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公共政策研討

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Deriving public policy for Hong Kong as an infrastructure financing hub and super-connector in project finance: The Belt and Road Initiative

香港作為一帶一路的基建融資樞紐及超級
聯繫人的公共政策研討

Report



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Title of Project (in both English and Chinese languages)

Deriving public policy for Hong Kong as an infrastructure financing hub and super-connector in project finance: The Belt and Road Initiative

香港作為一帶一路的基建融資樞紐及超級聯繫人的公共政策研討

Executive Summary 執行摘要 (in both English and Chinese languages)

(1) Abstract of the Research

The action plan on the One Belt One Road (OBOR) Initiative (or Belt and Road Initiative) entitled ‘*Vision and Actions on Jointly Building the Silk Road Economic Belt and 21st Century Maritime Silk Road*’ was unveiled in 2015. The importance of this Initiative was explicitly highlighted in the ‘*Outline of the 13th Five-Year Plan for the National Economic and Social Development*’ (the 13-5 Plan) in 2016. This proposed strategic Initiative is currently of primary national importance in China’s global economic development plan, as it covers many countries and involves a huge amount of capital investment in a number of large-scale infrastructure projects. Although it has extensive economic significance, limited “empirical” research has been conducted to develop competitive strategies and public policies to facilitate Hong Kong’s transition into an infrastructure financing hub in support of the OBOR Initiative.

To address this gap and enlighten policymakers developing long-term public policies to support the OBOR Initiative, we make the following contributions to current scholarship and public policy development. First, we develop competitive strategies and viable methods for transforming Hong Kong into an infrastructure financing hub by conducting quantitative and econometric analyses using data from a comprehensive project finance database and other financial databases. Second, we identify the policy implications and recommendations on the development of Hong Kong as an infrastructure financing hub in project finance.

研究摘要

2015 年，中國政府發布了《推動共建絲綢之路經濟帶和 21 世紀海上絲綢之路的願景與行動》。2016 年，《中華人民共和國國民經濟和社會發展第十三個五年規劃綱要》（「十三五」規劃）有專門一章圍繞“推進‘一帶一路’建設”，彰顯這一戰略的重大意義。“一帶一路”改變中國對外投資的格局，利用中國基礎設施建設的優勢，為許多國家投資建設大型基建工程。作為國際金融中心，香港有望成為一帶一路的基建融資樞紐，然而當前關於香港在“一帶一路”倡議中的競爭策略和政策的“實證”研究極為稀缺。

這項研究將填補這一空白，並提供長遠可行的政策建議以支持“一帶一路”倡議。本文在學術和公共政策的貢獻包含：為香港成為基建融資樞紐提供競爭策略和可行的方案，定量分析翔實的項目融資數據以及相關的宏觀數據；提出公共政策建議，發揮香港的獨特優勢，以推動香港成為一帶一路的基建融資樞紐；通過各種的渠道傳播我們的研究成果，促進公眾對“一帶一路”倡議的理解。

(2) Layman Summary on Policy Implications and Recommendations

An economic shock, such as a financial crisis, has significant negative impact on infrastructure investments. Using the global sample data from 1997 to 2017, we find that when the Economic Policy Uncertainty (EPU) is high (low), the number of announced infrastructure projects is small (large). In addition, we test four major hypotheses regarding the relation between project risks and major decisions of large-scale projects. The empirical results suggest that project risks including macroeconomic risk, political risk and currency risk are important factors for project companies to determine (1) the organizational structure for financing (project finance vs. conventional corporate finance); (2) the arrangements of major contracts (contract with offtake, construction and supply contract, and operation and maintenance contract); (3) the ownership type or governance structure (seeking or not seeking government support, and adopting PPP or BOO); and, (4) bond issuance decisions of large-scale projects.

In sum, there is no single universal model that is versatile for all projects across the globe. For example, although PPP has received growing attention in recent years, especially in emerging markets like China, the empirical results indicate that project companies in the countries with greater political risk, in fact, prefer BOO to PPP ownership structure. In addition to the competitive strategies in project finance mentioned above, we recommend the UGC-funded universities in Hong Kong and the Government of the HKSAR have more “proactive” involvement in project finance education. A detailed Talent Enhancement Scheme (TES) for the project finance sector is also developed for the Government’s consideration.

政策影響和建議摘要

經濟衝擊對基建投資具有深遠的負面影響。從 1997 年到 2017 年全球的數據上看，每當經濟政策不確定性加劇，基建項目的數量則明顯減少。另外，本文驗證四個關於項目風險和項目公司重大決策的假說。分析表明，包括宏觀經濟風險，政治風險和貨幣風險在內的項目風險是項目公司做出決策的重要影響因素。受項目風險影響的決策包括：（1）項目公司的組織結構（項目融資抑或傳統的企業融資）；（2）重要合同的安排（包括承購協議，建築合同，供應合同，運營和維護合同）；（3）所有製及治理結構（是否尋求政府支持，以及採用 PPP 或者 BOO）；（4）大型項目的債券發行。

總而言之，大型工程項目經營模式不一，並沒有一個通用的模型可適用於全球範圍的項目。譬如，雖然 PPP 模式在近年來日益受到關注，也在新興市場如中國比較流行，但我們的研究表明，當項目所在的國家政治風險較高時，項目公司更加偏向於採用 BOO 的所有製結構。除去以上討論的項目融資策略，我們鄭重建議，香港的公立大學以及香港政府應當採取更積極主動的姿態來推廣項目融資（project finance）的相關教育，以培養相應的人才。我們提出了一個詳細的關於項目融資方面的人才培養方案，供政府考慮實施。

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(1) Introduction

A deeper understanding of the global best practices in project finance as well as the statistical relationships predicting successful infrastructure financing and project financing reveals competitive strategies and public policies to support Hong Kong's transition into an infrastructure financing hub and a super-connector in project finance.

BlackRock (2015) advocates the importance of a holistic government policy framework, a high-quality database and a long-term supportive policy framework for infrastructure investments. Hence, in the absence of rigorous research methodologies and sophisticated statistical analyses, it may be difficult for Hong Kong policymakers to develop the Belt and Road Initiative and its coordinated long-term policies. We believe our comprehensive study provides a body of knowledge for successful initial planning and for formulating the long-term implementation strategies and policies required to meet the Belt and Road Initiative's specific investment and financing needs. Consequently, this also strengthens Hong Kong's position as an important platform for capital formation and financing, assisting it to meet the strategic needs of the Belt and Road Initiative.

Background of Research

1.1 Institutional Background

What is ‘One Belt One Road’ (OBOR), or ‘Belt and Road’ Initiative?

According to the Hong Kong Trade Development Council (HKTDC), the ‘Belt and Road’ (B&R) Initiative (also called the ‘One Belt One Road’ (OBOR) Initiative),

‘Refers to the Silk Road Economic Belt and 21st Century Maritime Silk Road, a significant development strategy launched by the Chinese government with the intention of promoting economic co-operation among countries along the proposed Belt and Road routes. The Initiative has been designed to enhance the orderly free flow of economic factors and the efficient allocation of resources. It is also intended to further market integration and create a regional economic co-operation framework of benefit to all’ (HKTDC, 2016).

The action plan on the China-proposed OBOR Initiative entitled ‘*Vision and Actions on Jointly Building the Silk Road Economic Belt and 21st Century Maritime Silk Road*’ was jointly issued by the National Development and Reform Commission (NDRC), the Ministry of Foreign Affairs and the Ministry of Commerce of the People’s Republic of China (PRC), with State Council authorization, on March 28, 2015 (NDRC, 2015; State Council, 2015b). This action plan presents the background, principals, framework, cooperation priorities, cooperation mechanisms and other information about the OBOR Initiative (see State Council (2015a) for descriptions of the main developments of OBOR Initiative in chronological order).

The Belt and Road routes run through the continents of Asia, Europe and Africa to connect an East Asian economic circle at one end with the European economic circle at the other (State Council, 2015a). The Silk Road Economic Belt (*‘the Belt’*) covers three routes and the 21st Century Maritime Silk Road (*‘the Road’*) covers two routes (FBIC, 2016). Appendix A presents a list of 80 OBOR countries by region, that is, China and 79 other OBOR countries, from six geographic regions (HKTDC, 2018; World Bank, 2018).

Many countries are not covered by the Belt and Road routes but have participated or shown interest in the B&R Initiative in different ways. For example, Australia, France, Germany, Switzerland, the UK and South Korea have signed up to become founding members of the Asian Infrastructure Investment Bank (AIIB). As of December 2015, 57 founding member countries have joined the AIIB, and all have signed the AIIB Articles of Agreement, which marked the official establishment of the AIIB (FBIC, 2016; HKTDC, 2016). See FBIC (2016) for a list of countries and their forms of participation or cooperation as of May 2016 (pp. 5-6) and for a complete list of the 57 founding members. See HKTDC (2016) for descriptions of the AIIB and Silk Road Fund.

The 13-5 Plan and OBOR

The ‘*Outline of the 13th Five-Year Plan for National Economic and Social Development*’ [中国国民经济和社会发展第十三个五年规划纲要] of the PRC (the 13-5 Plan), considered

the action agenda for the social and economic development of the country, was promulgated on March 17, 2016 (State Council, 2016). Chapter 51 of the 13-5 Plan highlights the importance of ‘One Belt One Road’ advancement, which is the key theme of China’s financial and economic development plan in the global arena. It advocates a sound OBOR cooperation mechanism, including promotion of and support for the AIIB, the New Development Bank (NDB), (formerly referred to as the BRICS Development Bank) and the Silk Road Fund. It plays a significant role in attracting international financial cooperation and capital.

Sections 1 and 2 in Chapter 54 of the 13-5 Plan focus on expressing support for the long-term prosperity and stable development of Hong Kong and Macao and to emphasize their increased cooperation with the mainland. They also indicate clear Chinese support for Hong Kong and Macao to actively participate in the OBOR Initiative, and to motivate enterprises to use their respective advantages in seizing this opportunity. In addition, China supports Hong Kong in expanding its economic competitiveness by (1) consolidating and enhancing its international financial, transportation and trade centers, (2) strengthening its status as a global offshore renminbi (RMB) business hub and an international asset management center, and (3) promoting financial and other professional services towards high-end and high value-added developments.

The OBOR-related Work by HKMA, IFFO, HKTDC and Others

In response to the full recognition of Hong Kong’s participation in the OBOR Initiative mentioned in Chapter 54 of the 13-5 Plan (the Dedicated chapter), the specific directions of Hong Kong’s participation in this major initiative were discussed at the Sixth Meeting of the Commission on Strategic Development, relating to the Central Policy Unit (CPU), the Government of the Hong Kong Special Administrative Region (HKSAR), on May 5, 2016. It was suggested that *‘Hong Kong can perform its role as a “super-connector” in areas such as capital formation and financing ... by serving as a platform, and make contributions in the course of our country’s two-way opening up for both “going global” and “attracting foreign investment”...’* (CPU, 2016, p. 9). To provide a platform to facilitate investments in infrastructure projects and their financing in the Belt and Road region and to promote financing services towards high-end and high value-added developments, the Hong Kong Monetary Authority (HKMA) confirmed the launch of the Infrastructure Financing Facilitation Office (IFFO) in late 2016 (CPU, 2016, p.11).

To promote the development of Hong Kong as an infrastructure financing hub, the HKMA established the IFFO on July 4, 2016 as a platform to facilitate infrastructure investments and their financing through collaboration with key stakeholders including fund providers, debt investors (such as multinational development banks) and infrastructure project proponents (such as government institutions and corporations along B&R routes and relevant professionals) (HKMA, 2016). As of June 21, 2016, 40 organizations have joined IFFO as partners, including the Asian Development Bank, Blackstone Group, Canada Pension Plan Investment Board, Global Infrastructure Hub, HSBC Holdings Plc, International Finance Corporation (IFC; a member of the World Bank Group), KPMG and the Silk Road Fund (IFFO, 2016).

HKTDC launched a specific portal to provide updated news and factual information about the B&R Initiative (HKTDC, 2016). Through its Corporate Network and Intelligence Unit (ECN and EIU) the Economist Group published two recent country-level reports on the countries in

the OBOR region; a country risk-assessment report with reference to the prospects and challenges on the OBOR (EIU, 2015) and an economic roadmap for the OBOR (ECN 2016).

1.2 Literature Review

Of the many studies of project finance and syndicated loans, very few appear in the top academic finance journals. Due to the limitations of space in this proposal, we focus on more recent examples that are most relevant to our research areas or from the top academic journals in finance and related fields. Esty and Megginson (2003), Esty (2004) and Gatti, Rigamonti, Saita and Senati (2007) provide studies of project finance. More recent empirical studies include those of Sawant (2010), Corielli, Gatti and Steffanoni (2010), Hainz and Kleimeier (2012), Buscaino, Caselli, Corielli and Gatti (2012), Byoun, Kim and Yoo (2013), Gatti, Kleimeier, Megginson and Steffanoni (2013) and Byoun and Xu (2014).

To investigate the relationship between creditor governance and debt ownership structure, Esty and Megginson (2003) study the relation between creditor rights and their legal enforcement (measurements of creditor's governance) and the structure for syndicated project finance loans in the global market (the measurement of debt ownership structure) by analyzing a sample of 495 project finance loan tranches related to borrowers from 61 countries from 1986 to 2000. They find that creditor governance is an important determinant of the structure of debt ownership. Other things being equal, the stronger the creditor rights and the more reliable their legal enforcement, the more concentrated the debt ownership or the larger the size of the syndicated loan. Soon after this study, Esty (2004) provides a discussion of the importance and merits of studying project finance. Gatti, Rigamonti, Saita and Senati (2007) propose a quantitative model based on Monte Carlo simulations to derive Value-at-Risk estimates for project finance transactions. They also highlight the important issues to be taken into account when developing the model.

Sawant (2010) develops a theory to explain why multinational enterprises (MNEs) prefer project finance to corporate finance in infrastructure investments. The theory is tested empirically based on an international sample of 200 projects in the oil, gas and petrochemical industries from 59 countries with investment data from 1988 to 2004. The results indicate that the risk of large infrastructure investments for MNE can be mitigated by project financing. The author also suggests that host governments can reduce project financing costs by developing a stable policy environment for project finance investments.

Using an international sample of more than 1,000 project finance loans from 1998 to 2003, Corielli, Gatti and Steffanoni (2010) find significant effects of loan characteristics and contractual structure of the deal on loan pricing (measured by loan spreads) and capital structure (measured by debt-to-equity ratios) in project finance transactions. Nonfinancial contracts are important to lenders when determining the leverage level for the deal or the financial package, if sponsors are not involved as project counterparties.

Using the complete population of observations of collateralized debt obligation (CDO) transactions in Europe and the US between 1998 and 2007, Buscaino, Caselli, Corielli and Gatti (2012) conduct the first empirical study of project finance CDO issues. They analyze the relation between the nature of collateralized assets and the spreads of CDO tranches to investigate the price determinants of structured transactions backed by project finance loans. Their results show that the idiosyncratic risk underlying projects is an important determinant of primary market CDO spreads, which are in turn positively related to market risk and to the

proportion of projects still under construction during the CDO launch.

Hainz and Kleimeier (2012) examine whether different financial structures (in particular, non-recourse project finance loans as opposed to full-recourse loans) and the participation of development banks help mitigate political risk in syndicated lending, using a sample of 4,978 loans to borrowers in 64 countries between 1996 and 2005. Their results indicate that although project finance loans and development banks are more likely to be chosen if the political risk of the country is higher, the contract terms of the loans are influenced by the legal and institutional environment of the country.

Gatti, Kleimeier, Megginson and Steffanoni (2013) test two hypotheses related to the role of certification: the Valuable Certification Hypothesis and the Direct Compensation Hypothesis by lead loan-arranging banks (or lead arrangers). They analyze an international sample of 4,122 project finance loans during the period 1991-2005. They confirm both hypotheses by showing that certification by prestigious lead arrangers rather than less-prestigious arranging banks can reduce loan spreads, and that participating banks other than the project sponsors pay for this certification. The economic value is even higher during the banking crisis.

Unlike studies that explore project finance from the loan-level perspective (mainly using loan or deal-related databases such as Dealogic and Dealscan), both Byoun, Kim and Yoo (2013) and Byoun and Xu (2014) provide empirical evidence at the project-level. Each uses a common project-based dataset, the Project Finance Database from Thomson Financial Securities Data Corporation (SDC) (known as SDC Platinum from Thomson Reuters).

Byoun, Kim and Yoo (2013) investigate the capital structures of 2,572 project-financed investments in 124 countries from 1997 to 2006. They find that project companies use more leverage when risks are higher and less when the contract structures have risk-reducing measures such as offtake agreements. They conclude that the use of leverage and risk-reducing contract structures in project companies is important hedging methods in project risk management.

Through analyzing the global project finance investments from 1990 to 2012, Byoun and Xu (2014) demonstrate that the contract choices (including the features of government concession grants and offtake agreements and the public-private governance structure) in project finance are significantly affected by the political and financial risk of a country. To mitigate the political influence of the local government, projects in countries with higher political risks tend to be structured with less government involvement and have a lower probability of obtaining government concessions or offtake agreements. To protect the public interest, financially motivated projects with private finance initiatives tend to have more government participation or government concession grants.

1.3 Basic Terminologies in Project Finance

Some basic terminologies in project finance are used in this report. For the term “project finance”, we refer the following definitions from Esty (2004) and Finnerty (2013). As our major source of project finance data is from SDC Financial Database of Thomson Reuters Company, their definitions of project finance-related terms are applied to this report. See Appendix B for the brief explanations of key project finance-related terms used in this report.

What is Project Finance/Project Financing?

“**Project finance** involves the creation of a legally independent project company financed with nonrecourse debt (and equity from one or more sponsors) for the purpose of financing of a single purpose, industrial asset.” (Esty, 2004 p.25)

“**Project financing** may be defined as the raising of funds on a limited-recourse or nonrecourse basis to finance an economically separate capital investment project in which the providers of the funds look primarily to the cash flow from the project as the source of funds to service their loans and provide the return of and a return on their equity invested in the project.” (Finnerty, 2013 p.1)

1.4 Economic Policy Uncertainty Index and Sub-Indices

Baker, Bloom and Davis (2016) have developed an index of **Economic Policy Uncertainty (EPU) (overall index)** and its sub-indices for the US and the world’s major economies. They use these indices to investigate the relation between **policy uncertainties** and **economic activities** (see Baker, Bloom and Davis, 2016; and Bonaime, Gulen and Ion, 2018).

This US EPU Index consists of the following four components (4 Sub-Indices).

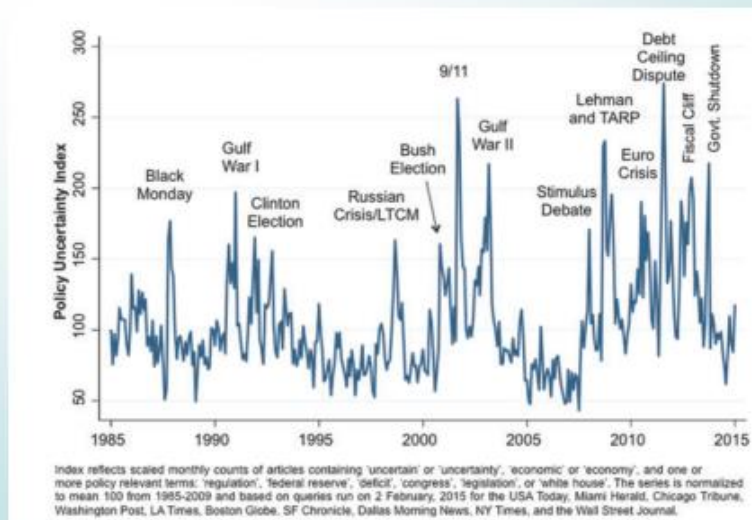
- **News component (NEWS):** Economic policy uncertainty related to all types of economic policies, as long as these events are covered in the news
- **Tax component (TAX):** Tax-related uncertainty
- **Government spending component (FED):**
Economic forecast disagreement in government spending
- **Consumer Price Index (CPI) component:**
Economic forecast disagreement in CPI

Besides the US EPU, Baker, Bloom and Davis (2016) have also constructed indices for G20 countries. A global Economic Policy Uncertainty (GEPU) is developed from the GDP-weighted average of these country EPU indices. We use the GEPU to represent the macroeconomic risk in the global market which may have impact on infrastructure investment. Figures 1 and 2 show that US EPU and global EPU indices are coincident with major economic and political events in the US and the world, respectively. The data can be downloaded from:

<http://www.policyuncertainty.com/index.html>.

Figure 1

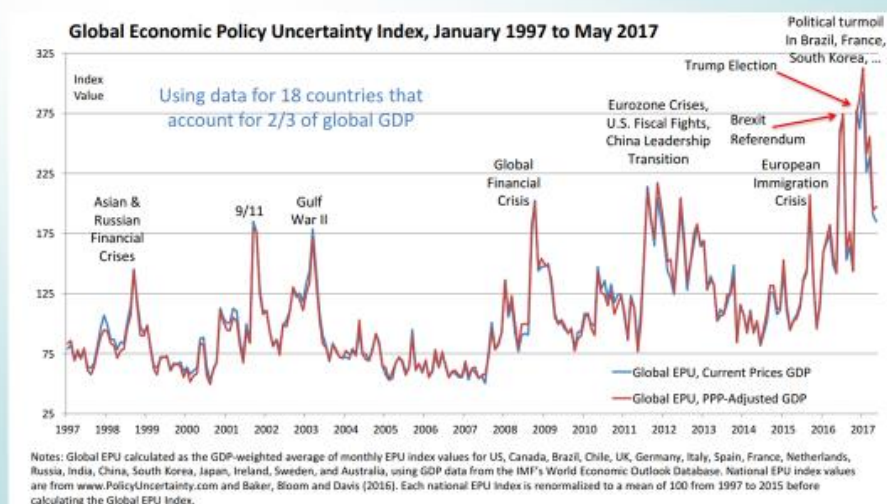
Economic Policy Uncertainty (EPU) Index for the US



Source: Baker, Bloom and Davis (2016)

Figure 2

Global EPU Index



Source: Baker, Bloom and Davis (2016)

(2) Objectives of the Study

The objectives of the study are:

1. To examine and analyze the historical development, current status and future trends of infrastructure investment and financing, project finance and marine finance in the global environment.
2. To conduct a comprehensive literature review on infrastructure investment and financing, project finance, marine finance, and the related areas.
3. To study the determining factors for this investment and financing in the countries of the Belt and Road region, including the macroeconomic, institutional and legal environment.
4. To develop competitive strategies and viable methods for advancing Hong Kong as an infrastructure financing hub and a super-connector, particularly for the Belt and Road region, by conducting (a) qualitative analysis of international best practices and successful cases and (b) quantitative and econometric analyses using comprehensive project finance and syndicated loan databases.
5. To derive relevant public policy implications for promoting the development of Hong Kong as an infrastructure financing hub and a super-connector in project finance by leveraging our unique advantages and enhancing our financial competitiveness.
6. To publicly disseminate the research findings through various channels and methods, and to promote understanding of the Belt and Road Initiative and its economic significance to the general public and key stakeholders.

(3) Research Methodology

3.1 Sample and Data Sources

The project data are obtained from the database of Thomson Reuters SDC Project Finance. The database contains comprehensive coverage and information about global projects in more than 200 countries. The database has been used in other studies on project finance (Byoun, Kim and Yoo, 2013; Byoun and Xu, 2014; Sawant, 2010). We extract detailed project information including basic project characteristics, sponsor information, concession types, offtake contracts, construction & supply contracts, operation & maintenance contracts, government support, financial categories, financial advisors, and others. The database also provides an item indicating whether the projects are financed by classic project finance or by conventional corporate finance. The data dates back to as early as 1971, however, the coverage may not be comprehensive before 1990s.

We collect the list of OBOR countries from HKTDC. Based on the project nations from Thomson Reuters SDC Project Finance database, we can divide the projects into OBOR and non-OBOR groups. We obtain country-level data from different data sources. The global economic policy uncertainty is from Baker, Bloom and Davis (2016) (introduced in previous section). The political risk is measured by the score of political stability and absence of violence from Worldwide Governance Indicators (WGI), World Bank. The WGI data cover more than 200 countries from 1996 to 2017. We also calculate industry-average financial statement variables from Compustat.

The full sample in this report contains more than 26,000 projects in the global market. We report the descriptive statistics from the full sample. In the empirical models, we use a subsample of the projects announced between 1997 and 2017 in 174 countries. We restrict observations to those located in the countries that have political risk data.

3.2 Empirical Analysis: Hypotheses, Methodology and Models

We present the hypotheses and models in this section. We carry out our empirical investigations on the project organizations, contractual arrangements, governance structure and financing decisions in large-scale projects. We develop the hypotheses from the theoretical frameworks of risk management and agency cost (Brealey, Cooper and Habib, 1996; Esty, 2003).

Infrastructure projects are capital intensive, last long period of time, and usually involves multiple parties such as sponsors, developers, suppliers, offtakers and others in the development, construction and operation processes. There are several types of risks associated with the projects. Yescombe (2014) classifies the project risks into four categories: commercial risk, macroeconomic risk (or financial risk), regulatory risk, and political risks. The commercial risk is related to the risks inherent in a project and the market, including construction risk, revenue risk, operating risk, supply risk, etc. (see the detailed discussions in Chapter 9, Yescombe (2014)). Macroeconomic risk comes from the external macroeconomic environments such as the changes in interest rates, inflation, currency exchange rates and others. Regulatory and political risks are risks arising from the changes in law and regulation and the political instability, e.g., war and civil disturbance in a country. Country-level risks are more relevant in emerging countries, which have weak investor protection, weak legal enforcement and great political uncertainty (Esty and Megginson, 2003; Byoun and Xu, 2014; Subramanian and Tung, 2016).

Agency costs arise whenever there are transactions between different parties. The investments in infrastructure projects are mostly tangible assets with rich free cash flow upon operation, and are therefore vulnerable to abuse and exploitation. Agency conflicts could occur amongst different parties in a project, for example, between host governments and project companies (creeping expropriation problem), between suppliers/offtakers and project companies (hold-up problem), between sponsors and project companies (debt overhang or underinvestment problem), or between managers and project companies etc. (free cash flow or managerial discretion problem) (see the relevant discussions in Esty, 2003).

Project companies may make several arrangements to mitigate project risks and agency conflicts. The project can be organized as a separate company with limited recourse to the sponsors instead of a subsidiary to a parent company. The project company can have concentrated equity ownership with few sponsors and debt ownership with only a small number of banks. The project company can raise substantial capital from debt market and operate with high leverage. The project company may sign contracts with related parties before the project is implemented. The project company may seek government support and be funded by the joint venture between public and private sectors. These arrangements may be set up due to the consideration of project risk, agency cost, or both. However, these topics are under-investigated in the literature.

Development of Hypothesis 1

Our first hypothesis is about the use of project finance vs. corporate finance in a project. Project finance involves separate legal incorporation with nonrecourse debt and extensive contracting with construction contractors, suppliers, customers, and other parties. Both risk management and agency cost could be the major deciding factors to adopt project finance

instead of traditional corporate finance. Brealey, Cooper and Habib (1996) argue that through contractual arrangements in project finance, the major risks in a project can be shifted to the parties that can best manage the risks. It is worthy to note that contractual arrangements can only transfer risks specific to the project. However, some of the risks such as country risk, are non-transferable (Byoun, Kim and Yoo, 2013). Separation of the project from parent company confines the risk contamination in case if the project fails. Together with the risk shifting mechanism in project finance, project sponsors can reduce the expected distress cost and undertake a highly risky investment which may otherwise be forgone if the project is to be financed by a company already loaded with multiple projects.

On the other hand, the use of project finance can also provide benefits to the sponsor and project company by mitigating agency cost. Conflicts between project companies and related parties (or the hold-up problem due to asset specificity) can be mitigated by extensive or appropriate contracting arrangements. Project-specific governance structures such as concentrated debt and equity ownership and high leverage can restrict managerial discretion and resolve the free cash flow problem (Esty, 2003). Subramanian and Tung (2016) show that the contractual constraints on the cash flow and the private enforcement mechanism in project finance can reduce agency cost and substitute for the legal rule of investor protection; hence, project finance is more preferable to corporate finance in a country with high legal risk. Based on these arguments, we derive the first hypothesis as:

- H1a: Project companies adopt project finance rather than conventional corporate finance when the project risk is higher.
- H1b: Project companies adopt project finance rather than conventional corporate finance when the agency cost is higher.

Development of Hypothesis 2

We focus on the contractual arrangements in the second hypothesis. As discussed above, the contractual arrangements can help project companies transfer some specific risks. Meanwhile, the contractual structure lessens the abuse and exploitation of cash flow from the project. Both risk management and agency cost can drive a project company to arrange extensive contracts with related parties. Byoun, Kim and Yoo (2013) find that offtake contract between the project company and customers is a means to reduce project risk (measured by the volatility of project cash flow). Corielli, Gatti and Steffanoni (2010) argue that the nonfinancial contracts in a project can reduce the cash flow volatility and the opportunistic behaviors of relevant parties. The direct tests of the relations among project risk, agency cost, and contracting arrangements are thoroughly examined. The second hypothesis is given as:

- H2a: Project companies are more likely to involve in an offtake contract, a construction & supply contract and an operation & maintenance contract if the project risk is higher.
- H2b: Project companies are more likely to involve in an offtake contract, a construction & supply contract and an operation & maintenance contract if the agency cost is higher.

Development of Hypothesis 3

We explore the role of government support and governance structure in a project in the third hypothesis. Government support takes a significant role for a project company to deal with project specific risks by providing capital, guarantee or even direct a purchase contract. The political risk may be mitigated if the project is backed by the host government as the interests of the project company and the government are aligned. On the other hand, the support from the government may decrease the sponsors' control of the project company. Also, the project return may decrease if the promised government support is not eventually provided (Brealey, Cooper and Habib, 1996). Similar arguments can be applied to the choice of governance structure in a project company. Under a build-own-operate (BOO) structure, project sponsors have full control the project companies. On the other hand, the private sectors collaborate with the public sector under a public-private partnership (PPP). The advantage of BOO over PPP is that private sponsors are less likely to be exploited by the public sector. Conversely, a project company may be able to gain benefit from the government participation to mitigate the project specific risk under a PPP. Byoun and Xu (2014) show that political risk and financial risk have differing impacts on the choices of BOO and PPP. They show that BOO is preferred in countries with higher political risks and PPP is more likely to be adopted in the countries with higher financial risks. We do not have predictions about the impacts of agency cost on government support and governance structure. Thus, we have the third hypotheses only related to project risk as follows:

- H3a: Project companies are more likely to seek government support if the project specific risk and political risk are higher.
- H3b: Project companies are more likely to adopt PPP ownership structure if the project specific risk is higher and political risk is lower; the BOO structure is preferred if the project specific risk is lower and political risk is greater.

Development of Hypothesis 4

Our last hypothesis is about the project bond issuance. Infrastructure investments are mostly financed by a syndicated loan. Public bond is a promising source of project financing as the bond market provides stronger liquidity than the bank loan market, and the long maturity of a project bond can better match the project life. Infrastructure projects may be attractive to bond investors because they generally provide substantial cash flow upon completion and operation. Moody's (2016) shows that infrastructure debt securities have better credit ratings and fewer potential losses than corporate bonds. However, infrastructure bonds differ from normal bonds, as their interest repayments are irregular – especially in the early construction stage, which may lead to difficulties in bond pricing and discourage the project bond issuance.

No previous study has been conducted to consider the debt financing choices made between loans and public bonds by project companies. We follow the framework of risk management and agency cost and explore the decision with respect to bond financing in a project. First, if the project risk is high, the future cash flow from the project would become volatile, which makes it less attractive to the bond investors. Second, costly agency conflict may also affect the cash flow available to external debt providers. Unlike the banks, bond investors may not be able to effectively monitor the actions of project companies. The agency cost would also cause project bond issuance to be less attractive to investors. Last, contractual arrangements and government support can help reduce the volatility of future cash flow as well as agency

conflict, thereby increasing the probability of project bond issuance. The last hypothesis is given as:

- H4a: Project companies are less likely to issue project bond if the project risk is higher.
- H4b: Project companies are less likely to issue project bond if the agency cost is higher.
- H4c: Project companies are more likely to issue project bond if the project is associated with contractual arrangements and supported by government.

Construction of Variables

To test the hypotheses above, we set off to construct variables which measure project risk and agency cost. Following the project risk classifications in Yescombe (2014), we employ four variables to measure different types of project risks. The first measure is the global economic policy uncertainty index from Baker, Bloom and Davis (2016), which reflects the uncertainties of economic policies in global markets. The economic policies include monetary policy, fiscal policy, taxes, government spending, regulation, health care, trade policy, and others. This economic policy uncertainty is directly related to macroeconomic risk of a project; and the uncertainties in fiscal policy, government spending, and regulation are also associated with the revenue risk, input supply risk, operating risk, and commercial viability of a project. The variable GEPU is the log of the average, monthly index in 12 months prior to the announcement date of a project (Bonaime, Gulen and Ion, 2018). The second measure of project risk is the political risk of the host country of a project. For such purpose, we use the data of Political Stability and Absence of Violence from World Governance Indicators in World Bank database. The political stability scores on more than 110 countries are published annually since 1997. The scores range from 0 to 1 with high value indicating more political stability (less political risk) of a country. To facilitate the interpretation, the political risk PRISK is constructed as 1 minus the political stability score (Byoun and Xu, 2014). We also use the Moody's sovereign rating to measure the political risk of project countries. Our tests include the variables of political risk and sovereign rating in the previous year prior to the project announcement.

The third measure is currency risk. The variable CRISK is a dummy variable equal to 1 if the project currency is not the same as currency of host country (Corielli, Gatti and Steffanoni, 2010). The last variable EBITDAVOL measures the inherent risk in project. Following Byoun, Kim and Yoo (2013), we use the standard deviation of the ratio of earnings before interest, taxes, depreciation and amortization over total assets (EBITDA) in the 10 years prior to the project announcement to measure the volatility of future cash flows for a project. As the EBITDA for each project is not available, we use the industry average EBITDA in a country to represent the cash flow for a project. The industry average EBITDA is calculated from Compustat Global for non-US countries by year and from Compustat for the US. The industry is classified by 2-digit SIC code. If a project in a country that lacks accounting data in Compustat, the industry average EBITDA in the US is used for that project. The variable EBITDAVOL is the standard deviation of the industry average EBITDA in the previous 10 years.

We measure the agency cost by three industry-level variables. The first variable, EBIDTA,

indicates the future cash flow available to a project. It is the mean value of industry average EBITDA in the past 10 years in each country - each year by a 2-digit SIC code. This proxy relates to a free cash flow problem that a project with rich cash flow is susceptible to costly agency conflict. The variable can also measure the profitability of a project. The second variable, PPE, measures the capital intensity of a project, which is the industry average ratio of plant, property and equipment (PP&E) over total assets (Bonaime, Gulen and Ion, 2018). If a project needs intensive capital investments, a hold-up problem may arise after the project is completed. The last variable, SALEPPE, measures the asset redeployability. The variable is calculated by the industry average ratio of PP&E sale in the past 3 years over lagged PP&E in a country in each year. If the fixed assets in an industry can be resold in the market, the agency cost from asset specificity can be mitigated. We use the accounting data from Compustat to construct the agency cost variables. Similarly, we use US data for the projects in the countries that do not appear in Compustat Global. In sum, agency cost in a project is larger if the industry average EBITDA ratio is higher, PPE ratio is larger, and SALEPPE ratio is lower.

We also create variables to measure the project characteristics, following Esty and Megginson (2003) and Byoun, Kim and Yoo (2013). PUBLIC is a dummy variable that measures whether the project sponsors are listed; RATED is a dummy variable equal to 1 if the project sponsors are rated by credit rating agency and 0 otherwise; CONG is a dummy variable that measures whether the project has government concessionary grant; PFI is a dummy variable equal to 1 if the project is private finance initiative and 0 otherwise; and, the variable SIZE is the project size measured by the log value of the project cost. We include project sector dummies and time trend variable in the empirical models. See Appendix C for brief definitions of the variables used in our empirical models.

Empirical Models

We run logistic regression to test the hypotheses. The dependent variable for the first hypothesis is a dummy variable for the use of project finance in a project. The variable PF equals to 1 if the project company is organized as project finance and 0 if the project is financed by conventional corporate finance. We use the Equation (1) to test the H1.

$$PF_{ij,t} = \alpha_0 + \beta_1 GEP_{i,t} + \beta_2 PRISK_{j,t} + \beta_3 CRISK_i + \beta_4 EBITDAVOL_{i,t} \\ + \beta_5 EBITDA_{i,t} + \beta_6 PPE_{i,t} + \beta_7 SALEPPE_{i,t} + \beta_8 PUBLIC_{i,t} \\ + \beta_9 RATED_{i,t} + \beta_{10} CONG_{i,t} + \beta_{11} PFI_{i,t} + \beta_{12} SIZE_{i,t} + SECTOR_i \\ + TREND_t + \varepsilon \quad (1)$$

According to hypothesis H1a, the coefficients on the four measures of project risk should be positive, meaning that the project company tends to adopt project finance if the project risk is high, because the major project risks can be shifted and managed by the organizational structure. However, some risks, like political risk, are not transferrable even in project finance; and hence the coefficient on PRISK may not be positive. H2a suggests that project finance is more likely to be adopted if the agency cost is high in project company. It is expected that the coefficients on EBITDA and PPE are positive, and the coefficient on SALEPPE is negative.

The second hypothesis involves the contractual arrangements in a project. The major contracts in an infrastructure project are offtake contract (purchase agreement), construction contract, supply contract, and operation & maintenance contract. The dependent variables are OFFTAKE, CONSUP and OPMAIN, which are dummy variables equal to 1 if a project is

associated with offtake contract, construction & supply contract, and operation & maintenance contract, respectively. We use all observations of the projects with project finance and corporate finance. To control the self-selection effect that project company organized by project finance tends to enter into comprehensive contracts, we add a dummy variable PF in the regression. The Equation (2) gives the empirical model.

$$\begin{aligned}
& \text{OFFTAKE/CONSUP/OPMAIN}_{ij,t} \\
& = \alpha_0 + \beta_1 \text{GEPU}_t + \beta_2 \text{PRISK}_{j,t} + \beta_3 \text{CRISK}_i + \beta_4 \text{EBITDAVOL}_{i,t} \\
& + \beta_5 \text{EBITDA}_{i,t} + \beta_6 \text{PPE}_{i,t} + \beta_7 \text{SALEPPE}_{i,t} + \beta_8 \text{PF}_{i,t} \\
& + \beta_9 \text{PUBLIC}_{i,t} + \beta_{10} \text{RATED}_{i,t} + \beta_{11} \text{CONG}_{i,t} + \beta_{12} \text{PFI}_{i,t} \\
& + \beta_{13} \text{SIZE}_{i,t} + \text{SECTOR}_i + \text{TREND}_t + \varepsilon
\end{aligned} \tag{2}$$

The risk management framework suggests that a project company is more likely to sign the contracts with purchaser, supplier, construction contractor, and operation & maintenance contractor if the project risk is high, indicating that the coefficients on the project risk variables should be positive. Yet, like the argument above, the nontransferable risk like political risk may not be managed by these contractual managements. So, the coefficient on PRISK may not be positive. On the other hand, if the agency cost can explain the contractual arrangements, according to H2b, we should observe positive coefficients on EBITDA and PPE, and negative coefficient on SALEPPE.

The third hypothesis explores the government support and governance structure in a project. The dependent variables for government support are GOVSUP and GOVEQT, which are dummy variables used if a project obtains any government support and strong level of support by direct equity participation, respectively. The ownership structure build-own-operate is the most common type in the projects, in which the sponsors fully own and operate the project. The variable BOO is a dummy variable equal to 1 if the ownership structure of a project is build-own-operate type and 0, if otherwise. In a public-private-partnership, the project company is a joint venture where private sponsors and host government cooperate. The variable PPP is a dummy variable equal to 1 if the ownership structure is public-private-partnership type. The equation for H3 is given as:

$$\begin{aligned}
& \text{GOVSUP/PPP/BOO}_{ij,t} \\
& = \alpha_0 + \beta_1 \text{GEPU}_t + \beta_2 \text{PRISK}_{j,t} + \beta_3 \text{CRISK}_i + \beta_4 \text{EBITDAVOL}_{i,t} \\
& + \beta_5 \text{EBITDA}_{i,t} + \beta_6 \text{PPE}_{i,t} + \beta_7 \text{SALEPPE}_{i,t} + \beta_8 \text{PF}_{i,t} \\
& + \beta_9 \text{PUBLIC}_{i,t} + \beta_{10} \text{RATED}_{i,t} + \beta_{11} \text{CONG}_{i,t} + \beta_{12} \text{PFI}_{i,t} \\
& + \beta_{13} \text{SIZE}_{i,t} + \text{SECTOR}_i + \text{TREND}_t + \varepsilon
\end{aligned} \tag{3}$$

The support from government can help project companies mitigate project specific risk. For instance, the government may provide capital, guarantee, subsidy, or infrastructure improvement to the project company, which in turn decreases the uncertainty of future cash flow and increases the project return. The government support can also reduce the impact of political uncertainty on the project cash flow, as the government may have direct interest in the project. We expect that in the regression of government support, the coefficients on the project risk variables are positive. The impact of project risk on ownership structures varies across different risk categories. PPP may be preferred if the project inherent risk is high because similar to the government support, a joint venture with host government can mitigate such risk. BOO may be adopted if the political risk is high, as the private sponsors may want to retain the control of the project. We expect the coefficient on EBITDAVOL is positive in

PPP regression and the coefficient on PRISK is positive in BOO regression.

In the tests of H4, the dependent variable, BOND, is a dummy variable equal to 1 if the project is financed by public bonds and 0 otherwise. We include the project risk variables, contractual arrangement variables and government support variable in the regression. We expect the probability to issue public bond for a project will decrease if the project risk is high, while the contractual arrangements and government support can reduce project risk such as cash flow volatility, and thus lead to project bond issuance. We expect that the coefficients on the project risk variables are negative and the coefficients on the contractual arrangement and government support are positive.

$$\begin{aligned}
 BOND_{ij,t} = & \alpha_0 + \beta_1 GEP U_t + \beta_2 PRISK_{j,t} + \beta_3 CRISK_i + \beta_4 EBITDAVOL_{i,t} \\
 & + \beta_5 EBITDA_{i,t} + \beta_6 OFFTAKE_{i,t} + \beta_7 CONSUP_{i,t} + \beta_8 OPMAIN_{i,t} \\
 & + \beta_9 GOVSUP_{i,t} + \beta_{10} BOO_{i,t} + \beta_{11} PF_{i,t} + \beta_{12} PUBLIC_{i,t} \\
 & + \beta_{13} RATED_{i,t} + \beta_{14} CONG_{i,t} + \beta_{15} PFI_{i,t} + \beta_{16} SIZE_{i,t} \\
 & + SECTOR_i + TREND_t + \varepsilon
 \end{aligned} \tag{4}$$

(4) Research Results/Findings

4.1 Descriptive Statistics

Using the project data from the SDC Financial Database of Thomson Reuters Company (Thomson Reuters) from January 1971 to September 2018, we prepare the descriptive statistics of over 20,000¹ projects from about 200 countries by financing source, project basic, and sponsor information which we outline below. The corresponding result tables and figures along with the discussions of their results follow.

Sources of Finance

- Financing category and sub-category (see Figures 3-5)
- Classic project finance or else (see Table 1)

Project Basics

- Project nations by different classifications (see Table 2, Figures 6-9)
- Projects by debt ratio (see Table 3)
- Projects by structure of the project (see Figures 10-11)
- Projects by industry sector (see Figure 12)
- Projects by government support level and type (see Figures 13-14)
- Projects by financial advisor (see Table 4)

Sponsor Information

- Projects by sponsor stock exchange (see Table 5 and Figure 15)
- Projects by sponsor's credit rating level (see Table 6)
- Projects by sponsor's credit rating grade (see Figure 16)
- Projects by sponsor's financial advisor (see Table 7)

Sources of Finance

Figures 3 and 4 display the four financing categories of the projects in our sample during the study period by percentage and by percentage over time. The four financing categories are senior debt, equity, concessionary grant, and subordinated debt where 88% of our sample projects uses senior debt which consistently dominates over the years. Figure 5 displays the more refined sub-categories in which about half of the projects (53%) employ syndicated loans. Table 1 shows that about 73% of the sample projects adopt “project finance” instead of the conventional corporate finance method in which senior debt is employed by most of these projects.

¹ The numbers of observations vary in different tables due to the availability of data of these variables in SDC Financial Database of Thomson Reuters Company.

Table 1

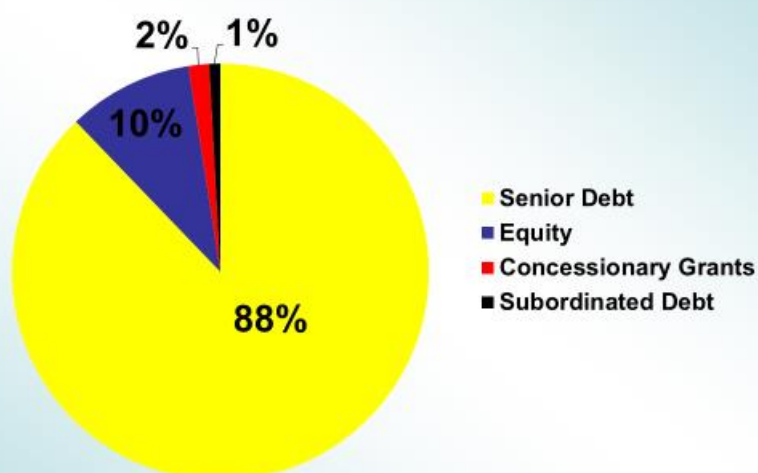
Classic project finance by financing category

Financing Category	Classic Project Finance			
	Yes		No	
Senior Debt	13680	(64.6%)	4909	(23.2%)
Equity	1501	(7.1%)	560	(2.6%)
Concessionary Grants	151	(0.7%)	186	(0.9%)
Subordinated Debt	158	(0.7%)	24	(0.1%)
Sub-Total	15490	(73.2%)	5679	(26.8%)

Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 3

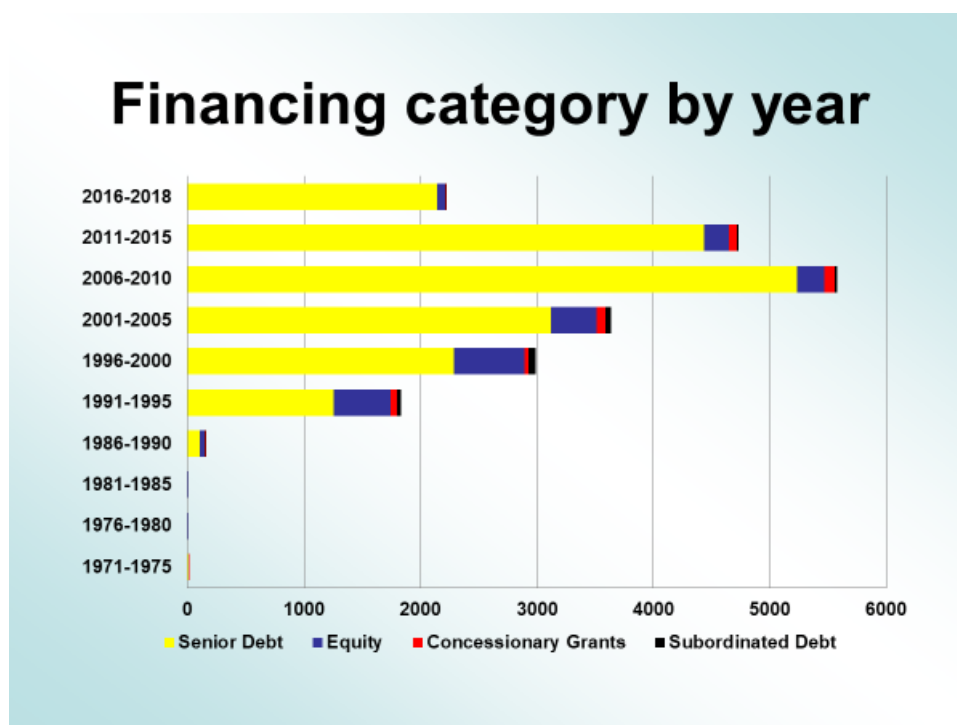
Financing category



Remark: Figures may not add up to 100% due to rounding.

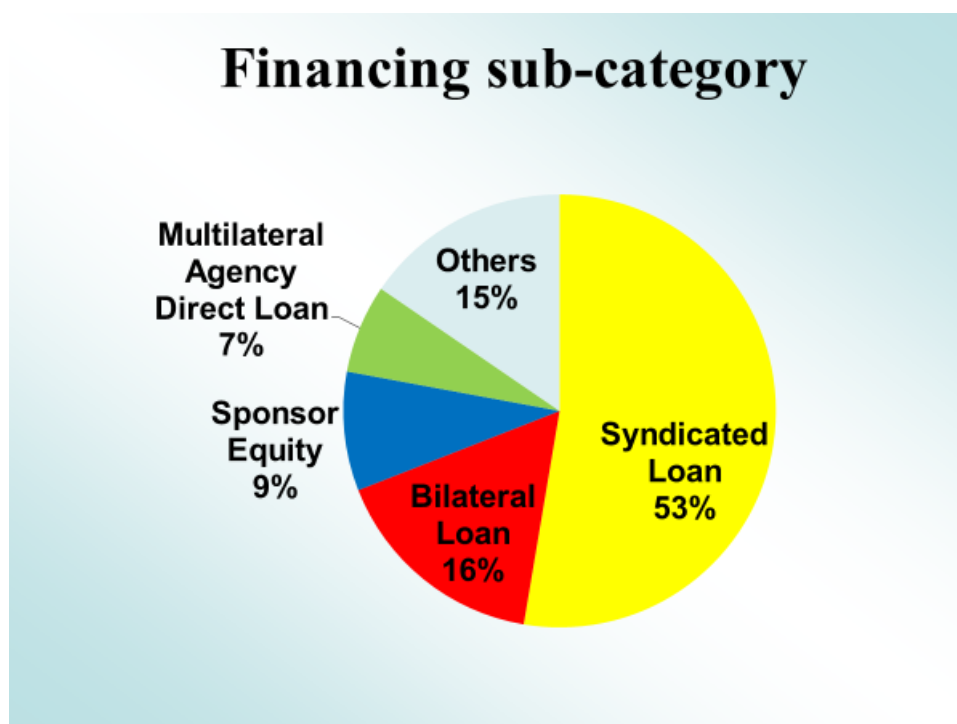
Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 4



Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 5



Source: SDC Financial Database of Thomson Reuters Company 2018

Project Basics

Table 2 and Figure 6 show the credit ratings (sovereign ratings) of project nations by letter grade and investment grade/non-investment category, respectively. The credit ratings assigned to project nations by Moody's Investors Service (Moody's) and Standard and Poor's Ratings Services (S&P's) are similar, e.g., 82% of the project nations obtain investment-grade ratings from both credit rating agencies (CRAs).

Table 2

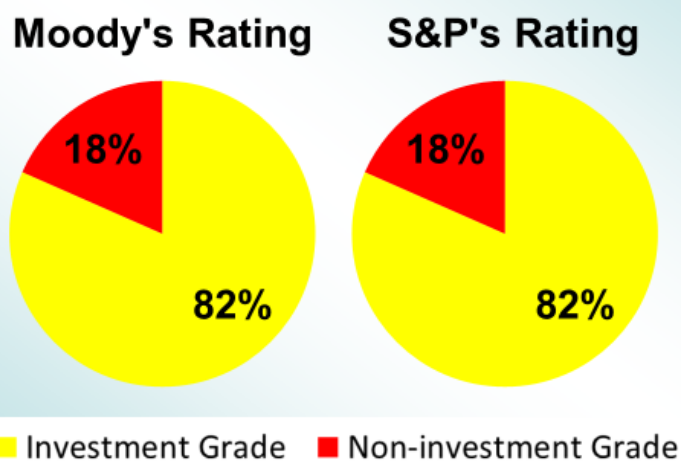
Project nation: Moody's Rating and S&P's Rating

Moody's Rating	No.	%	S&P Rating	No.	%
Aaa	9446	39.0	AAA	7566	31.8
Aa1	650	2.7	AA+	2412	10.1
Aa2	1304	5.4	AA	1240	5.2
Aa3	847	3.5	AA-	765	3.2
A1	572	2.4	A+	1208	5.1
A2	570	2.4	A	561	2.4
A3	1072	4.4	A-	489	2.1
Baa1	1238	5.1	BBB+	744	3.1
Baa2	1862	7.7	BBB	1413	5.9
Baa3	2190	9.1	BBB-	3052	12.8
Ba1	972	4.0	BB+	1106	4.6
Ba2	756	3.1	BB	793	3.3
Ba3	597	2.5	BB-	896	3.8
B1	855	3.5	B+	411	1.7
B2	488	2.0	B	651	2.7
B3	539	2.2	B-	403	1.7
Caa1	160	0.7	CCC+	50	0.2
Caa2	33	0.1	CCC	17	0.1
Caa3	35	0.1	CCC-	1	0.0
Ca	18	0.1	CC	16	0.1
C	0	0.0	C	0	0.0
			D	9	0.0
Total	24204	100.0	Total	23803	100.0

Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 6

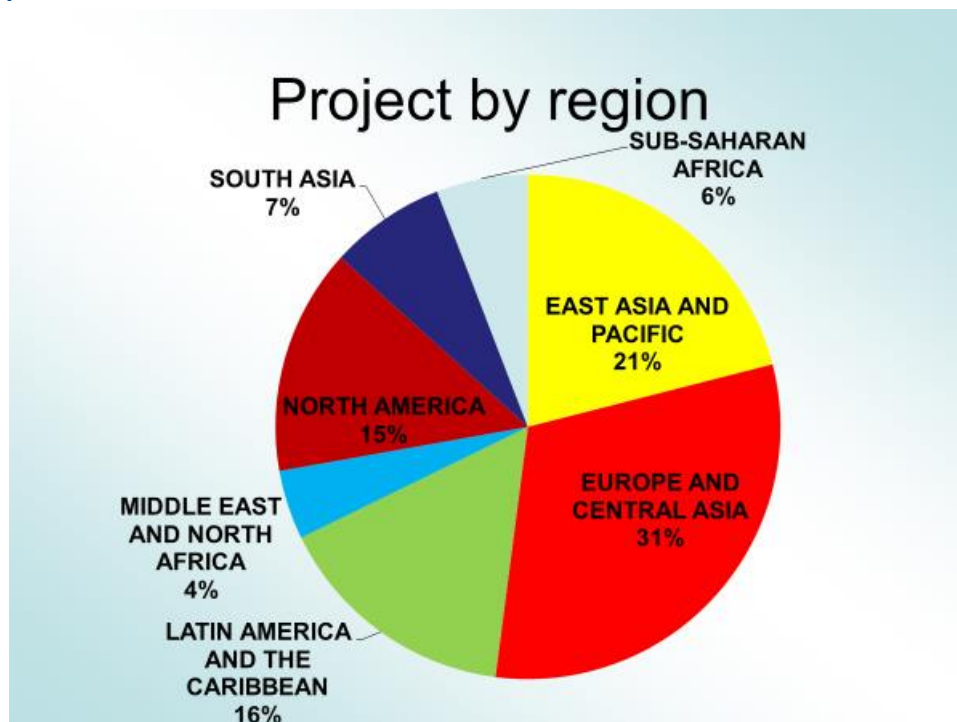
Project nation: Moody's Rating and S&P's Rating by investment grade and speculative grade (Percentage)



Source: SDC Financial Database of Thomson Reuters Company 2018

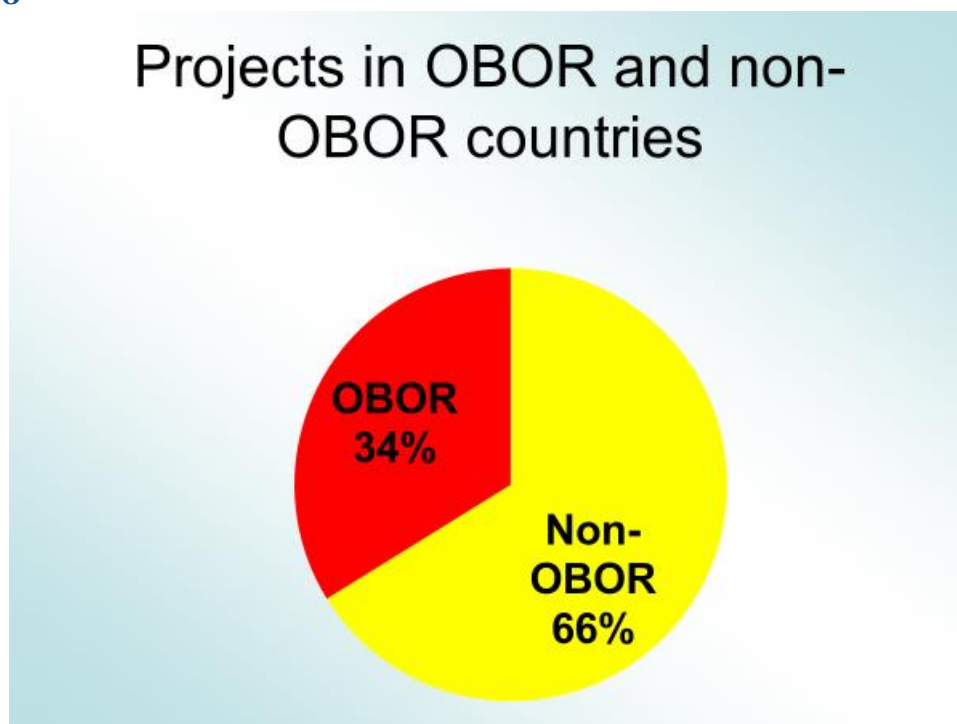
Figure 7 exhibits the project nations by region according to Thomson Reuters' classifications where Europe and Central Asia region has the highest percentage of projects (that is, 31%). Figures 8 and 9 display the projects by OBOR vs. non-OBOR countries in total and over time, respectively. About one-third of the projects are from the OBOR countries.

Figure 7

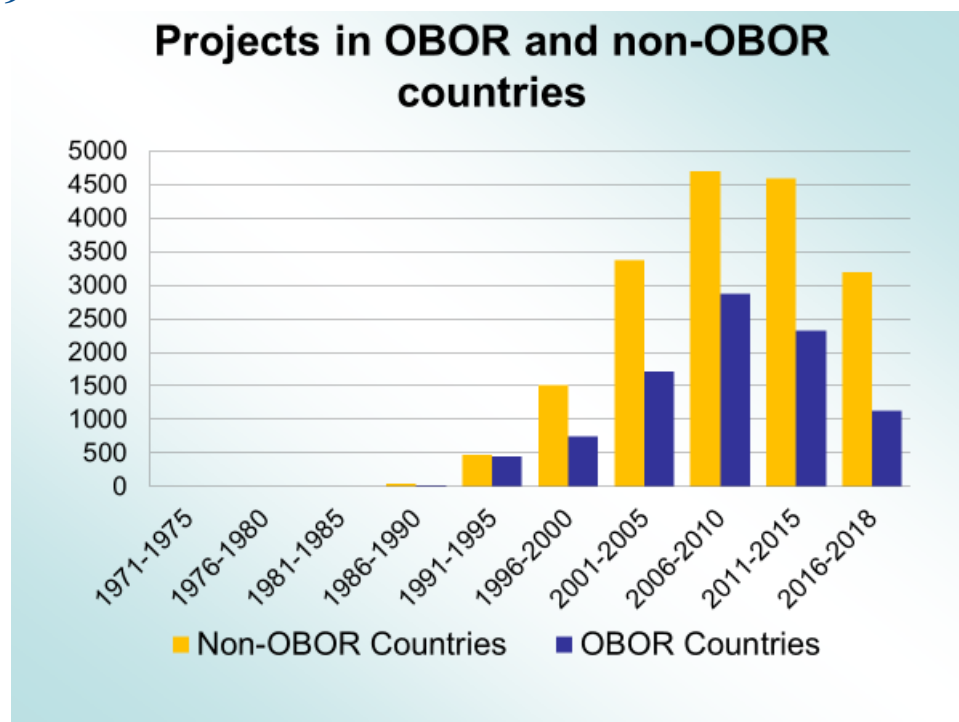


Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 8



Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 9

Source: SDC Financial Database of Thomson Reuters Company 2018

Table 3 indicates that about 66% of the projects in the sample adopt 80-100% debt ratio, and in fact, most of the projects choose to use high debt ratio, that is, over 60% debt ratio. The allocation of project type by structure of the project is displayed in Figures 10 and 11. Although Public-Private-Partnership (PPP) structure seems to receive more attention in emerging markets such as in China, most of the projects in both OBOR and non-OBOR countries are organized in Build-Own-Operate (BOO) structure (see Figures 10 and 11).

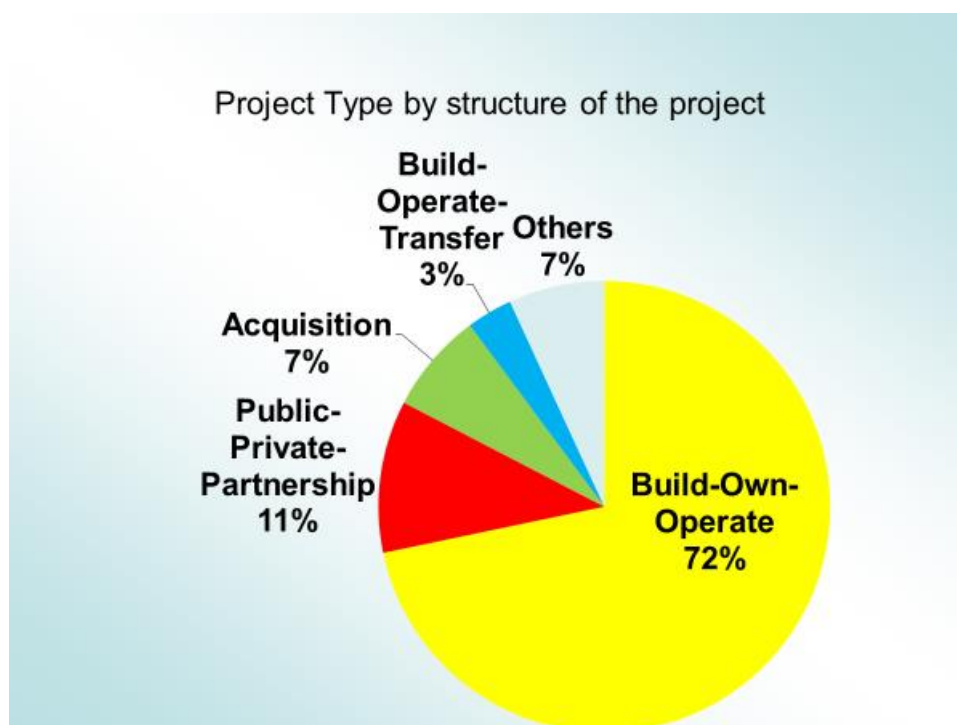
Table 3

Gearing ratio debt% with no. and %

Gearing Ratio Debt %	No.	%
<20	96	1.0
20-<40	156	1.6
40-<60	713	7.1
60-<80	2410	24.1
80-100	6614	66.2
Total	9989	100.0

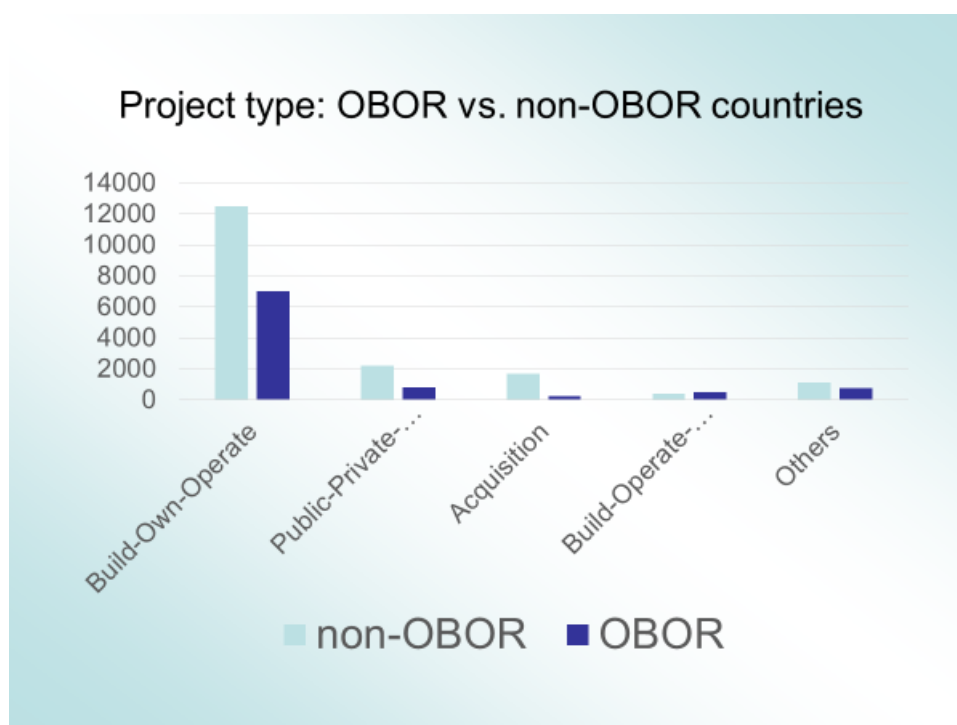
Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 10



Source: SDC Financial Database of Thomson Reuters Company 2018

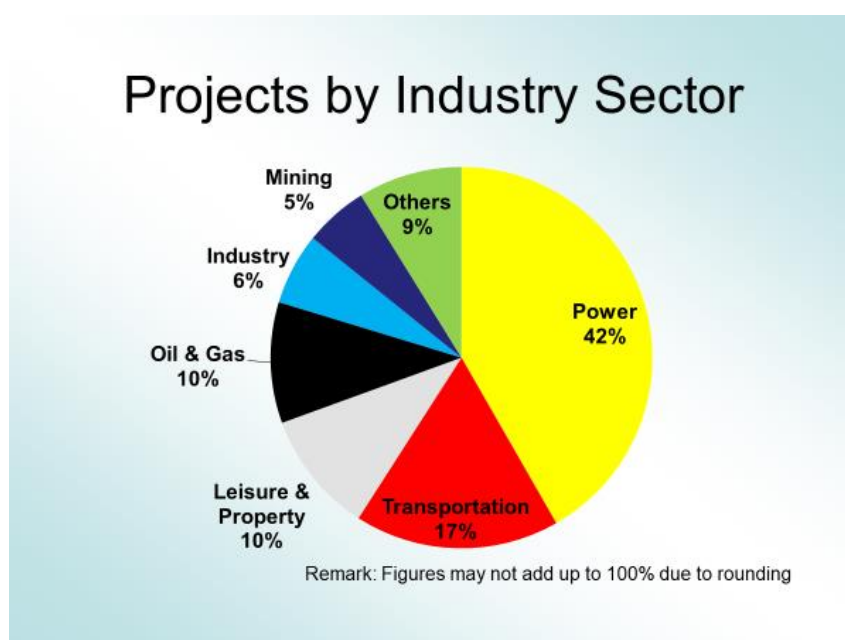
Figure 11



Source: SDC Financial Database of Thomson Reuters Company 2018

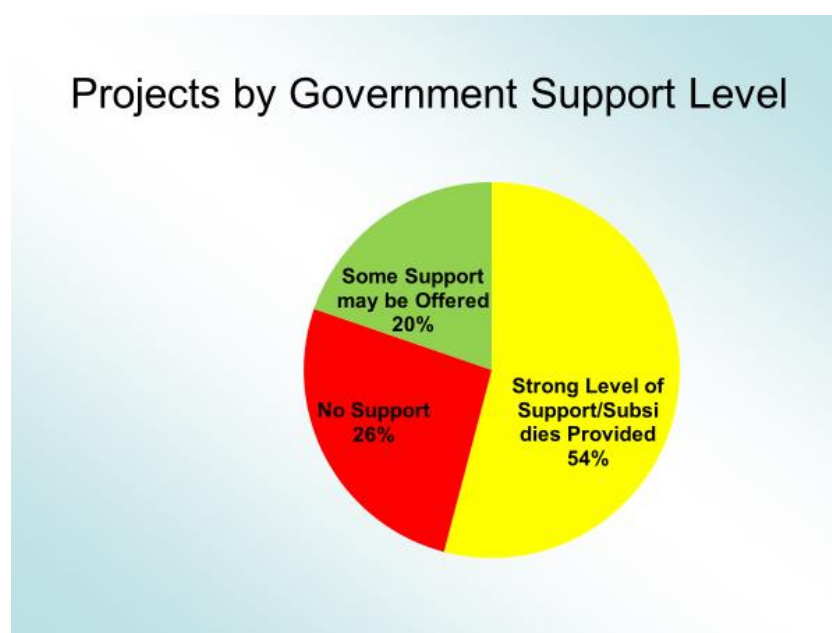
Regarding the industry sectors of the projects, 59% of the projects fall in the power and transportation industries where 42% of the projects are from the power industry (see Figure 12). Figures 13 and 14 demonstrate the projects by government support level and by government support type, respectively. About half of the projects receive a high level of governmental support or subsidiaries provided by the respective governments. Most governments opt for equity participation as the type of support to finance the sample projects. Table 4 shows the top 20 financial advisors employed for the sample projects. The choice of financial advisors seems to be diversified without any significant concentration in a few major investment banks or Big-4 audit firms. That is, none of the financial advisors serve more than 5% of the projects in the sample.

Figure 12



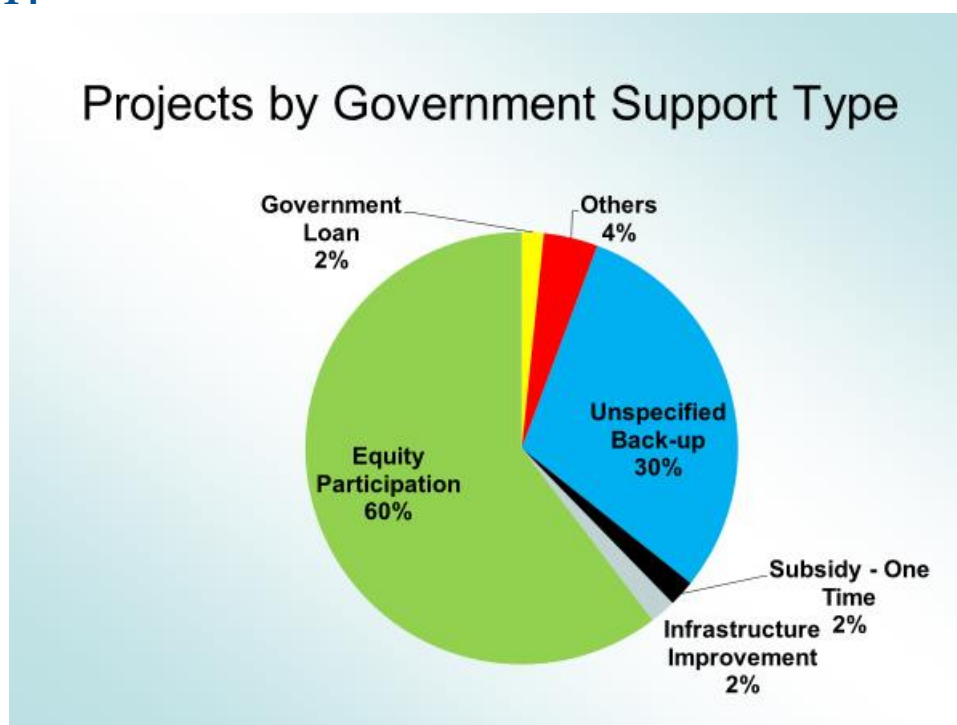
Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 13



Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 14



Source: SDC Financial Database of Thomson Reuters Company 2018

Table 4

Top 20 Financial Advisors

Top 21 Financial Advisor	No. of observations	%
PricewaterhouseCoopers	416	4.6%
KPMG	306	3.4%
Macquarie Bank	281	3.1%
SBI Capital Markets Ltd	268	3.0%
BNP Paribas SA	240	2.7%
Societe Generale	229	2.5%
HSBC Holdings PLC	211	2.3%
Ernst & Young LLP	199	2.2%
Deutsche Bank	156	1.7%
Sumitomo Mitsui Banking Corp	143	1.6%
RBS	115	1.3%
Korea Development Bank	113	1.3%
Ernst & Young (UK)	105	1.2%
Royal Bank of Canada	103	1.1%
Hongkong & Shanghai Bank (HK)	93	1.0%
JP Morgan	77	0.9%
ABN-AMRO Holding NV	72	0.8%
International Finance Corp	71	0.8%
Goldman Sachs & Co	70	0.8%
ABN AMRO Bank NV	68	0.8%
Morgan Stanley & Co	68	0.8%

Source: SDC Financial Database of Thomson Reuters Company 2018

Note: There are 21 financial advisors reported in the table as there is a tie between ABN AMRO Bank NV and Morgan Stanley & Co.

Sponsor Information

Table 5 shows the top 10 stock exchanges, and Figure 15 displays the top 5 stock exchanges where the sponsors of the sample projects are listed. About 14% of the project sponsors are listed on the New York Stock Exchange.

Table 5

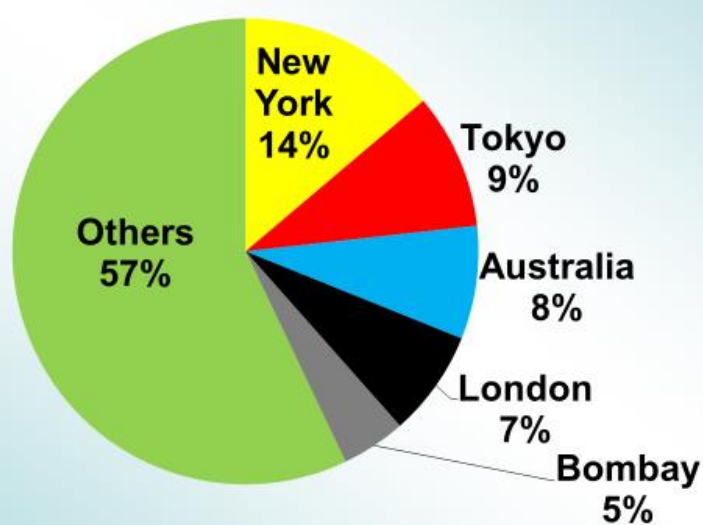
Top 10 Sponsor Stock Exchanges

	No.	%
New York	1869	13.8%
Tokyo	1275	9.4%
Australia	1063	7.9%
London	996	7.4%
Bombay	605	4.5%
Toronto	573	4.2%
Madrid	549	4.1%
Korea	419	3.1%
Euro Paris	416	3.1%
Nasdaq	350	2.6%
Others	5412	40.0%

Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 15

Top 5 Sponsor Stock Exchanges



Source: SDC Financial Database of Thomson Reuters Company 2018

The credit ratings of project sponsors by letter grade and by investment grade/non-investment category are shown in Table 6 and Figure 16, respectively. Consistent with the credit rating results of project nations mentioned above, there is no significant difference in the credit ratings assigned to sponsors between Moody's and S&P's and most of the sponsors obtain investment-grade ratings from both CRAs.

Table 6

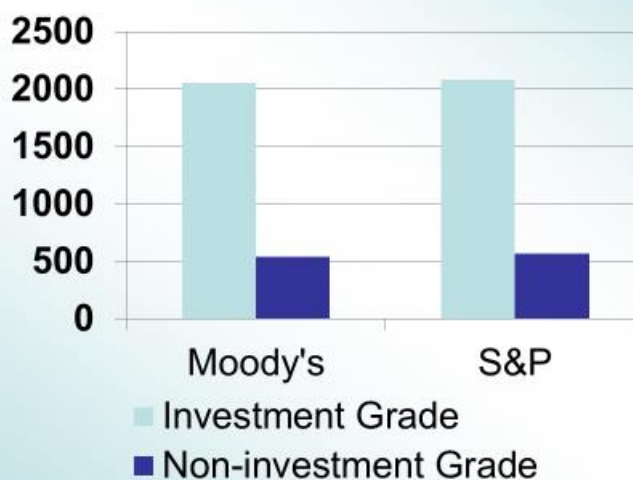
Sponsor: Moody's rating and S&P's rating

Moody's Rating	No.	%	S&P Rating	No.	%
Aaa	214	8.3	AAA	258	9.7
Aa1	127	4.9	AA+	82	3.1
Aa2	166	6.4	AA	194	7.3
Aa3	175	6.8	AA-	154	5.8
A1	240	9.3	A+	208	7.9
A2	238	9.2	A	279	10.5
A3	244	9.4	A-	240	9.1
Baa1	215	8.3	BBB+	245	9.3
Baa2	227	8.8	BBB	259	9.8
Baa3	207	8.0	BBB-	162	6.1
Ba1	107	4.1	BB+	105	4.0
Ba2	92	3.6	BB	156	5.9
Ba3	123	4.7	BB-	110	4.2
B1	92	3.6	B+	97	3.7
B2	56	2.2	B	50	1.9
B3	50	1.9	B-	29	1.1
Caa1	6	0.2	CCC+	5	0.2
Caa2	9	0.4	CCC	0	0.0
Caa3	2	0.1	CCC-	3	0.1
Ca	2	0.1	CC	3	0.1
C	2	0.1	C	5	0.2
			D	4	0.2
Total	2594	100	Total	2648	100.0

Source: SDC Financial Database of Thomson Reuters Company 2018

Figure 16

Sponsor: Moody's rating and S&P's rating by investment grade and speculative grade



Source: SDC Financial Database of Thomson Reuters Company 2018

Table 7 indicates the top 20 financial advisors by project sponsors in the sample. Similar to the results of projects' financial advisors in Table 4 above, the choice of financial advisors does not seem to be clustered in a few major investment banks or Big-4 audit firms. Interestingly, nine out of the top 10 financial advisors overlap with the top 10 advisors on the list in Table 4.

Table 7

Top 20 Sponsor Financial Advisors

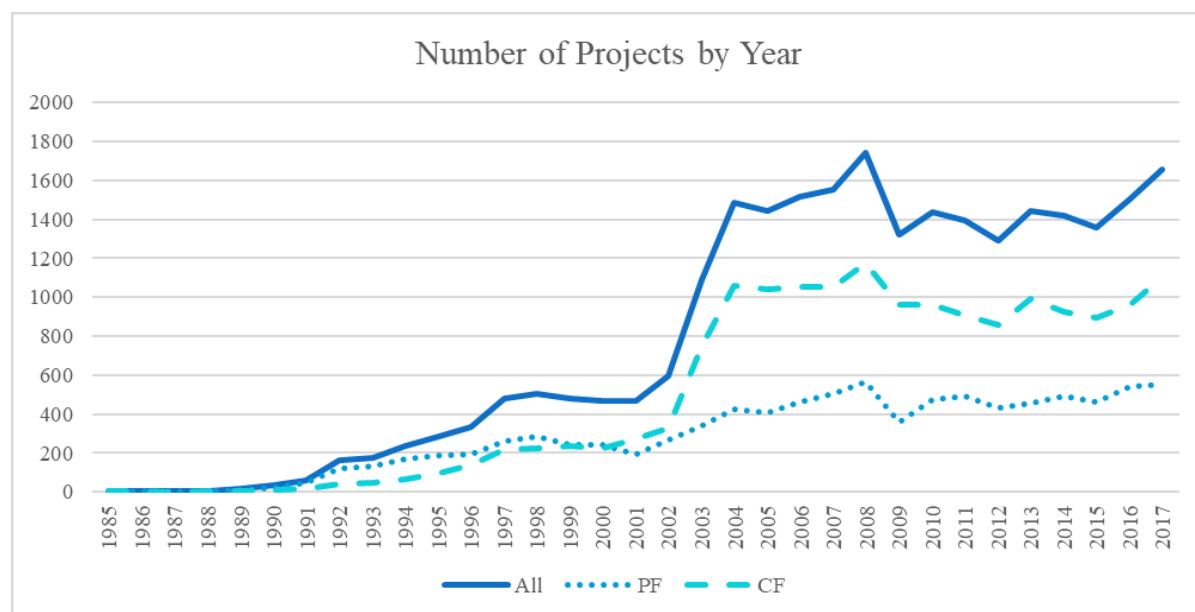
Top 20 Sponsor Financial Advisor	No. of observations	%
Societe Generale	331	4.3%
SBI Capital Markets Ltd	316	4.1%
BNP Paribas SA	299	3.9%
Macquarie Bank	267	3.5%
PricewaterhouseCoopers	249	3.3%
HSBC Holdings PLC	241	3.2%
KPMG	210	2.7%
Korea Development Bank	183	2.4%
Sumitomo Mitsui Banking Corp	171	2.2%
Deutsche Bank	136	1.8%
RBS	130	1.7%
Ernst & Young LLP	124	1.6%
Royal Bank of Canada	108	1.4%
Hongkong & Shanghai Bank (HK)	104	1.4%
ABN-AMRO Holding NV	88	1.2%
Mizuho Corporate Bank Ltd	79	1.0%
ANZ Banking Group	76	1.0%
Dexia SA	73	1.0%
ABN AMRO Bank NV	69	0.9%
Goldman Sachs & Co	68	0.9%

Source: SDC Financial Database of Thomson Reuters Company 2018

4.2 Empirical Results

We present the empirical results in this section. Figure 17 reports the number of large-scale projects in the global market from 1985 to 2017. In general, the number of projects increases during the period; for instance, 37 projects in 1990, 468 projects in 2000 and 1,437 projects in 2010. We expect that the number of projects will continue to grow in the future given the huge shortage of infrastructure investment around the world. We find that 1,742 projects were announced in 2008, which is largest in number within a single year. The decrease in the project numbers after 2008 should be caused by the Global Financial Crisis. We also observe that after 2000 the number of projects organized as project finance is smaller than the number of projects by corporate finance. In recent years (2010-2017), about two-thirds of the projects are structured as conventional corporate finance rather than being set up as an independent entity. In terms of project cost, the total project size by corporate finance is also much larger than that by project finance. Infrastructure related projects are more likely to be financed by the traditional corporate finance than project finance, although the organization of project finance provide some benefits such as managing risk and reducing agency cost.

Figure 17 The number of projects by year in the global market



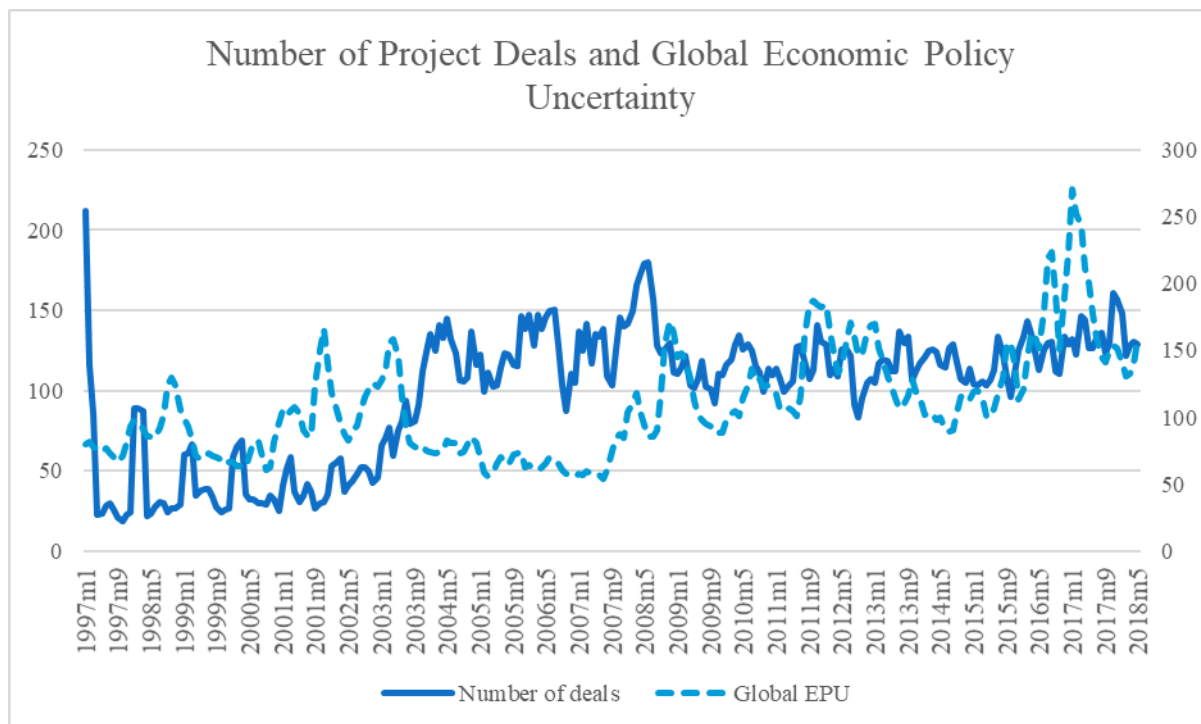
Note: this figure reports the number of infrastructure-related projects in the global market from 1985 to 2017. We report the number of projects by year for all types of project, the projects organized as project finance (PF), and the projects organized as conventional corporate finance (CF).

An economic shock, such as a financial crisis, has significant negative impact on the infrastructure investments. In Figure 18, we plot the number of projects by month with the monthly economic policy index from Baker, Bloom and Davis (2016). We report the results for the global market (including US) and the US market only in Panels A and B, respectively. From both graphs, we can observe that when the economic policy uncertainty is high (low), the number of announced infrastructure projects is small (large). The results are consistent with the findings of Baker, Bloom and Davis (2016) and Bonaime, Gulen and Ion (2018) that uncertainties about monetary/fiscal policies, government spending, taxes and regulation negatively affect the corporate investments. We show that infrastructure investment is also

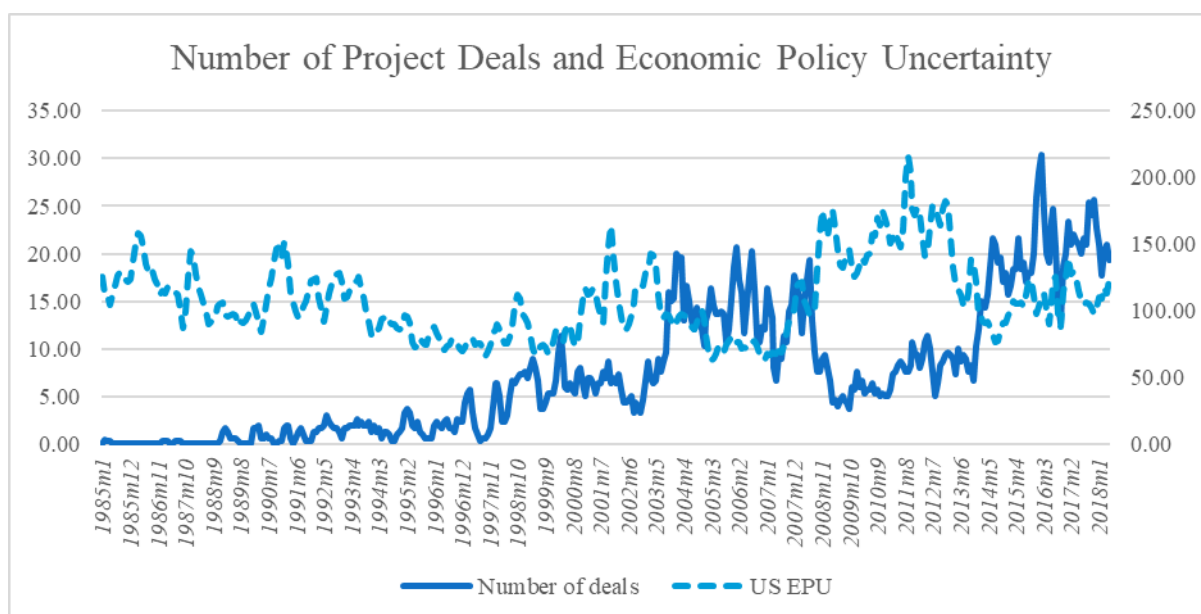
affected by the economic policy uncertainty. In the following tests, we use the global economic policy uncertainty index to represent the shock from macroeconomic environment.

Figure 18 The number of projects and economic policy uncertainty

Panel A: the number of projects in the global market and global economic policy uncertainty



Panel B: the number of projects in US and US economic policy uncertainty



Note: this figure reports the number of infrastructure-related projects and the monthly economic policy uncertainty index. Panel A reports the results for the global market (including the US) from 1997 to 2018. Panel B plots the project in US and economic policy uncertainty index in US from 1985 to 2018.

Results of Hypothesis 1

We test the four hypotheses using the global sample from 1997 to 2017. Table 8 reports the results from logistic regressions of the determinants of the use of project finance. The dependent variable, PF, is a dummy variable equal to 1 if a project is financed by project finance and 0 if it is corporate finance. We explore two competing motivations to adopt project finance: risk management and agency cost.

Table 8 The determinants of the use of project finance

Dependent variable is a dummy variable = 1 for project finance, 0 otherwise					
	Predicted Sign (H1)	(1)	(2)	(3)	(4)
GEPU	+	0.128 (1.81)*	0.214 (3.01)***	0.124 (1.76)*	
PRISK	+/?	-1.743 (-17.53)***		-1.741 (-17.73)***	
SOVRATING	-/?		0.082 (20.38)***		
CRISK	+/?	-0.109 (-2.97)***	0.030 (0.80)	-0.105 (-2.87)***	
EBITDAVOL	+	0.085 (0.17)	0.646 (1.28)	0.022 (0.05)	
EBITDA	+	0.118 (0.42)	0.312 (1.12)		-0.727 (-3.16)***
PPE	+	-0.056 (-0.53)	0.034 (0.32)		-0.133 (-1.42)
SALEPPE	-	0.133 (1.58)	0.081 (1.01)		0.119 (1.54)
PUBLIC		0.153 (4.12)***	0.162 (4.39)***	0.153 (4.13)***	0.175 (5.29)***
RATED		-0.078 (-1.25)	0.025 (0.41)	-0.078 (-1.26)	0.075 (1.53)
CONG		0.503 (8.33)***	0.562 (9.45)***	0.505 (8.37)***	0.355 (6.90)***
PFI		0.591 (5.10)***	0.639 (5.93)***	0.596 (5.15)***	0.685 (7.01)***
SIZE		-0.309 (-24.72)***	-0.313 (-24.68)***	-0.309 (-24.79)***	-0.295 (-26.05)***
TREND		0.008 (1.68)*	-0.011 (-2.37)**	0.009 (1.74)*	-0.025 (-9.47)***
Constant		0.951 (1.03)	-1.236 (-1.12)	0.956 (1.04)	2.543 (3.42)***
Sector dummy		Yes	Yes	Yes	Yes
N		15,188	15,216	15,188	18,144
Pseudo R-sq		0.080	0.085	0.080	0.060

This table presents the results of logistic regressions of the determinants of the choice between project finance and corporate finance in infrastructure investment. The key dependent variable is a dummy variable equal to 1 if the deal is financed by the project finance. The global economic policy uncertainty (GEPU) comes from Baker, Bloom and Davis (2016), which is the log of the average monthly index in 12 months prior to the announcement date of a project. PRISK is one minus political stability score in a country from World Governance Indicator one year before project announcement. SOVRATING is the Moody's rating of the project host country. CRISK is dummy variable for currency risk. EBITDAVOL is the volatility of EBITDA ratio in prior 10 years; EBITDA is the earnings before interest, tax and depreciation to total assets ratio; PPE is the ratio of Plant, Property &

Equipment to total assets, SALEPPE is the sale of fixed assets divided by the lagged PPE. The project-level data include public sponsor dummy (PUBLIC), rated sponsor dummy (RATED), dummy for concession grant, dummy for private finance initiative (PFI), and the log value of the project cost (SIZE). The time trend variable and sector dummies are included in the regressions. The *t*-statistics are adjusted by robust standard error and reported in parentheses.

Column (1) of Table 8 shows that the coefficients on global economic policy uncertainty index and cash flow volatility are positive and are significant on GEPU. The results are consistent with the hypothesis H1a which states that when the project risk is higher, project companies are more likely to adopt project finance. However, the coefficients on political risk and currency risk are significantly negative in the regression, which indicates that if political risk is high in the host country and the project currency is foreign to the host country, project finance is less likely to be adopted. The reason could be that these two types of risks cannot be transferred or mitigated under the arrangement of project finance. The structural features, such as legally separated entity, contractual arrangements, or non-recourse debt, may help reallocate project inherent risks such as the uncertainty of future cash flow, but not the non-transferable risk such as political risk. The coefficients on the agency cost variables are generally not significant. The hypothesis H1b, about the agency cost motivation, is not supported by our results. While we find that projects with public sponsors, concession grants from government, and private finance initiatives are more likely to be funded by project finance, whilst corporate finance is more likely to be adopted for projects with high investment costs.

Column (2) reports the results from the regression with sovereign rating as the measure of political or country risk. We convert the sovereign rating on the host country into numerical values as: Aaa = 21, Aa1 = 20, Aa2 = 19, ..., Ca = 2, C = 1. The higher the sovereign rating, the larger the numerical value, and hence the lower country risk is. The coefficient on the sovereign rating is positive and highly significant. The result is consistent with Column (1) - the use of project finance is associated with countries with lower political risk and better sovereign rating. It is possible that if a project is being run as an independent entity, it is likely to be appropriated by the government if the political risk is high. By undertaking the project within a parent company, the appropriation risk may be mitigated. Columns (3) and (4) report the results from the regressions with project risk variables and agency cost variables separately. The results remain similar to the regression results in Column (1).

In sum, we find that if the transferable risk in a project is high, project finance is more likely to be adopted. On the other hand, for projects with high political risk and currency risk, traditional corporate finance is preferred. The agency cost motivation to use project finance, however, is not supported in the results. Our findings confirm the argument in Brealey, Cooper and Habib (1996) that project finance allows the project company to allocate major risks among the parties that can better manage the risks.

Results of Hypothesis 2

Table 9 reports the results of the tests for H2. The dependent variables are dummy variables for the major contracts in a project, including offtake contract, construction & supply contract, and operation & maintenance contract. Contractual arrangements may help a project company shift risks to relevant parties or mitigate the costly agency conflict between the project company and other parties. We test the two motivations using Equation (2).

Table 9 Project risk, agency problems, and contractual arrangements

Dependent variable	Predicted Sign (H2)	Offtake	Construction & Supply	Operation & Maintenance
		(1)	(2)	(3)
GEPU	+	0.272 (2.44)**	0.514 (5.03)***	0.042 (0.25)
PRISK	+/?	0.111 (0.72)	0.355 (2.49)**	-0.094 (-0.40)
CRISK	+/?	-0.421 (-7.70)***	0.024 (0.45)	-0.336 (-3.97)***
EBITDAVOL	+/?	1.740 (2.16)**	-2.211 (-2.89)***	-0.262 (-0.28)
EBITDA	+	-1.504 (-3.29)***	-1.694 (-4.36)***	-1.779 (-3.01)***
PPE	+	0.617 (3.33)***	0.328 (2.06)**	-0.310 (-1.26)
SALEPPE	-	-0.176 (-1.18)	0.091 (0.61)	0.381 (1.95)*
PF	+	0.827 (13.81)***	0.761 (13.61)***	0.751 (8.57)***
PUBLIC		0.305 (5.41)***	0.044 (0.83)	0.326 (3.81)***
RATED		0.137 (1.63)	0.050 (0.63)	0.057 (0.49)
CONG		0.690 (6.10)***	0.726 (8.91)***	0.686 (5.84)***
PFI		0.142 (0.41)	0.429 (3.00)***	0.492 (2.72)***
SIZE		0.159 (8.56)***	0.249 (13.72)***	0.184 (6.69)***
TREND		-0.082 (-11.51)***	-0.134 (-20.17)***	-0.182 (-18.27)***
Constant		-2.900 (-5.93)***	-2.313 (-5.16)***	0.287 (0.37)
Sector dummy		Yes	Yes	Yes
N		15,183	15,183	15,183
Pseudo R-sq		0.167	0.113	0.164

This table reports the logistic regressions of the impacts of project risk and agency cost on the contractual characteristics in infrastructure investment. The dependent variables are the dummy of offtake contract in a project, the dummy of construction & supply contract and the dummy of operation & maintenance contract. The key independent variables are measures of project risk and agency cost. The global economic policy uncertainty (GEPU) comes from Baker, Bloom and Davis (2016), which is the log of the average monthly index in 12 months prior to the announcement date of a project. PRISK is one minus political stability score in a country from World Governance Indicator one year before project announcement. SOVRATING is the Moody's rating of the project host country. CRISK is dummy variable for currency risk. EBITDAVOL is the volatility of EBITDA ratio in prior 10 years; EBITDA is the earnings before interest, tax and depreciation to total assets ratio; PPE is the ratio of Plant, Property & Equipment to total assets, SALEPPE is the sale of fixed assets divided by the lagged PPE. The project-level data include public project finance dummy (PF), sponsor dummy (PUBLIC), rated sponsor dummy (RATED), dummy for concession grant, dummy for private finance initiative (PFI), and the log value of the project cost (SIZE). The time trend variable and sector dummies are included in the regressions. The *t*-statistics are adjusted by robust standard error and reported in parentheses.

Column (1) presents the coefficient estimates in the regression for offtake contract. The

coefficients on economic policy uncertainty and cash flow volatility are positive and significant. The findings confirm the hypothesis H2a that offtake contracts are more likely to be negotiated in project company if the project risk is high. The coefficient on political risk is positive but not significant. The coefficient on currency risk is negative and highly significant. It is reasonable because offtake contracts are mainly used to smooth the future cash flow from the project but cannot shift the currency risk away. We also find that if the future cash flow is high in a project, project companies are less likely to have offtake contracts. The result is not consistent with the agency cost argument that projects with free cash flow are likely to suffer agency problems. The coefficient on the PP&E ratio is significantly positive, which indicates that projects with large heavy capital intensity would have offtake contracts negotiated with customers. The finding is consistent with the story of asset specificity or hold-up problem. The coefficient on the sale of PP&E ratio is not significant.

Column (2) shows the results for the construction & supply contract. Similarly, the coefficient on GEPU is significantly positive, which confirms H2a that construction and supply contracts can mitigate the impacts of economic policy uncertainty. We also find that the project companies are more likely to have the construction & supply contract if the political risk in the host country is high. However, the cash flow volatility in the project reduces the propensity to have such a contract. It is possible that due to the uncertainty in future earnings of the projects, the parties on the side of construction contractors and suppliers are not willing to provide construction and supply services to the project companies. In the agency cost variables, we observe the same pattern as the results for offtake contract: project companies are less likely to reach agreements with construction contractors and suppliers if the future cash flow is larger; and more likely to have the contract if the capital intensity is higher.

Column (3) shows the results for operation & maintenance contracts. The coefficients on the project risk variables are only significant for currency risk. Compared with the offtake contract and construction & supply contract, the project risks do not have significant power to explain the use of the operation & maintenance contract. It is possible that the major risks in a project comprise mainly of revenue risk, input supply risk and construction risk. The coefficient on future cash flow is also significantly negative. The coefficient on the sale of PP&E ratio is positive and marginally significant. These results do not support the predictions from the agency cost framework and hypothesis H2b. In all three regressions, project companies organized with project finance are more likely to have contracts with related parties, which is consistent with the key organization characteristics of project finance. Generally, project companies with a government concession grant, large project size, listed sponsors, and private finance initiative have a higher propensity to arrange the major contracts for projects.

Overall, we find that project risks are important drivers for project companies to make contractual arrangements. Economic policy uncertainty is an important consideration for project companies to obtain offtake and construction & supply contracts. Political risk is positively associated with the use of construction & supply contracts. The project inherent cash flow volatility (commercial risk) can be managed by offtake contracts. In contrast, currency risk cannot be effectively shifted away by contractual arrangements, probably because the related parties are not willing to take such risk. We also show that agency cost generally cannot explain the contractual arrangements in a project.

Results of Hypothesis 3

Table 10 presents the results for the tests of government support and ownership structure in the hypothesis H3. Columns (1) and (2) show that when a project is associated with higher political risk, currency risk, and cash flow volatility, the project company is more likely to seek government support and government equity participation. However, if economic policy uncertainty is larger, government support is less preferred. Two possible reasons can explain the finding: first, if there is greater uncertainty related to economic policies such as future government spending, government support may not be realized in the future which weakens the project company's incentive to solicit government support (see the discussions of Channel Tunnel in Brealey, Cooper and Habib, 1996). Second, the host government may not be willing or capable of granting support to large-scale projects if it lacks stabilities in the economic policies.

Table 10 Project risk, agency problem, and governance structure

Dependent variable		Government Support	Government Equity	PPP	BOO
	Predicted Sign (H3)	(1)	(2)	(3)	(4)
GEPU	+/?	-0.275 (-3.04)***	-0.439 (-4.38)***	-0.036 (-0.26)	-0.291 (-3.29)***
PRISK	+/?	0.764 (6.18)***	0.607 (4.28)***	-1.691 (-7.32)***	1.044 (7.95)***
CRISK	+	0.275 (5.67)***	0.359 (6.76)***	0.321 (4.45)***	0.149 (3.23)***
EBITDAVOL	+	1.790 (3.11)***	2.189 (3.49)***	3.171 (3.48)***	-0.698 (-1.21)
EBITDA	?	0.579 (1.67)*	1.220 (2.98)***	2.096 (3.73)***	0.375 (1.05)
PPE	?	-0.394 (-3.05)***	-0.253 (-1.85)*	-0.568 (-3.18)***	-0.032 (-0.25)
SALEPPE	?	0.256 (2.12)**	0.206 (1.67)*	0.409 (2.60)***	-0.069 (-0.66)
PF	?	-0.566 (-11.42)***	-0.443 (-8.16)***	-0.274 (-3.81)***	0.178 (3.75)***
PUBLIC		-0.183 (-3.81)***	-0.185 (-3.51)***	-0.152 (-2.12)**	-0.210 (-4.51)***
RATED		0.380 (4.98)***	0.629 (7.75)***	0.241 (2.01)**	-0.375 (-5.29)***
CONG		1.032 (15.60)***	0.663 (9.79)***	1.041 (12.85)***	-1.915 (-28.78)***
PFI		1.988 (12.33)***	0.843 (6.83)***	-0.741 (-4.52)***	0.575 (4.60)***
SIZE		0.220 (13.34)***	0.236 (12.97)***	0.148 (5.79)***	-0.019 (-1.24)
TREND		2.506 (6.68)***	-0.351 (-0.86)	-5.228 (-9.46)***	1.740 (4.85)***
Constant		3.271 (8.39)***	0.255 (0.60)	-6.919 (-11.69)***	2.784 (7.32)***
Sector dummy		Yes	Yes	Yes	Yes
N		15,183	15,183	14,395	15,183
Pseudo R-sq		0.241	0.184	0.322	0.200

This table reports the impacts of project risk and agency cost on the government support and governance structure in infrastructure investment. The dependent variables are the dummies of government support, government equity participation, public-private-partnership and build-own-operate in a project. The key independent variables are measures of project risk and agency cost. The global economic policy uncertainty (GEPU) comes from Baker, Bloom and Davis (2016), which is the log of the average monthly index in 12 months prior to the announcement date of a project. PRISK is one minus political stability score in a country from World Governance Indicator one year before project announcement. SOVRATING is the Moody's rating of the project host country. CRISK is dummy variable for currency risk. EBITDAVOL is the volatility of EBITDA ratio in prior 10 years; EBITDA is the earnings before interest, tax and depreciation to total assets ratio; PPE is the ratio of Plant, Property & Equipment to total assets, SALEPPE is the sale of fixed assets divided by the lagged PPE. The project-level data include public project finance dummy (PF), sponsor dummy (PUBLIC), rated sponsor dummy (RATED), dummy for concession grant, dummy for private finance initiative (PFI), and the log value of the project cost (SIZE). The time trend variable and sector dummies are included in the regressions. The *t*-statistics are adjusted by robust standard error and reported in parentheses.

Government support is more likely to occur in the projects with larger future cash flow, less capital intensity and higher resale value of fixed assets. On the one hand, host governments may choose to support these projects because the supports, such as equity participation and loan, can be easily repaid. On the other hand, a project company may not be concerned about the possible agency conflict brought from the government support (or hold-up problem) because the project is less asset specific. We also find that projects with rated sponsors, concessionary grant, private finance initiative, and large size are positively associated with government support, whereas project companies with project finance and running under listed sponsors are less likely to take up government support.

Column (3) of Table 10 shows the important factors that determine the use of private-public partnership in ownership structure of a project. Similar to the impacts of government support, a joint venture with the public sector can mitigate the currency risk and cash flow volatility in a project. However, PPP is less preferred in a country with high political risk because private sponsors want to retain the control of the projects and reduce the political influence (Byoun and Xu, 2014). The coefficients on other variables are similar to the regressions of government support in Columns (1) and (2), except that the coefficient on PFI is significantly negative. In the projects with private finance initiative, the private sectors are contracted to build and operate facilities for public interest. Joint venture between private and public sectors is less frequently found in such projects.

Column (4) presents the results for the regression of build-own-operate ownership structure. We find that project companies prefer to have BOO ownership structure when the political risk of the host country is high. This is consistent with (Byoun and Xu, 2014) who find that projects are more likely to be fully owned by private sectors when the political risk is greater. BOO structure is negatively associated with economic policy uncertainty and positively related to currency risk. Project companies funded by project finance as well as private finance initiatives are more likely to be privately owned. The projects with listed and rated sponsors and concession grant have lower probability to adopt BOO ownership structure.

Results of Hypothesis 4

The results for the last hypothesis are presented in Table 11. We show the project risk variables and agency cost variables in the regression in Column (1), the contractual arrangement variables in Column (2), government support variable in Column (3), and all these variables in Column (4). Interestingly, we find that the project bond issuance is positively associated with economic policy uncertainty, which suggests this type of risk can

be shifted to bond investors. Consistent with hypothesis H4a, project companies are less likely to issue bonds if the projects are associated with greater political risk, currency risk and cash flow volatility. The coefficients on agency cost variables are all negative and only significant in PP&E ratio. Project companies with more fixed asset investments are less likely to issue bond, which may be consistent with the argument in H4b that costly agency conflict due to large capital intensity and asset specificity discourages the interests of bond investor in the project.

Table 11 Project risk, contractual arrangements and project bond issuance

Dependent variable is a dummy variable = 1 for project bond issuance, 0 otherwise					
	Predicted Sign (H4)	(1)	(2)	(3)	(4)
GEPU	-	0.622 (3.07)***	0.571 (2.79)***	0.660 (3.25)***	0.566 (2.78)***
PRISK	-	-1.456 (-4.63)***	-1.439 (-4.61)***	-1.467 (-4.76)***	-1.438 (-4.60)***
CRISK	-	-0.493 (-4.98)***	-0.475 (-4.68)***	-0.509 (-5.08)***	-0.491 (-4.81)***
EBITDAVOL	-	-2.887 (-2.00)**	-1.845 (-1.49)	-1.859 (-1.45)	-3.209 (-2.19)**
EBITDA	-	-0.320 (-0.47)			-0.289 (-0.42)
PPE	-	-0.777 (-2.97)***			-0.782 (-2.94)***
SALEPPE	+	-0.111 (-0.67)			-0.122 (-0.75)
OFFTAKE	+		0.500 (3.41)***		0.487 (3.30)***
CONSUP	+		0.380 (2.86)***		0.375 (2.82)***
OPMAIN	+		0.385 (2.03)**		0.368 (1.94)*
GOVSUP	+			0.397 (3.19)***	0.335 (2.69)***
PF	+	1.180 (10.29)***	1.070 (9.14)***	1.204 (10.40)***	1.112 (9.34)***
PUBLIC		-0.087 (-0.89)	-0.114 (-1.14)	-0.072 (-0.73)	-0.106 (-1.06)
RATED		0.509 (3.72)***	0.467 (3.35)***	0.465 (3.38)***	0.452 (3.22)***
CONG		0.208 (1.43)	0.179 (1.25)	0.145 (1.00)	0.079 (0.54)
PFI		0.135 (0.52)	0.167 (0.65)	0.054 (0.20)	0.028 (0.11)
SIZE		0.485 (14.58)***	0.459 (13.52)***	0.468 (13.97)***	0.454 (13.18)***
TREND		0.027 (1.86)*	0.048 (3.38)***	0.035 (2.43)**	0.049 (3.39)***
Constant		-9.706 (-10.94)***	-10.522 (-12.17)***	-10.636 (-12.32)***	-10.244 (-11.31)***
Sector dummy		Yes	Yes	Yes	Yes

N	15,183	15,183	15,183	15,183
Pseudo R-sq	0.121	0.128	0.121	0.132

This table reports the factors that determine the project bond issuance decision. The dependent variable is the dummy equal to 1 if a project issues public bond and 0 otherwise. The key independent variables are measures of project risk, contractual arrangements and government support. The global economic policy uncertainty (GEPU) comes from Baker, Bloom and Davis (2016), which is the log of the average monthly index in 12 months prior to the announcement date of a project. PRISK is one minus political stability score in a country from World Governance Indicator one year before project announcement. SOVRATING is the Moody's rating of the project host country. CRISK is dummy variable for currency risk. EBITDAVOL is the volatility of EBITDA ratio in prior 10 years; EBITDA is the earnings before interest, tax and depreciation to total assets ratio; PPE is the ratio of Plant, Property & Equipment to total assets, SALEPPE is the sale of fixed assets divided by the lagged PPE. OFFTAKE, CONSUP and OPMAIN are dummy variables for the offtake contract, construction & supply contract and operation & maintenance contract in a project. GOVSUP is dummy for government support. The project-level data include public project finance dummy (PF), sponsor dummy (PUBLIC), rated sponsor dummy (RATED), dummy for concession grant, dummy for private finance initiative (PFI), and the log value of the project cost (SIZE). The time trend variable and sector dummies are included in the regressions. The *t*-statistics are adjusted by robust standard error and reported in parentheses.

Columns (2) and (3) show that the variables on the contractual arrangement variables and government support variables are positive and highly significant, indicating that project bonds are more likely to be issued if the project companies have negotiated contracts with relevant parties and obtained government support. The results strongly support the hypothesis H4c. The contractual arrangements and government support can reduce the fluctuations of the future cash flows available to the capital providers and make the project attractive to the bond investors. The results remain similar in Column (4) if all the variables are included in the regression.

In sum, the empirical results suggest that the project risks are important considerations for project companies to determine the organization structure (project finance vs. corporate finance), the arrangements of major contracts, ownership structure, and bond issuance decisions. Project risks can be classified into different categories such as commercial risk, macroeconomic risk, regulatory and political risk. We show that project companies may respond to the different types of risks by various means. For instance, some contractual arrangements, like offtake contract, can help mitigate commercial risk and economic policy uncertainty (related to macroeconomic risk). Government support could be important to control political risk, although project companies prefer BOO ownership structure rather than PPP in the countries with high political risk. The agency cost, however, cannot explain the use of project finance, contractual arrangements or bond issuance decision. Our results can provide some implications to the practitioners and investors that are interested in the infrastructure related projects.

(5) Policy Implications and Recommendations

To facilitate Hong Kong's transition into an infrastructure financing hub and a super-connector in project finance, we derive the following policy implications and recommendations based on our understanding of the global best practice and our empirical results in project finance discussed in Section 4. Our recommendations and suggestions are threefold: we propose (1) competitive strategies in project finance; (2) university and Government involvement in project finance education; and, (3) talent enhancement scheme for the project finance sector.

5.1 Competitive Strategies in Project Finance

Project finance or corporate finance

Our analysis shows that project finance has advantages over corporate finance in large-scale projects, e.g., extensive contractual arrangements can transfer some project risks to the parties who can better manage them. However, according to the statistics, we find that, overall, the projects by corporate finance outnumber the projects by project finance in the global market. One of the reasons for this is that it is more costly to set up the organization structure of project finance as it takes a long time to establish an independent entity, and there are thousands of contracts involved in the process. The total transaction cost to use project finance can be as high as 5%-10% of the total project cost (Esty, 2004). In addition, our results indicate that some nontransferable risks such as political risk and currency risk may not be mitigated by contractual arrangements. We would suggest that the sponsors/project companies should weigh the benefits and costs in determining the organization structure.

Management of project risks

Large-scale projects are usually associated with different types of risks, from externally macroeconomic and political risks to internally project inherent risks. Our results show that economic policy uncertainty is negatively associated with the investments in large-scale projects. Nevertheless, the adverse effect of economic policy uncertainty can be mitigated by the design of the organization structure and contractual arrangements of the projects. The implication is that in order to boost infrastructure investment in a country, its host government should reduce the uncertainty by maintaining consistencies in economic policy. Another important risk in a project is political risk. This type of risk is more significant in OBOR-countries, which are mostly emerging countries. The risk is not transferable to any related parties such as offtakers, suppliers and construction contractors in a project. Government support, like direct equity participation, can mitigate such risk as it aligns the interests of project companies with their host governments. However, we find that when the political risk is greater, project companies are more likely to adopt build-own-operate ownership structure than public-private-partnership ownership structure. The implication is that although government support may reduce political risk, the joint venture with public sector increases its political influence in a project and therefore weakens the control of private sponsors. Recently, some OBOR projects such as Malaysia's East Coast Railway Link have been suspended or cancelled due to the political uncertainty in host country. Our study provides some findings to mitigate political risk.

Project bond market development

As compared to the syndicated loan financing, bond financing is relatively rare for large-scale projects in the capital market. Public bond is a promising source of financing for large-scale projects as the bond market provides stronger liquidity than the bank loan market, and the long maturity of a project bond can better match the project life. Our results indicate that political risk, currency risk, and project inherent risk are negatively associated with project bond issuance. To develop a project bond market, it is particularly important to control these project risks. Project companies using project financing are more likely to issue bonds. Other factors to promote bond financing in large-scale projects include the arrangements of major contracts, government support, and large project size. Our analysis provides recommendations to the development of project bond market.

5.2 University and Government Involvement in Project Finance Education

Relevant course offering

Panel 1 of Appendix D lists a sample of selected courses, lecture and training program related to project finance that are recently offered by the UGC-funded universities in Hong Kong. Given the growing importance of infrastructure development in Hong Kong and the increasing demand for professionals in project financing, it is surprising to find that no (or very few, if any) undergraduate finance program(s) or comprehensive finance course(s) is being offered by the UGC-funded universities with a global project finance orientation.

To equip the undergraduate and postgraduate students with the essential academic knowledge in order to meet the greater market demand and new job opportunities arising from the OBOR Initiative, universities in Hong Kong should be “more proactively” involved in project finance education. For example, it is highly recommended universities offer more courses with a strong emphasis on project finance in a global environment. They could offer a comprehensive and integrated curriculum major or minor in project finance or a minor in project finance consisting of a cluster of related courses that cover the knowledge in the subject areas such as international financial markets, bond financing, syndicated loan financing, risk management, international taxation, legal knowledge in contractual agreements, and documentations for international infrastructure projects.

Scholarships for overseas studies

To support local students with a means-tested grant to participate in exchange activities outside Hong Kong, the **Education Bureau (EDB)** of the HKSAR Government has introduced “Scheme for Subsidy on Exchange to ‘Belt and Road’ Regions for Post-secondary Students” (SSEBR), among other subsidy schemes. In addition to this need-based subsidy scheme, we recommend the introduction of two types of scholarships for both undergraduate and postgraduate students (1) to pursue overseas studies or exchange programs in Belt and Road Regions; or, (2) to take project finance-related courses/programs at prestigious overseas universities with well-developed and renowned project finance programs (not limited to studying in OBOR countries). All university students should be eligible to apply for these two scholarships which would be funded by the Government of the HKSAR. We recommend the EDB to initiate and implement this scholarship scheme with the involvement of all UGC-funded universities.

5.3 Talent Enhancement Scheme for the Project Finance Sector

We propose an integrated **Talent Enhancement Scheme in Project Finance (TES)** which aims at encouraging young individuals to develop specialized knowledge and/or professional working experience in the project finance sector through lifelong learning and professional development. The governance framework and funding of the TES are similar to the pilot program to enhance talent training for the asset and wealth management sector (the WAM Pilot Program) (FSTB, 2018). That is, the TES will be funded by the HKSAR Government and initiated by the **Financial Services and the Treasury Bureau (FSTB)** over a period of three to five years. As the WAM Pilot Program is successfully executed by the **Hong Kong Securities and Investment (HKSI) Institute**, we recommend the **HKSI Institute** to be the implementation agent of the TES with the FSTB as the governing body.

However, we propose some unique elements in the TES which would distinguish it from other existing programs. For example, the promotion and public education activities do not only appeal to only to undergraduate students but also postgraduate students and young practitioners in the financial services industry, among others.

Promotion and public education activities

Along with the admirable infrastructure projects of global scale, the distinct status of Hong Kong as a potentially significant financial hub for the OBOR initiative will be conveyed to the general public through education and various promotion activities. Public awareness and understanding of such strategic prominence, and more essentially, sound implementation of financing for the OBOR projects, could create more career opportunities in the project finance sector. In turn, this will attract young graduates and young professionals in the finance industry to pursue career in this specialized project finance sector.

Therefore, we suggest the HKSI Institute enhance publicity and extend outreach activities to both undergraduate and postgraduate students of all universities, as well as young practitioners in the financial services industry via their mentorship programs. Similar to the WAM Pilot Program, we highly recommend career fairs, professional seminars, recruitment talks, industry updates, and networking days with seasoned professionals in the industry.

Internship and mentorship programs for undergraduate and postgraduate students

Internship and mentorship programs related to project financing are proposed for undergraduate and postgraduate students of UGC-funded universities. For both internship and mentorship programs, honorariums are paid to participating employers and mentors, respectively, with certain ceilings.

The objective of the **summer internship program** is to provide a framework through which students from diverse academic backgrounds may be assigned to enhance their educational experience through practical work assignments in project finance. Project finance institutions, sponsors, developers, project managers and financial advisors, among others, are invited to participate in the program and offer internship positions related to project financing to local non-final year undergraduate students and postgraduate students. This summer internship program can be extended to a term-break internship program for those postgraduate students who pursue only one-year programs.

In addition, a **one-year mentorship program** (not summer mentorship) can provide valuable opportunities for students (mentees) to understand more about the project finance sector from

their mentors. For example, seasoned professionals in project financing such as the experts working for the top 20 financial advisors (see Tables 4 and 7), if available in Hong Kong, are invited to serve as mentors for students who join this mentorship program.

Financial incentive scheme for professional development and training

A financial incentive scheme for professional development and training in project finance is proposed to set up for current practitioners already in the project finance sector, as well as for other practitioners within the financial services industry. First, for the current practitioners, the scheme can provide incentive to enhance their professional knowledge and expertise in the sector. Second, the scheme can assist other financial services practitioners to acquire the fundamental knowledge and skills for entering in this specialized sector.

A steering committee should be formed to endorse professional courses, seminars and conferences relating to project finance offered by the HKSI Institute and other recognized professional bodies under the Scheme. The recognized professional bodies include the Chartered Financial Analysts Institute (CFA Institute), Global Association of Risk Professionals (GARP), and global credit rating agencies (CRAs) or their holding groups. See Panel 2 of Appendix D for a sample of project finance courses offered by Fitch Learning and Moody's Analytics.

Permanent residents who are practitioners of the financial services industry are eligible for government subsidy for a major portion, say 80%, of the tuition fees of endorsed professional training courses, seminars and conferences. Eligible participants are subject to a maximum grant, of say HK\$20,000 per year per person, upon satisfactory completion of the training program.

(6) Details of the Public Dissemination Held

One main objective of the study is to publicly disseminate the research findings through various channels and methods and provide a clearer understanding of the economic significance of the OBOR Initiative to the general public. The investigators delivered and disseminated the research findings through the following channels.

Public Seminar and Release of Research Findings

A public seminar entitled “Deriving public policy for Hong Kong as an infrastructure financing hub and super-connector in project finance: The Belt and Road Initiative (Preliminary Findings)” (the Seminar hereafter) was held at the Mini Theatre, Fong Sum Wood Library, Lingnan University (LU) on October 27, 2018, and the key research findings of our study were delivered by the Principal Investigator of the project. The Seminar was co-organized by the Department of Finance and Insurance and the Fong Sum Wood Library of LU and open to the general public to attend on the Information Day of LU. An abstract that reports the major findings of the study was distributed to the public at the event and was released to the Office of Communications and Public Affairs of LU after the Seminar. The attendees of the Seminar found the study very informative and interesting. They enthusiastically raised questions and engaged in some fruitful discussions. See Appendix E for the poster, banners, and abstract of the Seminar.

Academic Seminar

Both investigators have been working on an academic paper related to our study. The Co-Investigator presented the preliminary results of the paper entitled “The impact of economic policy uncertainty on investment in large-scale projects” (tentative title) at the academic seminar jointly organized by the Department of Geography and Resource Management and the Institute of Future Cities, The Chinese University of Hong Kong (CUHK) (the Academic Seminar hereafter) on November 1, 2018. The participants of the Academic Seminar not only brought out some interesting questions for discussion but provided some constructive comments and suggestions for improving our paper. See Appendix F for the poster of the Academic Seminar.

Academic Journal Submission

After receiving valuable comments and suggestions from the abovementioned seminars, the investigators have been conducting further statistical and editorial work to ascertain the manuscript in publishable form before it will be submitted to a good academic journal in finance or related fields for publication consideration. As it is an empirical study involving an abundance of interesting data from various sources in different formats, data analysis and econometric modelling work take a lot of time.

Case Developed for Teaching

To improve university students’ understanding in OBOR and its economic and financial significance, the investigators have developed an international finance case on OBOR for teaching. The preliminary version of the case was assigned to the students at LU in the International Financial Management course as a group project. The students learned a lot about the OBOR Initiative through this exercise.

(7) Conclusions

Although OBOR Initiative has extensive economic significance, limited “empirical” research has been conducted to develop competitive strategies and public policies to facilitate Hong Kong’s transition into an infrastructure financing hub and a super-connector in supporting this Initiative. To address this gap and enlighten policymakers developing long-term public policies to support the OBOR Initiative, we develop competitive strategies as well as policy implications and recommendations in this study.

Using the project data from about 200 countries during the period January 1971 to September 2018 from Thomas Reuters, we obtain the following descriptive statistics. Regarding the financing sources and methods, 88% of our sample projects uses senior debt, and about half of the projects employ syndicated loans. About 66% of the projects in the sample adopt 80-100% debt ratio, and in fact, most of the projects choose to use a high debt ratio. Most of the project nations and sponsors obtain investment-grade ratings from both Moody’s and S&P’s.

Approximately one-third of the sample projects are from the OBOR countries. Although PPP structure seems to have received more attention in emerging markets, most of the projects in both OBOR and non-OBOR countries are organized in BOO structure. Regarding the industry sectors of the projects, 59% of the projects fall in the power and transportation industries where 42% of the projects are from the power industry. About half of the projects receive a high level of governmental support or subsidiaries provided by the respective governments, and most governments opt for equity participation as the type of support to finance the sample projects.

The economic shock such as financial crisis has a significant negative impact on infrastructure investments. Using the EPU data (1985-2017 for the US market and 1997-2017 for the global market), we find that when the economic policy uncertainty is high (low), the number of announced infrastructure projects is small (large). The results are consistent with Baker, Bloom and Davis (2016) and Bonaime, Gulen and Ion (2018) who find uncertainties about monetary/fiscal policies, government spending, taxes and regulation negatively affect the corporate investments.

Using the global sample data from 1997 to 2017, we test four major hypotheses regarding the relationship between project risks and major decisions of large-scale projects. The empirical results suggest that project risks including macroeconomic risk, political risk and currency risk are important factors for project companies to determine (1) the organization structure for financing (project finance vs. conventional corporate finance); (2) the arrangements of major contracts (contract with offtake, construction and supply contract, and operation and maintenance contract); (3) the ownership type or governance structure (seeking or not seeking government support, and adopting PPP or BOO); and, (4) bond issuance decisions of large-scale projects.

In sum, there is no single universal model that is versatile for all projects across the globe. For example, although PPP has received growing attention in recent years, especially in emerging markets like China, the empirical results indicate that project companies in the countries with greater political risk, in fact, prefer BOO to PPP ownership structure. In addition to the competitive strategies in project finance mentioned above, we recommend the UGC-funded universities in Hong Kong and the Government to have more “proactive”

involvement in project finance education. A detailed Talent Enhancement Scheme for the project finance sector is also developed for the Government's consideration.

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Appendices

Appendix A: List of One Belt One Road Countries by Region

The following table lists China and the other 79 OBOR countries (80 in total) in alphabetical order by region, adhering to the geographic classifications of the World Bank as of August 2018.

Number	Region	OBOR Country
1	East Asia and Pacific	Brunei
2	East Asia and Pacific	Cambodia
3	East Asia and Pacific	China
4	East Asia and Pacific	Indonesia
5	East Asia and Pacific	Laos
6	East Asia and Pacific	Malaysia
7	East Asia and Pacific	Mongolia
8	East Asia and Pacific	Myanmar
9	East Asia and Pacific	New Zealand
10	East Asia and Pacific	Papua New Guinea
11	East Asia and Pacific	Philippines
12	East Asia and Pacific	Republic of Korea
13	East Asia and Pacific	Singapore
14	East Asia and Pacific	Thailand
15	East Asia and Pacific	Timor-Leste
16	East Asia and Pacific	Vietnam
17	Europe and Central Asia	Albania
18	Europe and Central Asia	Armenia
19	Europe and Central Asia	Austria
20	Europe and Central Asia	Azerbaijan
21	Europe and Central Asia	Belarus
22	Europe and Central Asia	Bosnia and Herzegovina
23	Europe and Central Asia	Bulgaria
24	Europe and Central Asia	Croatia
25	Europe and Central Asia	Czech
26	Europe and Central Asia	Estonia
27	Europe and Central Asia	Georgia
28	Europe and Central Asia	Hungary
29	Europe and Central Asia	Kazakhstan
30	Europe and Central Asia	Kyrgyzstan
31	Europe and Central Asia	Latvia
32	Europe and Central Asia	Lithuania
33	Europe and Central Asia	Macedonia
34	Europe and Central Asia	Moldova
35	Europe and Central Asia	Montenegro

36	Europe and Central Asia	Poland
37	Europe and Central Asia	Romania
38	Europe and Central Asia	Russia
39	Europe and Central Asia	Serbia
40	Europe and Central Asia	Slovakia
41	Europe and Central Asia	Slovenia
42	Europe and Central Asia	Tajikistan
43	Europe and Central Asia	Turkey
44	Europe and Central Asia	Turkmenistan
45	Europe and Central Asia	Ukraine
46	Europe and Central Asia	Uzbekistan
47	Latin America and The Caribbean	Antigua and Barbuda
48	Latin America and The Caribbean	Bolivia
49	Latin America and The Caribbean	Panama
50	Latin America and The Caribbean	Trinidad and Tobago
51	Middle East and North Africa	Bahrain
52	Middle East and North Africa	Egypt
53	Middle East and North Africa	Iran
54	Middle East and North Africa	Iraq
55	Middle East and North Africa	Israel
56	Middle East and North Africa	Jordan
57	Middle East and North Africa	Kuwait
58	Middle East and North Africa	Lebanon
59	Middle East and North Africa	Libya
60	Middle East and North Africa	Morocco
61	Middle East and North Africa	Oman
62	Middle East and North Africa	Qatar
63	Middle East and North Africa	Saudi-Arabia
64	Middle East and North Africa	Syrian Arab Republic
65	Middle East and North Africa	Tunisia
66	Middle East and North Africa	United Arab Emirate
67	Middle East and North Africa	Yemen
68	South Asia	Afghanistan
69	South Asia	Bangladesh
70	South Asia	Bhutan
71	South Asia	India
72	South Asia	Maldives
73	South Asia	Nepal
74	South Asia	Pakistan
75	South Asia	Sri-Lanka
76	Sub-Saharan Africa	Ethiopia
77	Sub-Saharan Africa	Madagascar
78	Sub-Saharan Africa	Senegal

79	Sub-Saharan Africa	South Africa
80	No Classification	Palestine

Sources:

Country Profiles, Belt and Road, Hong Kong Trade Development Council (HKTDC). Retrieved on August 23, 2018 from

<http://beltandroad.hktdc.com/en/country-profiles/country-profiles.aspx>.

Country Classification, World Bank Country and Lending Groups, The World Bank. Retrieved on August 23, 2018 from <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

Appendix B: Brief Explanations of Key Terminologies Mentioned in the Report

Terms	Brief Definitions/Explanations	Reference
Project basics:		
Sponsor	A sponsor is the company or individual that coordinates the development of a project and usually provides financial support in the form of equity. A sponsor can be a party with a direct interest in the project such as contractor, supplier, purchaser or user of the project's output or facilities, or it can be a party holding an <i>indirect</i> interest in the project. As long as a company or individual has an <i>equity</i> ownership in the project, that company or individual is considered a sponsor.	TR's PF Guide
Private Finance Initiative (PFI)	This "Private Finance Initiative" scheme is mainly used in the UK and in Japan, for promoting private investment in public sector infrastructure. Private firms will build and operate a facility such as a school or a hospital in exchange for government rent payments.	TR's PF Guide
Major project type/structure of the project:		
Build-Own-Operate (BOO)	Structure under which the sponsor constructs, retains ownership and operates the project. This is the most common type used, especially in power plant projects in the US.	TR's PF Guide
Public-Private-Partnership (PPP)	Structure designed as a joint venture whereby the sponsor (private entity) and government cooperate, each applying its particular strengths, to develop a project more quickly and efficiently than if the government chooses to accomplish this task on its own. This type of partnership is structured so that the private entity is able to make a rate of return that commensurate with what it can earn on alternative projects of comparable risk.	TR's PF Guide
Major contractual agreements		
Concession	The agreement between the host government and the project company or sponsor(s), for the construction, development and/or operation of a project	TR's PF Guide
Offtake contract	A long-term agreement to purchase minimum amounts of the output or services of a project, at an agreed price.	TR's PF Guide
Construction & supply contract	The agreement with the firm engaged by the developer(s) to provide construction and/or supply services for the project or its facilities.	TR's PF Guide

Operation & maintenance contract	The agreement with the firm engaged by the developer(s) to provide operational and/or maintenance services for the project or its facilities after commercial start-up.	TR's PF Guide
Government support level and type:		
Government support	Refers to host government assistance only. Support from supranational agencies such as the World Bank or any regional development bank should not be recorded here.	TR's PF Guide
Government support level (class)	The level of government support given to a project. Depending on the type of assistance, a government support can be Strong, Some or None. The categories are: No Support: Use this only if it is specifically reported as such. Some Support may be Offered: Use this for all other Government Support Types. Strong Level of Support/Subsidies Provided: Use this only if the following Government Support Types are mentioned: Equity Participation, Government Loan, Loan Guarantee-Full and Part, and Subsidy – One time and yearly.	TR's PF Guide
Government support type	Refers to the appropriate host government assistance, directly or indirectly. There are different types of government support. Equity participation is a major type of government support. Equity Participation: An equity stake in the project that is owned by the host government or by a government-owned institution.	TR's PF Guide

Note: TR's PF Guide refers to the Project Finance Guide from Thomson Reuters, 2018.

Appendix C: Brief Definitions of Variables Used in Empirical Models

Variable	Description	Source
Project risk		
GEPU	The log value of the average monthly economic policy uncertainty index in the 12 months prior to the announcement date of a project	Baker, Bloom and Davis, 2016
PRISK	One minus political stability score in a country from World Governance Indicator one year before project announcement date	WGI, World Bank
SOVRATING	Moody's rating of the project host country when a project is announced; the letter grades are converted to numerical values as: Aaa = 21, Aa1 = 20, Aa2 = 19, ..., Ca = 2, C = 1	Moody's
CRISK	Dummy variable equal to 1 if the project currency is not the same as currency of host country	SDC
EBITDAVOL	The volatility of industry-average EBITDA ratio in a country 10 years prior to the year of project announcement	COMPUSTAT
Agency cost		
EBITDA	Industry-average EBITDA ratio by 2-digit SIC in a country in the year before project announcement. The ratio is calculated as the earnings before interest, tax and depreciation to total assets ratio for each company in a country. EBITDA is the mean value of industry average ratio in prior 10 years	COMPUSTAT
PPE	Industry-average of the ratio of Plant, Property & Equipment to total assets in a country	COMPUSTAT
SALEPPE	Industry-average ratio of PP&E sale in the past 3 years over lagged PP&E in a country in the year before project announcement	COMPUSTAT
Project finance characteristics		
PF	Dummy variable equal to 1 if a project is organized by the format of project finance and 0 otherwise	SDC
PUBLIC	Dummy variable equal to 1 if the project sponsors are listed and 0 otherwise	SDC
RATED	Dummy variable equal to 1 if the project sponsors are rated by credit rating agency and 0 otherwise	SDC
CONG	Dummy variable equal to 1 if the project has government concession grant and 0 otherwise	SDC
PFI	Dummy variable equal to 1 if the project is private finance initiative and 0 otherwise	SDC
SIZE	The log value of the project cost in million US\$	SDC
OFFTAKE	Dummy variable equal to 1 if a project has offtake contract and 0 otherwise	SDC
CONSUP	Dummy variable equal to 1 if a project has	SDC

	construction & supply contract and 0 otherwise	
OPMAIN	Dummy variable equal to 1 if a project has operation & maintenance contract and 0 otherwise	SDC
GOVSUP	Dummies variable equal to 1 if a project obtains the government support and 0 otherwise	SDC
GOVEQT	Dummies variable equal to 1 if a project obtains the government equity participation and 0 otherwise	SDC
PPP	Dummies variable equals to 1 if the ownership structure of a project is public-private-partnership and 0 otherwise	SDC
BOO	Dummies variable equals to 1 if the ownership structure of a project is build-own-operate and 0 otherwise	SDC
BOND	Dummy variable, equal to 1 if a project issues public bond and 0 otherwise. T	SDC
Other variables		
SECTOR	Dummy variable for the industry (sector)	SDC
TREND	Time trend variable	Complied by the authors

Appendix D: Selected Courses, Lecture, and Training Programs

Panel 1: A sample of selected courses, lecture and training programs offered by UGC-funded universities in Hong Kong

University	Faculty / Department offered	Name of the program	Course code and title	Retrieved from/Hyperlink
CityU	College of Business	10-day Training Program on Public-Private Partnership and One Belt One Road	N.A.	http://www.cb.cityu.edu.hk/obor/docs/10day-training-ppp-obor.pdf
CUHK	Faculty of Law	Master of Laws (LLM) in Energy and Environmental Law	LAWS6401 Project Finance and Infrastructure Law	https://cusis.cuhk.edu.hk/ps/c/public/EMPLOYEE/HRMS/c/COMMUNITY_ACCESS.SSS_BROWSE_CATLG.GBL
CUHK	Faculty of Business Administration	Master of Business Administration (MBA)	FINA6227 Project Finance	https://cusis.cuhk.edu.hk/ps/c/public/EMPLOYEE/HRMS/c/COMMUNITY_ACCESS.SSS_BROWSE_CATLG.GBL
HKU	Faculty of Law	Master of Laws	LLAW 6098 Project Finance	https://www.law.hku.hk/syllabuses/LLMCR_2017-18.pdf
PolyU	Department of Building & Real Estate	BRE LECTURE Emerging Practices in Infrastructure PPP Projects	One-time lecture on Dec. 7, 2018	http://www.bre.polyu.edu.hk/BRE_Lecture/07122018/07122018.html

Notes:

CityU = City University of Hong Kong

CUHK = The Chinese University of Hong Kong

HKU = The University of Hong Kong

PolyU = The Hong Kong Polytechnic University

Panel 2: A sample of selected professional training courses offered by global CRA-related groups

Professional training group	Name of the Course	Hyperlink
Fitch Learning, Fitch Group	Fundamentals of Project Finance	https://www.fitchlearning.com/fundamentals-project-finance
Moody's Analytics, Moody's Investors Service, Inc.	Moody's Analytics Project Finance Masterclass	https://www.moodyanalytics.com/-/media/learning-solutions/moodys-analytics-project-finance-masterclass-new.pdf

Appendix E: Poster, Banners and Abstract of the Public Seminar held at LU on October 27, 2018

Poster



CONTACT US PHONE 26168196/ 26168586 EMAIL fin_ins@LN.edu.hk

ALL ARE WELCOME

PUBLIC SEMINAR
 Deriving public policy for Hong Kong as an infrastructure financing hub
 and super-connector in project finance: The Belt and Road Initiative
 (Preliminary Findings)

DATE
27 October 2018, Saturday

TIME
12:00 - 13:00

VENUE
Mini Theatre, 2/F, Fong Sum Wood Library, Lingnan University

LANGUAGE
English

REGISTRATION LINK
<https://goo.gl/ra3zks>

SPEAKER
Dr. Winnie P.H. POON
(Associate Professor,
Department of
Finance and Insurance,
Lingnan University)

Acknowledgement
This research project (Project Number: 2016.A3.008.16D) is funded by the Public Policy Research Funding Scheme from Policy Innovation and Co-ordination Office of the Hong Kong Special Administrative Region Government.





 **Lingnan** 嶺南大學
University 香港


 鄺森活圖書館
Fong Sum Wood Library

 **FINANCE & INSURANCE**
LINGNAN UNIVERSITY

Banner 1


Lingnan 嶺南大學
University 嶺南 Hong Kong


鄭森活圖書館
Fong Sum Wood Library


FINANCE & INSURANCE
LINGNAN UNIVERSITY



Public Seminar

Deriving public policy for Hong Kong as an infrastructure financing hub and super-connector in project finance: The Belt and Road Initiative (Preliminary Findings)






Speaker:

Dr. Winnie P.H. POON,
Associate Professor,
Department of Finance and Insurance, Lingnan University

 **Date:** Saturday, October 27, 2018
 **Time:** 12:00 noon - 1:00 pm
 **Venue:** Mini Theatre, 2/F Library, Lingnan University
 **Language:** English

Contact phone: 26168196 / 26168586
Contact E-mail: fin_ins@LN.edu.hk

Acknowledgement
 This research project (Project Number: 2016.A3.008.16D) is funded by the Public Policy Research Funding Scheme from Policy Innovation and Co-ordination Office of the Hong Kong Special Administrative Region Government.

Banner 2


Lingnan 嶺南大學
University 香港 Hong Kong


鄭森活圖書館
Fong Sum Wood Library


FINANCE & INSURANCE
財政及保險學系
LINGNAN UNIVERSITY

Public Seminar

Deriving public policy for Hong Kong as an infrastructure financing hub and super-connector in project finance: The Belt and Road Initiative (Preliminary Findings)

Speaker:
Dr. Winnie P.H. POON, Associate Professor, Department of Finance and Insurance, Lingnan University

Date: Saturday, October 27, 2018

Time: 12:00 noon - 1:00 pm

Venue: Mini Theatre, 2/F Library, Lingnan University

Language: English

Acknowledgement
This research project (Project Number: 2016.A3.008.16D) is funded by the Public Policy Research Funding Scheme from Policy Innovation and Co-ordination Office of the Hong Kong Special Administrative Region Government.

Contact phone: 26168196 / 26168586
Contact E-mail: fin_ins@LN.edu.hk

Public Release

Deriving public policy for Hong Kong as an infrastructure financing hub and super-connector in project finance: The Belt and Road Initiative (Preliminary Findings)

Winnie P.H. Poon

Department of Finance and Insurance, Lingnan University

Jianfu Shen

Department of Economics and Finance, Hang Seng Management College

Abstract

The action plan on the One Belt One Road (OBOR) Initiative (or Belt and Road Initiative) entitled ‘*Vision and Actions on Jointly Building the Silk Road Economic Belt and 21st Century Maritime Silk Road*’ was unveiled in 2015. The importance of this Initiative was explicitly highlighted in the ‘*Outline of the 13th Five-Year Plan for the National Economic and Social Development*’ (the 13-5 Plan) in 2016. This proposed strategic Initiative is currently of primary national importance in China’s global economic development plan, as it covers many countries and involves a huge amount of capital investment in a number of large-scale infrastructure projects. Although it has extensive economic significance, limited “empirical” research has been conducted into developing competitive strategies and public policies to support Hong Kong’s transition into an infrastructure financing hub in supporting the OBOR Initiative.

To address this gap and enlighten policymakers developing long-term public policies to support the OBOR Initiative, we make the following contributions to current scholarship and public policy development. First, we develop competitive strategies and viable methods for transforming Hong Kong into an infrastructure financing hub by conducting (a) qualitative analysis of international best practices and successful cases; and (b) quantitative and econometric analyses using comprehensive project finance and syndicated loan databases. Second, we are inspired to identify the public policy implications of the development of Hong Kong as an infrastructure financing hub in project finance.

From the preliminary findings using the US sub-sample, we find that economic policy uncertainty based on Baker, Bloom and Davis (2016) is negatively associated with investments in large-scale projects. Project companies tend to adopt project finance rather than conventional corporate finance when the economic policy uncertainty is higher. However, our results suggest that the adverse effect of economic policy uncertainty can be mitigated by the structuring of the contractual arrangements and governance of the projects. Although government support plays an important role in capital-intensive investments, project companies are inclined to adopt the build-own-operate project structure when they confront with substantial uncertainty.

Acknowledgement

This research project (Project Number: 2016.A3.008.16D) is funded by the Public Policy Research Funding Scheme from Policy Innovation and Co-ordination Office of the Hong Kong Special Administrative Region Government.

Appendix F: Poster and Abstract of the Academic Seminar held at CUHK on November 1, 2018

The Chinese University of Hong Kong
Department of Geography and Resource Management
Institute of Future Cities
jointly organize a seminar
by
Dr. Jianfu Shen
Assistant Professor
Department of Economics and Finance
Hang Seng Management College

**The Impact of Economic Policy Uncertainty
on Investment in Large-Scale Projects**

Abstract:
This study explores the impacts of economic policy uncertainty on investment in large-scale projects in the US. The uncertainties regarding fiscal policy, monetary policy, tax, CPI, government spending and regulation reduce corporate investments and related activities such as mergers and acquisitions. Our study shows that economic policy uncertainty is negatively associated with the investments in large-scale projects in the US. However, the adverse effect of economic policy uncertainty can be mitigated by the design of the organization structure, contractual arrangements and governance structure of the projects. We find that project companies tend to adopt project finance rather than conventional corporate finance when the economic policy uncertainty is higher. Contractual arrangements of the project can help spread the risks amongst the parties involved and thereby alleviate the negative effects of economic policy uncertainty. Although government support plays an important role in capital-intensive investments, project companies are inclined to adopt the build-own-operate (BOO) project structure when they confront with substantial uncertainty.

About the Speaker:
SHEN Jianfu, Jeff is Assistant Professor at the Department of Economics & Finance, Hang Seng Management College. Dr Shen completed his PhD degree in Real Estate Finance from The University of Hong Kong. He was a visiting scholar at the University of Connecticut, and worked at the School of Accounting & Finance, The Hong Kong Polytechnic University. He is also a certificated FRM and CFA charter holder. His research interests lie in project finance, fundamental analysis, institutional investment, credit rating, real estate, and China's capital market. His works appear in finance and real estate journals, including Financial Review, Pacific-Basin Finance Journal, European Journal of Finance, Journal of Real Estate Finance and Economics, Journal of Property Investment and Finance and others. He also obtains two research grants as PI from Research Grant Committee, Hong Kong, and one grant as Co-I from Public Policy Research Funding Scheme, Central Policy Unit, Hong Kong.

Language: English
Date: 1 November 2018 (Thursday)
Time: 4:30-6:00pm
Venue: Room 221
Chen Kou Bun Building
Chung Chi College

~All are Welcome~

For any inquiries, please contact Prof. Li Jing (Tel. 3943 6537 or Email: victorli@cuhk.edu.hk).





Abstract

The Impact of Economic Policy Uncertainty on Investment in Large-Scale Projects

Winnie P.H. Poon

Department of Finance and Insurance, Lingnan University

Jianfu Shen

Department of Economics and Finance, Hang Seng Management College

Abstract:

This study explores the impacts of economic policy uncertainty on investment in large-scale projects in the US. The uncertainties regarding fiscal policy, monetary policy, tax, CPI, government spending and regulation reduce corporate investments and related activities such as mergers and acquisitions. Our study shows that economic policy uncertainty is negatively associated with private sector investments in large-scale projects in the US. However, the adverse effect of economic policy uncertainty can be mitigated by the design of the organization structure, contractual arrangements and governance structure of the projects. We find that project companies tend to adopt project finance rather than conventional corporate finance when the economic policy uncertainty is higher. Contractual arrangements of the project can help spread the risks amongst the parties involved and thereby alleviate the negative effects of economic policy uncertainty. Although government support plays an important role in capital-intensive investments, project companies are inclined to adopt the build-own-operate (BOO) project structure when they confront with substantial uncertainty.

Acknowledgement

This research project (Project Number: 2016.A3.008.16D) is funded by the Public Policy Research Funding Scheme from Policy Innovation and Co-ordination Office of the Hong Kong Special Administrative Region Government.

*****End of Report*****