org/project/climate-finance-private-sector)
- Wang, Y. (2016), “The Sustainable Infrastructure Finance of China Development Bank: Composition, Experience and Policy Implications”, Global Economic Governance Working Paper, No. 05, July, http://www.bu.edu/pardeeschool/files/2016/07/Wang.New_Final_.pdf.

- Wolfrom, Leigh and Mamiko Yokoi-Arai (2016), “Financial Instruments for Managing Disaster Risks Related to Climate Change”, *OECD Journal on Financial Market Trends*, Volume 2015/1, OECD, 2016
- World Bank (2016), World Bank Group Climate Change Action Plan, <http://pubdocs.worldbank.org/en/677331460056382875/WBG-Climate-Change-Action-Plan-public-version.pdf>
- World Economic Forum (WEF) (2016), Risk Mitigation Instruments in Infrastructure: Gap Assessment, Global Agenda report, World Economic Forum, Geneva.
- Weber, B. and Alfen, H. W. (2010), *Infrastructure as an Asset Class: Investment Strategies, Project Finance and PPP*, Wiley, Chichester.
- Western Asset (2012), Investment in Infrastructure Debt.
- World Bank (2011), “Supporting Infrastructure in Developing Countries”, Report 65561 v2, June 2011, Washington, D.C.
- White House (2015), White House Factsheet: “Increasing Investment in U.S. Roads, Ports, Drinking Water Systems Through Innovative Financing”. <https://www.whitehouse.gov/the-press-office/2015/01/16/fact-sheet-increasing-investment-us-roads-ports-and-drinking-water-syste>
- World Bank (2012) “Best Practices in Public Private Partnerships Financing in Latin America: the Role of Subsidy Mechanisms”, January 2012, Washington, D.C.
- World Economic Forum, “Mitigation of Political and Regulatory Risk in Infrastructure Projects”, February 2015.
- WEF (2010), “Paving the Way: Maximizing the Value of Private Finance in Infrastructure”.
- WEF (2013), “Strategic Infrastructure Steps to Prepare and Accelerate Public-Private Partnerships”.
- WEF (2014), “Infrastructure Investment Policy Blueprint”.
- U.S. Securities and Exchange Commission, Report on Municipal Securities Market, July 2012
- UNDESA (2005), “Rethinking the Role of National Development Banks”, background document, United Nations Department of Economic and Social Affairs, <http://www.un.org/esa/ffd/msc/ndb/NDBs-DOCUMENT-REV-E-020606.pdf>.
- UNEP (2016a), “Greening the Banking system: Taking Stock of G20 Green Banking Market Practice”, United Nations Environment Program Inquiry, 2016
- UNEP (2016b), Greening Banking Policy, United Nations Environment Program Inquiry, 2016
- UKGIB (2016), “Accelerating the UK’s transition to a greener, stronger economy”, Green Investment Bank webpage, UK Green Investment Bank, <http://www.greeninvestmentbank.com/about-us/> (accessed 08 December 2016).
- UN Secretary General (2015), Trends in Private Sector Climate Finance.
- Yescombe, E.R. (2014), *Principles of Project Finance*, Elsevier.