The Effects of Public–Private Partnerships on Partnering Private Sector Firms

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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Table of Contents

List of Figures

List of Tables

Abstract

Despite an increase in governments' demand for private participation in infrastructure, Public–Private Partnerships (PPPs) have received low engagement from the private sector in the task of bridging infrastructure gaps in emerging markets. Previous literature in the field mainly focuses on the effects of PPPs from the governments' perspective and it is inconclusive in its examination of the advantages and disadvantages of the private sector's participation. This thesis addresses these issues by answering three main research questions: (i) Do PPPs benefit partnering private sector firms? (ii) Does higher reliance on the government in PPPs benefit partnering private sector firms? and (iii) Does the relationship between institutional quality and PPP projects benefit partnering private sector firms?

Based on corporate finance and incomplete contract theories, PPPs, with their readily costless pledgeable government assets and government guarantee, are hypothesized to reduce capital constraints faced by private sector firms compared to their non-PPP counterparts. My study analyzes firm market valuation, investment–cash flow sensitivity, bank lending and their determinants for partnering private sector firms.

My main findings are as follows: (i) PPP announcements create positive abnormal return for partnering private sector firms in China and India. In the long run, PPP involvement reduces investment–cash flow sensitivity in both countries' private sector firms. Especially, PPP private sector firms with political connections can achieve better bank financing in both economies, and this situation is even more robust under the effects of the election event in India; (ii) high reliance on government through government equity participation, political connections and contract mechanisms are more beneficial in China compared to those in India in terms of reducing capital constraints. This aligns with the evidence of increasing overinvestment problems in PPP politically connected firms in India; and (iii) the benefits of lower capital constraints and increased firm value through PPP investments are more pronounced in mature economies with high institutional quality.

To my best knowledge, the study is the first comprehensive study on the effects of PPPs on partnering private sector firms using the corporate finance dimension. It contributes to the extant debatable literature on the role of PPPs, reliance on governments, contract mechanisms and institutional quality on private sector firms. It provides insights on the possible benefits of these unique contractual agreements and attempts to answer the question of whether the

intended purpose of reducing underinvestment in the private sector can be fulfilled through PPP contracts. It also contributes to the extant literature on corporate investment decisions and investment efficiency. Moreover, it sheds light on the extant debate on social lending objectives, political corruption views and the role of political connection and institutions. My study provides important guidance on the direction and viability of PPPs in China and India and is extensively applicable to other economies, depending on their PPP market maturity and institutional quality

Chapter 1

Introduction

Countries around the world are facing a serious infrastructure gap that hinders global development. It has been estimated that if infrastructure investment is less than US$ 57 trillion in the years from 2013 to 2030, the world economy will not able to keep up with the projected global Gross Domestic Product (GDP) growth (Dobbs et al., 2013). This amount is 60% more than all the value of investment in infrastructure over the past 18 years. Given the increasing public deficit and the constraints on commercial debts owing to recent financial crises, Public–Private Partnerships (PPPs) have an increasingly important role to play in alleviating the deficiencies in infrastructure. In recent times, China's "One Belt, One Road" initiative has been a massive example of PPPs aiming to mobilize public and private sectors jointly to create close economic ties through multiple infrastructure projects between China and Europe via countries in Eurasia and the Indian Ocean. However, the low engagement of the private sector, especially in emerging markets, provoke the question of whether partnering private sector firms have enough appetite for engaging in PPPs. Existing literature focuses on the effects of PPPs on the public sector. In the remaining less-explored side of these partnerships, there is inconclusive evidence on the gains and losses of the private sector. The main aim of my thesis is to understand whether and how such contractual agreements benefit PPP partnering private sector firms.

1.1 Research Motivation

The increasing significance of PPPs around the world provokes a substantial body of literature on PPPs. The specific literature in business, economics and finance focuses on three main features of PPPs. These include (i) the contract design (Bennett and Iossa, 2004; Dewatripont and Legros, 2005; Grossman and Hart, 1986; Hart, 2003), (ii) ownership and risk transfer (Bing et al., 2005; Besley and Ghatak, 2001; Cooper, 2005; Grimsey and Lewis, 2007; Roumboutsos

and Anagnostopoulos, 2008), and (iii) financing (Engel et al., 2010; Yescombe, 2011, e.g). The main aim of the literature is to illustrate that under certain conditions, PPPs, by nature of their unique contract agreements, can bring more benefits than conventional public procurement mechanisms. Therefore, most of the literature on PPPs comes from the government perspective, and there have been increasingly inconclusive findings on the gains and losses of private sector involvement in PPPs (Bennett and Iossa, 2004; Burger and Hawkesworth, 2011; Davies and Eustice, 2005; Dheret et al., 2012; Engel et al., 2008; Hart, 2003; Maskin and Tirole, 2008; Tang et al., 2010; UNESCAP, 2011). More importantly, to my best knowledge, there is virtually no research that examines the corporate finance side of these financial contracts. Meanwhile, understanding the corporate finance side of PPPs can allow us to shed light on whether these unique contractual agreements can reduce the unmet demand for capital in emerging markets. The evidence of such low private sector interest in PPPs motivates me to understand a less-explored rationale for private sector participation in PPP investments.

The literature on the role of government support on firm value is still inconclusive. Especially, it has been increasingly controversial in emerging markets, given the weak institutional environment and the high level of corruption and manipulation that can offset the benefits of government support at the expense of private sector firms (Engel et al., 2010; Ke et al., 2013; UNESCAP, 2011). In this circumstance, private sector firms may pursue political connections for better access to external finance. Social lending is not only one of the ideal forms of preferential treatment to politically connected firms but it also secures the mutual benefits between government and partnering private firms. However, the earlier literature in the field does not justify this motive. The literature supports the political corruption view that social lending leads to social loss since the preferential treatment may only fulfil the mutual benefits between private sector firms and connected politicians (for example, in terms of increasing votes and financial support for election events) (Khwaja and Mian, 2005; Cole, 2009; Dinç, 2005; Sapienza, 2004). More importantly, existing empirical literature uses general corporate lending for testing the social lending view; however, general corporate lending may not be clearly aligned with social objectives. Also, PPP contract mechanisms are considered as the other indirect methods to

secure government reliance and its related benefits; however, the previous literature primarily investigates factors driving the choices of contracts, little attention has been given to the effects of contract mechanisms on firm value (Besley and Ghatak, 2001; Engel et al., 2010; Ke et al., 2013; Iossa and Martimort, 2012; Maskin and Tirole, 2008; UNESCAP, 2011).

In relation to the effects of institutional quality, earlier literature finds it difficult to tease out whether the variations in private firms' benefits across economies are led by the "law–finance–growth" nexus[1] (Porta et al., 1997; López de Silanes et al., 1998) or the "political-tie" explanation[2] (Pistor et al., 2000; Claessens et al., 2008; Cull and Xu, 2005; Faccio et al., 2006; Faccio, 2010; Khwaja and Mian, 2005). Moreover, when it comes to PPPs, the previous literature attempts to explore the factors in institutional quality that are driving the choice of PPP projects and which increase their success rate in macro-level (country-level) analyses. In the literature, there is less discussion at a micro level that explores how institutional quality influences partnering private sector firms.

China and India command a lion's share in infrastructure projects with active private sector participation. PPP investments in China and India account for about 30% of the total number of PPP projects and 21% of total investments in developing countries in 2016 (World Bank Group, 2016*b*). However, the emergence of PPPs in China and India cannot bridge the infrastructure gap. While each country demanded a huge amount of more than $US one billion for infrastructure until 2015, only about 15% and 40% of the funding for infrastructure came from private investors in China and India, respectively in around 2012 (Bellier, 2003; Hongyan, 2010; Lakshmanan, 2008; High Level Committee on Financing Infrastructure, 2012; Wilkins et al., 2014). The shortage of private commitment in infrastructure motivates research on discovering the possible benefits of private sector firms through PPP investments in China and India. However, the empirical literature on PPPs focuses more on project-level analyses, and there has been scant comprehensive empirical research on how PPP influence partnering private sector firms in separate country, or more systematically, cross-country analyses. Additionally, most

[1]This nexus implies that the effectiveness of legal institutions and financial systems, which focus on strong protection of private properties, help to increase external financing.

[2]This explanation suggests that political connections work as an alternative channel to help firms secure their external financing.

of the empirical research on PPPs uses qualitative methods, including interviews, surveys and case studies with a small sample size, so it is difficult to encounter problem generalization. Few studies have been conducted using quantitative methods (Tang et al., 2010). The low level of interest shown by the private sector to PPPs in the reality and the low level of research devoted to the corporate finance side of PPP-invested private sector firms motivates the focus of my study. I investigate the less-explored rationale for private firms participating in PPPs and more importantly, their associated gains and losses in such a high risk social venture.

1.2 Research Objectives, Research Questions and Main Findings

The main aim of this thesis is to provide robust empirical analyses on whether and how Public–Private Partnerships benefit partnering private sector firms from the corporate finance perspective. The thesis is broken down into the following objectives:

The first objective is to evaluate the effects of PPPs on partnering private firms. This is conducted by investigating the nature of private sector firms that opt for PPPs and the associated benefits of these firms compared with their non-PPP competing counterparts. This evaluation is conducted by using 169 and 215 PPP projects (1988–2013) for China and India, respectively during the time that the firms engaged in PPP investments and during their long-term post-PPP period.

The second objective is to assess the role of government support for PPP-partnering private firms. My study examines whether and how government support can increase private sector firms' investment efficiency in the economies that face capital constraints due to low institutional development. More importantly, my study tests the Social Lending Objectives to examine whether such preferential treatment towards the private sector also enhances social welfare by encouraging banks to efficiently allocate capital to those with high growth opportunities

The third objective is to identify how institutional quality influences PPP benefits for private

sector firms. Initially, my study examines how institutional quality affects the Chinese and Indian private sector firms. Furthermore, my study, by using 625 PPP projects (1980-2015), extends to an inter-country analysis that straddles nine economies (namely the UK, Australia, Canada, the US, Japan, Brazil, Russia, India and China) at varying degrees of economic and PPP development. The aim here is to deeply understand how the variations in institutional quality across economies can explain the cross-sectional variation related to the benefits of PPP contracts.

To achieve these objectives, the main research questions are as follow:

Question 1. Do Public–Private Partnerships benefit partnering private firms?

1a. Do PPP announcements add value to partnering private firms?

1b. Do PPP investments reduce investment–cash flow sensitivity of partnering private firms?

1c. Do PPP investments increase partnering private firms' access to bank loans?

Question 2. Does higher reliance on the government benefit private sector firms?

2a. Does higher government equity participation reduce capital constraints for private sector firms?

2b. Do political connections reduce capital constraints for private sector firms?

2c. Do the variations in the contract mechanism explain the cross-sectional variation related to the benefits of PPP contracts?

Question 3. Does the relationship between institutional quality and PPP projects benefit partnering private sector firms

My main findings are as follows:

(i) PPP announcements create positive abnormal returns for partnering private sector firms in China and India; however, the nature of firms that undertake PPP projects varies. In China, older, matured, and better-valued firms with high cash inflows, compared to their non-PPP counterparts, engage in PPPs while in India, younger and cash-constrained firms with higher debt burdens engage in PPPs. This indicates that unlike in China, PPP investments in India are mainly driven by the underinvestment problem. In the long run, PPP involvement reduces investment–cash flow sensitivity in both countries' private sector firms. Especially, PPP private

sector firms with political connections can achieve better bank financing in both economies, and this situation is even more robust under the effects of the election event in India;

(ii) High reliance on government through government equity participation, political connections and contract mechanisms are more beneficial in China compared to those in India in terms of reducing capital constraints. This aligns with the evidence of increasing overinvestment problems in PPP politically connected firms in India;

(iii) The benefits of lower capital constraints and increased firm value through PPP investments are more pronounced in matured economies with better institutional quality.

1.3 Research Contributions

1.3.1 Theoretical Contributions

My thesis contributes to the following important theoretical streams of literature.

First, my study adds to the literature that investigates PPP benefits and associated partnering parties. A growing body of literature compares the effects of PPPs with those of traditional public procurement (UNESCAP, 2011; Maskin and Tirole, 2008), my study, from the private sector's perspective, evaluates how PPPs influence the partnering private sector firms. More importantly, although the literature mentions several factors influencing partnering firms, such as general political risk, transaction cost or the theory of project finance as in Engel et al. (2013), Hwang et al. (2013) and Yescombe (2013), I contribute to the inconclusive literature on the relationship between PPPs and their related private parties by stating an argument that PPPs, with costless pledgeable government assets and guarantees, can reduce the dependence on internal cash flow faced by private sector firms; by doing this, PPP partnering firms can outperform their non-PPP counterparts in terms of investment efficiency. Therefore, my study provides insights on the possible financial benefits of these unique contractual agreements in addition to those explained by the project finance theory of Yescombe (2013) in the previous

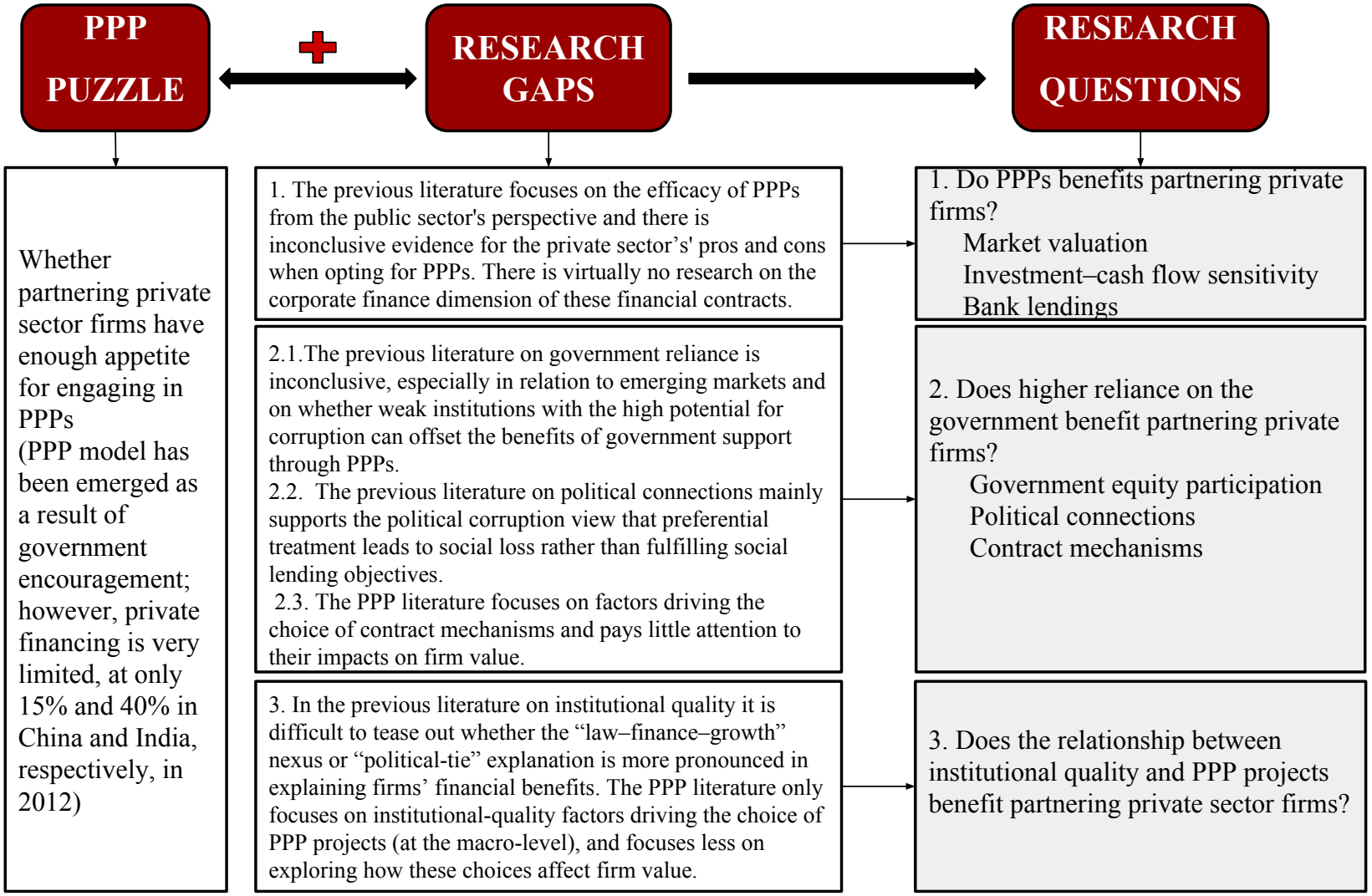


Figure 1.1: Research Framework

literature.

Second, my study fills the gap in the corporate finance literature on the role of PPPs, government reliance and contract mechanisms on partnering private sector firms. To my best knowledge, this is the first study on how PPPs influence PPP-invested firms in the corporate finance dimension. The previous literature on financial constraints indicate two possible channels, explained by the theory of information asymmetries between shareholders and debtholders as in Myers and Majluf (1984) and the theory of agency problems between managers and shareholders as in Jensen and Meckling (1976), that may distort firms' behavior in financing for their projects in terms of underinvestment or overinvestment in the context of market imperfection. My study extends the corporate finance literature by making an argument that, in emerging markets, there is every chance that cash-rich private sector firms with political connections can influence and secure PPP contracts. Therefore, given increased dependence on internal cash flow in the politically connected firms under the influence of PPPs, my study adds another channel responsible for causing firms' investment behavior distortion. That is, the dominance of related politicians or state representatives in PPP firms may lead PPP firms to overuse their free cash flow to pursue political/social goals at the expense of shareholders, which may reduce investment efficiency and increase capital constraints.

Third, my study contributes to the debate in the literature on the role of government support for firms' financing conditions. The previous literature on government involvement is inconclusive about which of the following is a better choice for private sector firms: high reliance on the government (e.g. obtaining public investment, government loan guarantees or securing political ties such as in Engel et al. (2010) and UNESCAP (2011)); or independence on the government, which can prevent corruption and high transaction costs as discussed in Ke et al. (2013). My study extends this literature by arguing that the effectiveness of such financial benefits through government reliance depends on the political setup in the economies. For example, the unitary polity with a stable centrally run state is proposed to let government interference be more active and effective, while the federalism with a two-level hierarchy lessens the chance of manipulation and of backing support for politically connected firms. As a result,

the political setting is assumed to work as a mediator for the effects of government support for PPPs.

Fourth, my study contributes to extant literature on the relationship between institutions, contract mechanism and PPPs. Existing studies explore institutional factors driving the choice of PPP contract mechanisms and increasing their success rate at the country level (e.g. Bajari et al., 2008; Chan et al., 2010; Chong et al., 2012; Hovakimian, 2009; Hwang et al., 2013). In contrast, my study aims at understanding how institutional quality and contract mechanisms influence PPP partnering private sector firms' performance. Hence, my study sheds light on which given institutions and which kinds of contractual agreements can bring more benefits to private sector firms.

1.3.2 Methodological Contributions

First, my study on PPPs provides a better setting, using robust methods to test the Social Lending Hypothesis (SLH) under the effects of political connections by comparing PPP private sector firms with their non-PPP competing counterparts. Existing studies use the general corporate lending by banks as a sample to test SLH; however, the general corporate lending may not be aligned with social objectives, resulting in a higher probability of SLH being rejected and the "Political Corruption" hypothesis being supported, such as in Cole (2009) and Khwaja and Mian (2005). These studies suggest that political connections may lead to the overall social losses since related politicians focus on their own benefits. My study chooses for its sample PPPs with a clear alignment to social values since the private sector may take over inefficient government projects that are expected to result in higher overall social welfare. Therefore, this allows me to shed light on whether the preferential treatment of politically connected firms can align with social objectives or whether it serves only to pursue the rent-seeking and collusive views of private sector firms and the politicians who support these firms.

Second, the previous literature finds it difficult to tease out whether the law–finance–growth nexus, which aims at high protection of private properties and low public expropriation (e.g.

Beck et al., 2003; Berkowitz et al., 2015; Claessens and Laeven, 2003; Porta et al., 1996) or the political-tie hypothesis, which focuses on pursuing politically-backed support (e.g. Pistor et al., 2000; Chen et al., 2014; Claessens et al., 2008; Cull et al., 2015; Faccio, 2010) is more pronounced in explaining firms' financial benefits. However, while the literature uses general corporate investment as a sample; this kind of investment may not align with political preference. When testing the effects of the legal framework, PPPs provide a greater platform for the activation of political connections since there is a direct cooperation for mutual benefits between the government and private sector firms. Also, political connections are considered as the mechanism to smoothen complex and high-risk PPP projects. Moreover, my analysis on institutions has been conducted across nine countries at varying degrees of institutional quality, whether this be a high level institution aiming to improve stability, accountability and equality between the public and private sector or an institution based on political connections or government-backed support for firms' development. Therefore, my study provides a better setting for testing whether the law–finance–growth nexus or the political-tie hypothesis is more pronounced in explaining why private sector firms undertake PPP investments.

Finally, my study is one of the first comprehensive studies on PPPs using a unique firm-level dataset on private sector firms from both the largest developed and the largest emerging markets. While earlier studies focus on developed economies, my study contributes to the extant PPP literature by providing important guidance on the direction and viability of PPPs in emerging markets as well as being extensively applicable to other economies with a given PPP market maturity and institutional quality. Moreover, owing to the variety of trends in the development of PPPs around the world, the empirical literature on PPPs states that cross-jurisdictional evaluation may be problematic due to different legal frameworks and tendering processes; therefore, they may evaluate each country separately. I overcome these differences by including in the baseline regressions some controlled variables for industry and country effects, which enable me to conduct a comprehensive inter-country analysis on PPPs.

1.3.3 Practical Contributions

First, my findings offer insights on the unique financial benefits and risks and their determinants in relation to partnering private firms. This has implications for partnering firms when evaluating corporate financial issues of each PPP investment, and thereby considering whether they should engage in PPPs based on a given set of assessment criteria in the corporate finance dimension. It should be highlighted from my study that the firms' desire to eliminate financial constraints and increase market valuation is far from straightforward. The firms depend much more on the nature of private sector firms and the interference of government in given institutional settings. Hence, my study suggests the kinds of support partnering firms should request from governments to ensure the firms' commitment and future success. For example, political connections should be exercised with more caution. In the unitary polity that has one stable centre party as in the Chinese markets, seeking for government investments or political ties may help PPP-invested firms be less reliant on their internal cash flow and increase access to bank lending. On the contrary, in the federal system as in the Indian economies, political connections, in some cases, may not work well and may have an adverse affect on firms. Politically connected firms may be even worse off in terms of investment–cash flow sensitivity since they may suffer from overinvesting their free cash flow in the interest of the firms' related politicians.

Second, since my findings offer important guidance on the direction and viability of PPPs in given economies, my study has implications for investors who are considering investment in a firm with PPP-related activities. Additionally, my findings offer guidance on how investors can position themselves so as to seize PPP investment opportunities. My findings also focus on the kinds of factors that constitute both the firms characteristics and governments' involvement and institutions. These are key factors that investors should take into account in their attempt to fulfil investment goals. For example, in China, larger, more mature and better-valued private sector firms with high government-backed support will have opportunities to achieve higher PPP benefits, which may in turn generate more potential future return for their investors. Whereas in India, there may still be the opportunity for investors to get long-term returns from

high debt-burden firms who are willing to engage in PPPs since PPPs help them reduce their underinvestment; however, these benefits may be viable for those firms with low government involvement.

Finally, my study has implications for governments, given their attempts to attract more private firms to participate in PPPs. My findings on the direction and viability of PPPs offer guidance for governments on which private sector firms are most attracted to PPPs and what added criteria governments should use to select these kinds of firms. Furthermore, my findings suggest some institutional agendas and resources that the government may focus on when establishing and adjusting their policies for PPP encouragement. For example, in the case of the Chinese economy, the political stability and the high quality of regulation with its aim of promoting private benefits are key issues for enhancing partnering private firms' success in gaining market return and reducing financial constraints. In contrast, for the Indian economy, a democracy that is less reliant on the government and the improvement of accountability are high priorities for the Indian government.

1.4 Structure of the Thesis

The thesis is comprised of six chapters.

Chapter 1 is an introduction that outlines the thesis' research motivation, research objectives and questions, research contributions, and the structure of my thesis.

Chapter 2 indicates the definitions, characteristics and background of PPPs and provides a brief overview of the literature on the economics of PPPs (the economic-based theories for PPP justification). It then reviews the PPP literature and emphasizes the effects of PPPs and their associated factors in relation to partnering private sectors firms. This chapter aims to generate the research gaps from the relevant PPP literature.

Chapter 3 forms the first major empirical chapter to investigate how PPPs and their related factors influence the investment–cash flow sensitivity and market valuation of partnering

private sector firms in China and India. The chapter presents an overview of the literature on the relationship among investment decisions, investment efficiency, and market valuation, along with the literature on the role of government reliance to develop hypotheses. It also provides the data, methodology, empirical results and main highlighted findings.

Chapter 4 forms the second major empirical chapter to investigate how PPPs and their related factors influence bank lending of partnering private sector firms in China and India. This chapter especially focuses on the following issues: how political connections increase private sector firms' access to bank loans and the subsequent influence of these connections on welfare. The chapter covers the literature review and hypothesis development on bank lending in emerging markets under the political-connection influences, the methodology and data, the main empirical results, and the discussion.

Chapter 5 forms the third major empirical chapter to investigate how institutional quality moderates the benefits associated with PPP investments of partnering private sector firms. It is conducted as a cross-country analysis for both developed and emerging economies (which also includes the Chinese and Indian firms) with different institutional quality and PPP market maturity. This chapter presents a brief overview of PPP development stages around the world, the literature review on how institutional quality influence firm financing capabilities and firm value, the methodology and data, the main empirical results, and the discussion.

Chapter 6 concludes with an overview of my thesis, the main findings, the contributions to the literature, and the implications of my thesis along with its limitation and suggestions for further studies.

1.5 Research Timeline

The participation in conferences during my PhD is as follows:

Chapters 1 and 2 are presented at the 15th International Business and Economy Conference, Nurtingen-Geislingen University, Nurtingen, Stuttgart Metropolitan Region, Germany.

Chapter 3 is presented at the 28th Asian Finance Association (AsiaFA) Annual Meeting, Bangkok, Thailand.

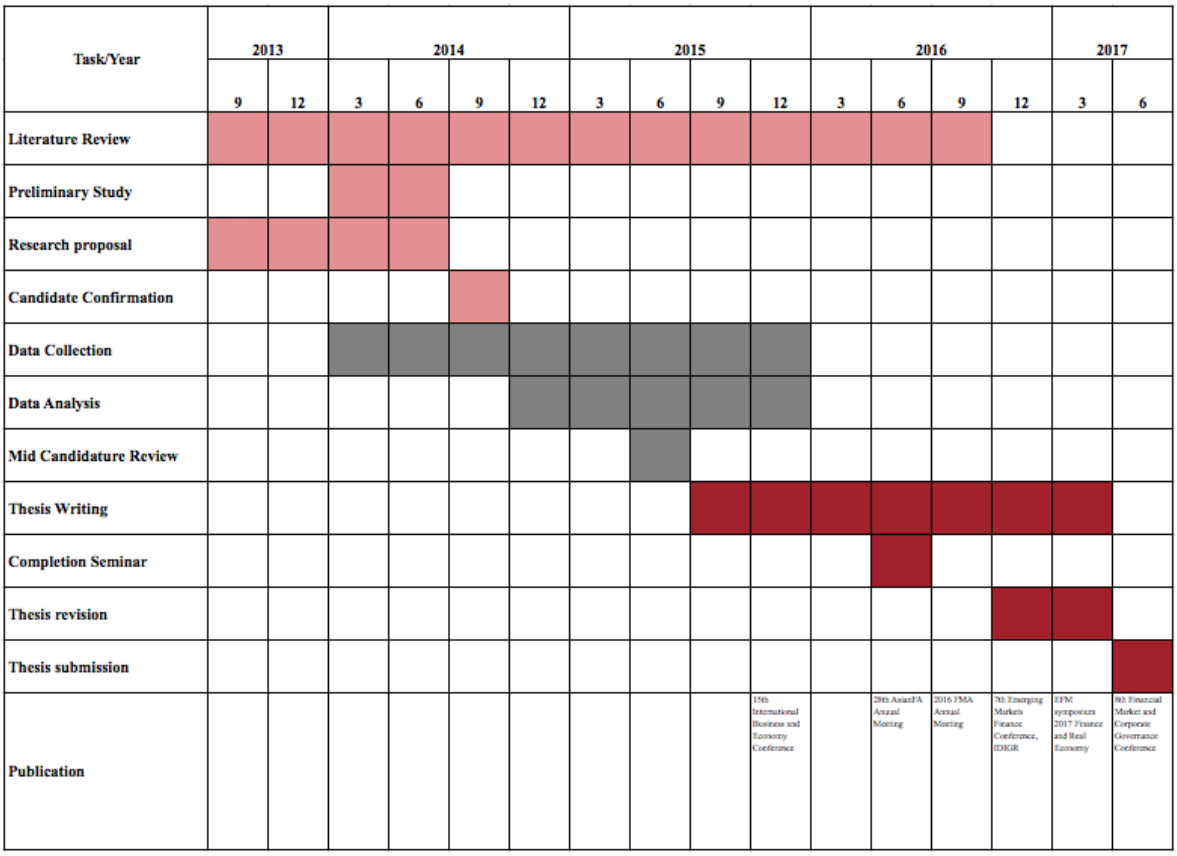
Chapter 3 is also presented at the 2016 Financial Management Association (FMA) Annual Meeting, Las Vegas, Nevada, the United States.

Chapter 4 is presented at the 7th Conference on Emerging Markets Finance, Indira Gandhi Institute of Development Research, Bombay, India.

Chapter 4 is also presented at the European Financial Management (EFM) Symposium: Finance and Real Economy, Xiamen University, China.

Chapter 5 is presented at the 8th Financial Market and Corporate Governance, Victoria University of Wellington, New Zealand.

Figure 1.2: Research Timeline



Chapter 2

Background and Literature Review on Public–Private Partnerships

2.1 Introduction

This chapter discusses the definitions and characteristics of Public–Private Partnerships (PPPs), indicates the background on PPPs and provides a brief overview of the literature on the economics of PPPs (the economic-based theories for PPP justification). It then reviews the PPP literature and emphasizes the effects of PPPs and their associated factors on partnering private sectors firms to generate the research gaps in the PPP literature.

2.2 Definitions and Characteristics of Public–Private Partnerships

There are many definitions of PPPs, depending on the form of the PPP contracts. PPP is a form of cooperation between public authorities and economic operators which aims to ensure the funding, construction, renovation, management or maintenance of an infrastructure or the provision of a service (European Commission, 2004). The National Council for Public–Private Partnerships of the United States of America defines a Public–Private Partnership as a "contractual arrangement between a public sector agency and a for-profit private sector developer, whereby resources and risks are shared for the purpose of delivery of a public service or the development of public infrastructure"(Akintoye et al., 2008, p.4).

PPPs can be considered as the middle path between public procurements and privatization

programs. Engel et al. (2010, 2008) emphasize the four main characters of PPPs, comprising (i) the bundling of contracts, (ii) private temporary ownership of assets, (iii) inter-temporal risk sharing, and (iv) project finance.

First, PPPs bundle contracts in a similar manner to private firms, which means that the private sector is responsible for the financing, construction and operation of projects. PPPs differ from traditional public procurement where separate contracting partners, constructors and operators are employed to implement projects. Through bundling, PPPs are able to help in the integration of investment expenditure and life-cycle costs to avoid cost overrun and increase the efficiency of project delivery (Hart, 2003). The level of efficiency in these aspects rises in infrastructure projects, where the levels of initial investment and design can determine future operating and maintenance costs (Engel et al., 2008).

Second, temporary ownership means that the private sector usually takes over control of assets from the government and retransfers them when the contract finishes. This results in more innovation and better management in PPPs than is the case in traditional public procurements, because ownership is granted by the party that has a higher stake in the projects (the private sector) (Besley and Ghatak, 2001; Engel et al., 2010). However, different from privatization programs, PPPs, with the appearance of government assets, allow greater government-backed support, which can lend more credibility to PPP partnering private sector firms from their creditors' perspective.

Third, compared to public provision, where the public sector bears the majority of risks, PPPs have a risk-sharing mechanism that usually ensures that project risk and life cycle cost are transferred partially or wholly to the private sector. However, PPPs might be preferred to fully privatized firms since government active intervention can help reduce demand risk.

Finally, in terms of project financing, PPP projects are developed on the basis of project finance, where the cash flow generated from the projects is the primary source of debt and dividend payments to sponsors (Yescombe, 2013). Therefore, according to Engel et al. (2010), this allows resources not to be diverted from creditors compared to the case of a division in full

privatized firms. To ensure this economically self-contained mechanism, PPPs are implemented via the so-called Special Purpose Vehicle (SPV) (Engel et al., 2010).

The structure of PPP projects and their relationships is presented in Figure 2.1. As illustrated in Figure 2.1, an SPV is set up, owned and operated by the initial sponsors (partnering private firms), and the web of financiers, the government and customers. The private sponsors provide long-term equity capital. The government issues contract agreements and decides on revenue sharing or guarantees and other subsidies. Sometimes, the government also provide an injection of capital to continue maintaining its interest. Under this circumstance, an SPV is framed as a joint venture between the private firms and the government. Financiers provide debt to the project company. The project company repays creditors directly or indirectly via an escrow agent as a third party.

2.3 Background on Public–Private Partnerships

PPPs have a long history of development. PPPs originated early in France in the 17th century via French concession models and continued in the United Kingdom (UK) and the United States (US) in the 18th century via about 2500 private turnpikes (Grimsey and Lewis, 2007). The mid-1990s experienced a surge in PPPs in Europe with two-thirds of projects coming from the UK. Following this trend, some economies, such as those of the US, Australia and Canada, have also emerged as the top PPP drivers in their areas (Kappeler and Nemoz, 2010; Grimsey and Lewis, 2007). Recently, the PPP markets have been reporting more than 30% increases in PPP deal flow in Australia and Canada in financial years between 2011 and 2014 compared with those between 2006 and 2010 (KPMG, 2015). The North Americans have emerged as one of the most attractive PPP markets with the US being projected as the next major global PPP player. The US has high potential investments, with about US$4.59 trillion for total infrastructure needs by 2025 in which a funding gap accounting for about US$2.064 trillion is expected to be delivered by private financing (American Society of Civil Engineers, 2016). It also receives strong political commitment through the new administration's policy agenda

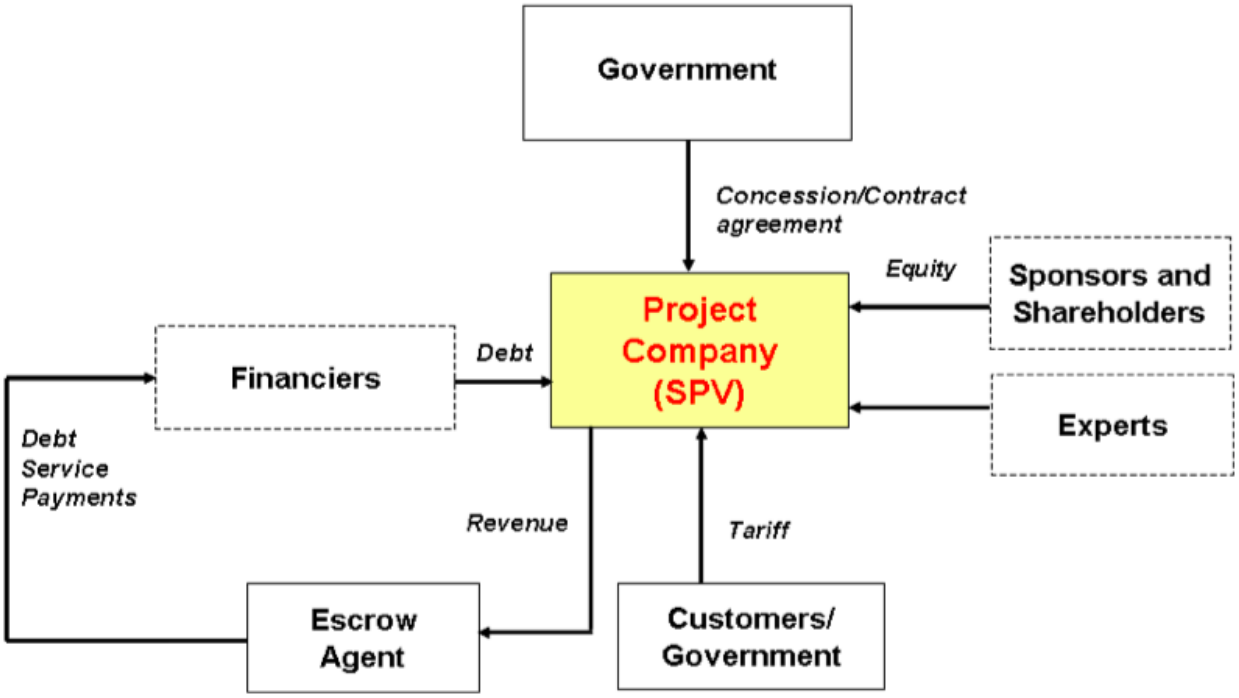


Figure 2.1: Contractual Relationships in an SPV

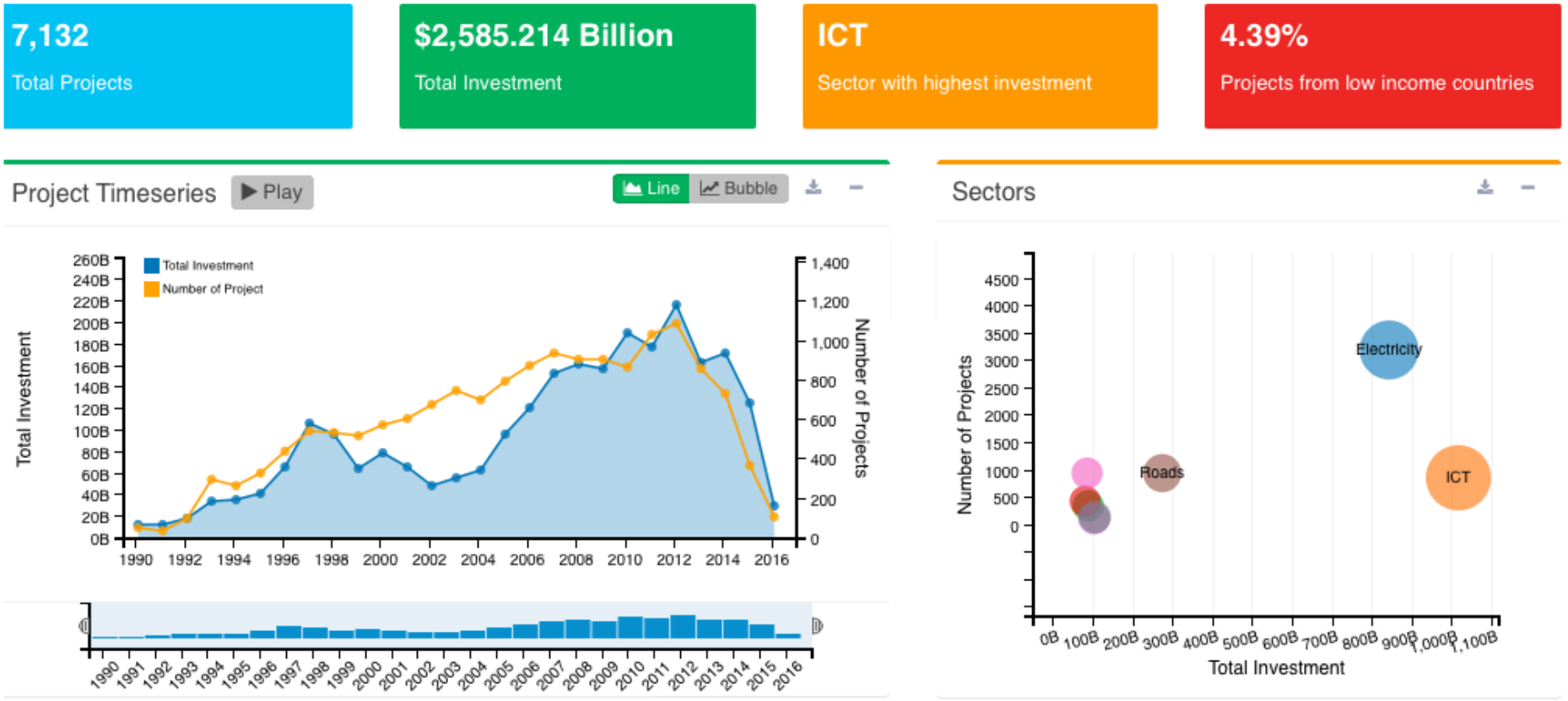
Source: UNESCAP (2011)

confirming that infrastructure upgrades will depend principally on PPPs supported by the use of federal tax credits (PricewaterhouseCoopers, 2016). On the contrary, European countries, like the UK, Portugal and Germany, have witnessed a decline in PPP deal flow after several decades of being the top PPP players. They are now being questioned about their effectiveness by anti-private finance parties (KPMG, 2015). As the opportunities for PPPs in such mature PPP markets decrease, seasonal investors may change their focus to developing economies with their desire to achieve higher return despite the countries' corresponding high risks.

In developing countries, as indicated in Figure 2.2, PPPs started later than those in developed economies, commencing from the 1990s and reaching a peak in both numbers of projects and total investment in 1997 (World Bank Group, 2016*b*). After a considerable reduction in the following five-year period, PPP investment value gradually increased before reaching an all-time high in 2012. It should be noted that, at that time, the total value of projects were estimated at approximately US$217.5 billion, accounting for an amount that was more than 17 times

Figure 2.2: Public–Private Partnerships in Developing Countries

This figure summarizes PPP data on total projects, total investment and sectors in developing economies. It is sourced from the World Bank's Private Participation in Infrastructure (PPI) data visualization dashboard updated in 2016.



Source: World Bank Group (2016*b*)

higher than those in 1990. After that, there was a plunge in total investment with a decline of almost 40% in 2015 compared to 2012 (World Bank Group, 2016*b*). Regarding sector allocation, World Bank Group (2016*b*) reports that while Electricity was the sector with the largest number of PPP projects, Information and Communication Technology was the sector with the highest total investment between 1990 and 2015. This is completely different from those PPPs started in 1990 when most PPP projects came from the transport industry. Additionally, per type of PPPs, greenfield projects continued to comprise almost 60% of the total project value (Public–Private Infrastructure Advisory Facility, 2016). This reflects the low starting base of infrastructure in developing countries in which PPPs create new infrastructure under greenfield projects rather than rehabilitate existing infrastructure under concessions.

In developing economies, there is an enormous need for infrastructure investment in order to address economic development and poverty reduction. For example, the Asian Development Bank (2017) estimates that its 45 developing member countries need approximately US $ 26.2 trillion for 15 years from 2016 to 2030 (or US $ 1.7 trillion annually) to finance the infrastructure needed for these countries to keep up with their economic growth momentum. Given that the investment demand far exceeds limited public financing, private financing through PPPs has emerged as a strong presence to fulfil the infrastructure gap. The Asian Development Bank (2017) reports that the infrastructure gap is estimated to be equivalent to about 5% of its projected GDP. The fiscal budget is expected to generate 40% of this gap, leaving the remaining 60% for the private sector. More importantly, given the failures of traditional public procurement and privatization programs, in terms of delays, cost overrun and poor government management (Grimsey and Lewis, 2007), PPPs are more and more demanding. However, compared to those in developed economies, the PPP market maturity in developing economies is in the initial stage of building the market place, establishing legal frameworks, PPP policies and administration. Therefore, this weak institutional environment leads the private sector to suffer from high upfront investment and transaction costs (UNESCAP, 2011), and to deal with more political risks in terms of corruption and expropriation (Sader, 2000). As a result, despite their increase in demand, PPPs are not attractive enough for private investments in

spite of governments' encouragement. This situation has been even more severe after financial crises because a high proportion of foreign investors has reduced their investment in developing markets (Farquharson et al., 2011). This, again, hinders the private sector's commitment and poses more challenges for the development of PPPs in developing economies.

2.4 Public–Private Partnerships in China and India

PPPs in developing countries are mainly concentrated in the BRIC (i.e. Brazil, Russia, India, and China) emerging markets, accounting for about 48% of the total number of projects and approximately 45% of total investments (World Bank Group, 2016*b*). As indicated in Figure 2.3, China and India have the highest number of projects, 18% and 12%, respectively, compared with 11% for Brazil and 6% for Russia. Also, PPP investments in China and India account for about 21% of the total value of PPP projects in developing countries between 1990 and 2016 (World Bank Group, 2016*b*).

The emergence of PPPs is aimed to fill the huge infrastructure gap attributed to urbanization and industrialization. Based on GDP in 2015, China and India are the two largest emerging economies in the world, together accounting for approximately 18% of total global GDP (World Bank Group, 2015). They are also the two biggest countries by population, constituting about 37% of the total world population (United Nation, 2015). To adapt with their economic growth and population, urbanization, industrialization and infrastructure is essential. Projections from China and India's 12th Five-Year Plan indicate that US$1.03 trillion and US$1.025 trillion should be invested to bridge the infrastructure gaps in the respective countries (Hongyan, 2010; India's Planning Commission, 2012).

PPPs developed as a consequence of economic reforms in China and India. They were first undertaken in the late 1980s and the early 1990s in China and India, respectively, as part of the liberalization initiative when their markets for public facilities and services were opened. In China, a dramatic development has occurred since 1988 when state-owned enterprises (SOEs) were contracted out and privatization programs expanded massively (Urio, 2010). Likewise, in

India, PPPs became popular after the Indian government announced a new industrial policy to develop infrastructure sectors and open up the economy in 1991, which brought a greater focus than before to the private sector contribution (Lakshmanan, 2008).

There are three primary rationales for the openness of the market for public facilities and the development of PPPs. The first one is insufficient funding for public facilities and services. For example, in China, spending on public facilities only accounts for a small amount of the GDP (3.82% in 2003) with almost 80% of funding coming from the government, and the Chinese public budget cannot afford to satisfy the increasing demand for urban infrastructure, given the unprecedented rate of urbanization, with 20 million rural people coming into the cities annually (Urio, 2010). Whereas in India, the state borrowings, that are capped by the Fiscal Responsibility and Budgetary Management Act (along with the budget deficit, about 10% of the GDP) hinders the government funding for infrastructure. Consequently, the government needs to encourage the private sector's contribution and PPPs to come in as a channel to raise funds for infrastructure. Secondly, while the majority of public facilities are provided by state-owned enterprises (SOEs), their poor provision raises the questions of how efficient the conventional public procurement is. For example, in China in 2003, 80% of public transport firms operated at loss. This situation opens room for the private sector participation to promote competition and effectiveness of the public goods market. Finally, since governments have changed their priority investment to soft infrastructure, such as schools, hospitals and security services, they really need the private sector to be more responsible for their hard infrastructure (e.g. transport, energy, water and sewerage). For example in India, it is estimated that about 30% of the country's hard infrastructure investments were financed by the private sector (Lakshmanan, 2008).

However, despite the urgent need for, and an increase in government support for private participation in infrastructure in China and India, the enormous infrastructure gap still exists, and it is questionable whether the private sector has enough appetite for engaging in PPPs. According to Wilkins et al. (2014), only about 15% of the funding for infrastructure in China came from private investors in 2012. Likewise, in India, under the 11th Five-Year Plan (2007-

2011), private financing accounted for about 40% of total investment (High Level Committee on Financing Infrastructure, 2012). This is because of regulatory challenges, political risks and the failures of previous PPP projects (Urio, 2010). In China, the group of three risks (i.e. corruption, government credibility and government intervention) are the primary obstacles for Chinese firms participating in PPPs (Ke et al., 2013; Urio, 2010). For example, shareholders of the Beijing Subway Line 4 project claim that their investment in this PPP project is running at a loss, since the government has intervened and decided on all of the important criteria, such as pricing, line extension and investment in their attempt to lower subway fares (Zhang et al., 2015). Also, among developing economies, the number of canceled projects in China is second to those in Argentina (World Bank Group, 2012*b*). Meanwhile, in India, PPP projects have had to face numerous challenges in terms of an incomplete regulatory framework, a dispute over risk sharing between the government and the private sector, and cost and time overruns. The absence of detailed PPP legislation and specialized agencies, especially in the local governments in India, allow government officials to implement PPPs at their own discretion. Subsequently, PPP Indian firms have to face high transaction costs in the negotiation and execution of PPP projects since they need approvals from several local bodies to move their projects forward (Mahalingam, 2009). The risk-sharing mechanism is also inequitable since greater risks are imposed on the private sector. For example, in the group of PPP land development projects in India, the government renegotiated the initial contracts signed with the private sector, refused to change zoning patterns on the land and left all related risks to their private partners (Mahalingam, 2009). This in turn made the private sector reluctant to become involve in the projects. In India, 231 in 491 projects were delayed in 2008, with cost overrun accounting for 51.8% and 13.9% of total costs in 2004 and 2008, respectively. India's power sector experienced technical and commercial losses of 40% in 2008 (Lakshmanan, 2008).

Owing to the paucity of private sector participation in infrastructure projects, it is necessary to explore what motivates these firms to participate in PPPs. Private sector firms engage in PPPs when they find sufficient incentives, and mainly when such projects can offset their financial constraints associated with high risk projects like PPPs.

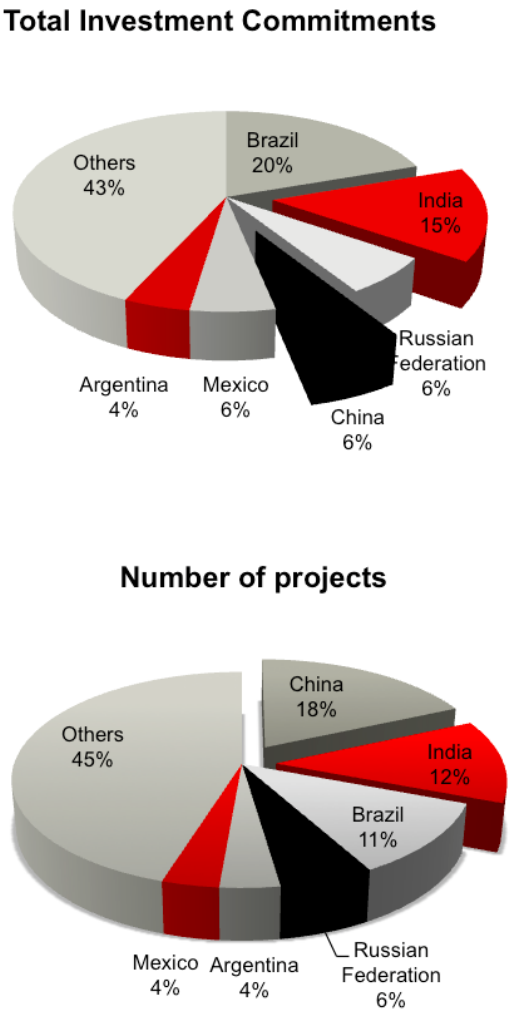


Figure 2.3: Number of Projects and Total Investments in Public–Private Partnerships

Source: World Bank Group (2016*b*)

2.5 Economics of Public–Private Partnerships

The increasingly common use of PPPs to replace public conventional procurements is explained in the literature. The main aim of this literature is to prove that under certain conditions, PPPs, with their unique characteristics, can bring more efficiencies than public procurements. My research follows Engel et al. (2010) and Dewatripont and Legros (2005) by reviewing the literature on the outstanding features of PPPs in terms of economic benefits, namely contract design, ownership, risk transfer and financing.

2.5.1 Contract Design

PPPs are implemented by the bundling contracts, mentioned above, in which partnering private sector firms conduct the construction and operation of these projects. There are two strands of literature to illustrate the inherited benefits of PPPs from this hybrid contract mechanism. The former draws from the theory of asymmetric information, and the latter originates from the theory of contract incompleteness (Dewatripont and Legros, 2005).

The theory of information asymmetries indicates one type of asymmetric information, namely hidden action, which may directly relate to the bundling of contracts in PPPs (Dewatripont and Legros, 2005). In a conventional project with a separated constructor and operator, a builder may apply some methods to reduce the construction cost but at the expense of operators. In the context of PPPs, only one agent, a PPP partnering private firm, is responsible for both construction and operation. Therefore, the probability of hidden action happening is lessened since the private sector, here playing as the operator, also incurs a loss as a consequence of its action in the construction stage. In the bundling PPP contracts, the private sector may have more incentives to invest in the reduction of operating costs than that in traditional projects. Moreover, the private sector might know early on during its construction stage whether its investment in technology and innovation is useful for reducing operation costs or not. However, the problem it must face is that the investment cost in some cases may offset the private sector's benefits from innovation, which can lead to inefficiencies (Dewatripont and Legros, 2005). Therefore, if the investment cost is small relative to the achieved benefits of lowering the operation cost, the bundle of PPP contracts may help partnering firms resolve information asymmetries in their operation phase. In contrast, if overrunning investment costs outweigh the benefits of operating cost savings, the traditional public procurement is preferable over PPPs.

The theory of contract incompleteness is discussed by Grossman and Hart (1986), Hart (2003) and Bennett and Iossa (2004). In the context of a complete contract, everything is set via detailed initial contractual agreements, and imperfection may arise from information asym-

metries By contrast, in an incomplete contract, unexpected market conditions can cause some contractual terms that have not been determined in advance, and consequently, renegotiation may happen later. In this case, Grossman and Hart (1986) explore the influence of bundling on the motivation for investing in cost savings or quality improvements. While the private sector only focuses on cost cutting, the public sector is also concerned about how these investments can increase social welfare. In PPPs, the bundling mechanism may induce the builder to be involved in two types of non-contractible investment: One is to cut costs in the operating stage at the expense of service quality, and the other is to lower operating costs along with improving the quality of services (Hart, 2003). Hart (2003) gives an example of building a bridge. On the one hand, if builders invest in a new technology that reduces the pressure on the beams, they will lower their maintenance frequency, which in turn reduces traffic congestion and corresponds to social desire. On the other hand, if builders choose to invest in fewer traffic lanes, this strategy can decrease the cost of maintaining the bridge but at the expense of increasing traffic jams.

Therefore, in order to answer the question about which contract design is better (PPPs or conventional public procurements), Hart (2003) indicates two alternative choices. If an investment in cost cutting and quality improvement can be verified in advance, the traditional public procurements, in which the government choose different builders and operators, dominate PPPs. This is because the investment and efficient level can be set ex ante when contracting with builders. By contrast, if investment in cost savings with corresponding quality erosion can be verified, PPPs are more pronounced than traditional procurements in terms of contributing to social welfare, since the consortium in PPPs has more motive than builders in conventional projects to invest in quality improvements than do builders when it comes to conventional projects (Hart, 2003). Similarly, Bennett and Iossa (2004) explore whether innovation at the construction phase increases operating costs. PPP-partnering firms have less incentives to innovate than the builders in conventional projects, since innovation may incur cost overrun. By contrast, if innovation leads to lessening operating costs, PPPs are more profound than conventional projects, since partnering firms can not only afford to internalize innovation into

life-cycle cost but can also induce social gains.

Overall, the choice of contract design depends on the relationship among innovation, cost savings and quality improvements and how they are verified in the ex ante contract agreements.

2.5.2 Ownership and Risk Transfer

According to Grimsey and Lewis (2007), along with the commercialization of infrastructure, there are three ways to provide infrastructure projects , and these are associated with three types of ownership. The most basic way is through a conventional public procurement in which the public sector keeps its ownership of infrastructure and operates more closely to the manner of the private sector in terms of market demand, revenue and cost. The second way is through a PPP in which the level of the private sector's involvement in infrastructure projects is higher because of the PPP's bundling responsibility, construction and operation and temporal ownerships. The third way is through a privatization program in which the infrastructure project is fully privatized with permanent private ownerships.

From the public sector's perspective, the ownership transfer from the public sector to the private sector can alleviate some of the failures of public procurements and achieve greater efficiency in providing infrastructure services (Grimsey and Lewis, 2007). Private ownership motivates the private sector to resolve agency conflicts between owners and operators of an infrastructure as seen previously in conventional public procurements. Moreover, according to Besley and Ghatak (2001), investment incentives are greater if the ownership is granted by the private sector (who cares more about investment) rather than the public sector (who owns investment technology). Besley and Ghatak (2001) also indicate that the private sector places a higher value in human capital since it specializes in developing and managing projects; hence, when the private sector obtains the ownership, this helps to maximize social surplus (Besley and Ghatak, 2001).

By contrast, opponents claim that, in some cases, a permanent private ownership in infrastructure is not a political preference. Infrastructure is considered as an industry where a

natural monopoly usually exists. Hence, if infrastructure is permanently owned by the private sector, the lack of competition in this industry encourages the private sector to act on behalf of its own benefits but at the expense of society. For example, the private sector can gradually increase motorway tolls for increasing its revenue, but it also imposes more financial liabilities for drivers, especially those who are frequently driving. As a result, the drivers may return to the roads on which they originally travelled, even if travelling time takes more time and effort, especially in the case of traffic congestion. Overall, some privatized infrastructure projects have received numerous social objections since they are not aligned with social objectives. This failure of privatization programs and permanent private ownership provokes the emergence of temporary private ownership and the partial risk transfer in the PPP model. This is because in this mechanism, governments are able to take more effort to control infrastructure projects and channel them in the right direction in which there are mutual benefits between private partners and social welfare.

Regarding risk-sharing mechanisms, Ke et al. (2010) summarize and categorize risk factors into seven groups, consisting of political, construction, operation, legal, market, economic and other risks. However, in relation to PPPs, the literature is still inconclusive about the kinds of risk that should be allocated to the private sector. Cooper (2005) provides a primary principal that risk should be allocated to the party who manages it better at a low cost, but it may vary among economies. Bing et al. (2005), who conducted a survey of risk-preferred allocation in PPP projects in the United Kingdom (UK), indicate that the project risks, including the project financial risk, the design risk and the construction and operation risk should be allocated to the private sector, while the political risk, land acquisition and permits should be referred to the public sector. Roumboutsos and Anagnostopoulos (2008) conducted the same survey in Greece and they offer similar findings to Bing et al. (2005) in terms of political risk or project risk. Where Roumboutsos and Anagnostopoulos (2008) differ is in their discussion of demand risk. They suggest that in Greece, it is better for this risk to be solely allocated to the public sector. By contrast, Bing et al. (2005) state that in the UK, the demand risk should be shared between the private and public sector. Likewise, according to Ke et al. (2010), the

Chinese economies share some significant features with those countries above. For example, risks related to governments and their actions should be allocated mainly to the public sector while project-level risks should, for the most part, remain with the private sector. However, the most distinctive risk allocation in China is that no risk is solely allocated to the private sector, which reflects the government-controlled economy in China. At a general level, Dewatripont and Legros (2005) develop a model to prove that an optimal risk-sharing mechanism needs to be balanced between the marginal benefit and its corresponding marginal cost when transferring risks from the public to the private sector. Accordingly, given the exogenous randomness in performance of the private sector, its degree of risk aversion and its cost of effort will determine how much risk should be borne by the private sector.

2.5.3 Financing

The literature on the financing side of PPPs emphasizes a common feature of financial sources for PPPs: project finance. Yescombe (2011) illustrates some of the main characteristics of this specialized form of finance, including the following: (i) project finance is based on project-generated cash flow to repay lenders; (ii) lenders consider project contracts themselves as guarantees of the private sector's repayment rather than its physical assets; (iii) project finance is used to achieve higher leverage as a mean of reducing the cost of capital, and in turn, project-level costs; (iv) projects must be legally and economically self-contained and be operated as an SPV; and (v) projects have a finite life so they need to be fully repaid.

Engel et al. (2010) add more detail about the life cycle of project finance by stating that financing sources change from bank loans and equity during the construction stage to bonds during the operation stage. The rationale for this change comes from incentive problems and the level of risk. In the construction stage, PPPs are subject to substantial risks in terms of design changes and cost overrun as a consequence of moral hazard arising between sponsors and contractors. In this circumstance, bank loans are appropriate since banks can provide strict control over such changes in projects as well as the conflict between sponsors and contracts

(Engel et al., 2010). After the construction stage, the major risk is eliminated and now mainly depends on the certainty of future cash flow. Therefore, financing sources are now transferred to bondholders, who care more about the security of cash flow than the management of PPP projects.

While Engel et al. (2010) focus on the changes of financing sources throughout different stages of PPP projects by stating which kinds of financial sources are more appropriate for each corresponding stage, Dewatripont and Legros (2005) try to understand the relationship between external financing and the private sector's incentives. They investigate whether debt or outside equity, which may be suitable for the construction stage as proved by Engel et al. (2010), is able to encourage the private sector to exert socially optimal efforts. According to Dewatripont and Legros (2005), PPPs differ from traditional public procurement is that their bundle of construction and operation is employed by private sector firms. This bundle enables these firms to exert efforts at the building stage and internalize their effects on the operation stage for improving consumers' willingness to pay. However, when private sector firms are involved in external financing, this may lower the firms' incentives to exert effort, since benefits arising from these efforts have to be shared with external investors. However, among external sources, debt is better than outside equity in terms of providing more incentives to the private sector (Dewatripont and Legros, 2005). This is because while outside equity investors take a constant portion of the return, regardless of whether its results are good or bad, creditors take only a minimum fraction of the return that corresponds with a bad state of the results, leaving the private sector in a good state with maximum benefits from its exertion of effort. Overall, by choosing debt instead of outside equity, the private sector maximizes its gains. This is a consequence of the private sector's efforts at the building stage that enhance customers' willingness to pay at the operation stage, which in turn maximizes social benefits.

2.6 Effects of Public–Private Partnerships

The following section reviews the effects of PPPs on the two parties that comprise these partnerships, the public sector and the private sector.

2.6.1 Effects of Public–Private Partnerships on the Public Sector

The previous literature on PPPs mainly focuses on the effects of these partnerships on the public sector. Taking a positive view, previous studies show that the cooperation between governments and the private sector through PPPs can help governments resolve their problem of insufficient budget financing for large and highly risky infrastructure projects (e.g. UNESCAP, 2011; Maskin and Tirole, 2008; Davies and Eustice, 2005). The private sector can use its own equity or go through project finance, a special funding mechanism, to access external financing from creditors, outside equity owners or bondholders (Engel et al., 2010). In these cases, the private sector uses PPP projects themselves as plegeable assets and the cash flow generated from these projects as a main source of capital repayment. As a result, compared to the traditional public procurement that governments use their budget to finance, PPPs help to relieve public budget deficit and ensure the viability of infrastructure projects. More importantly, by awarding the private sector with a right to bundle construction and operation as well as temporary ownership, the public sector, via PPPs, can exploit the private sector's specialization in design and professional project management to build up or rehabilitate government assets in a more innovative manner than those in conventional procurement.

By contrast, PPPs can also have negative impacts on the public sector since the private sector in prioritizing profit motive, can act in underhand way at the expense of social welfare (Dheret et al., 2012; Engel et al., 2008; Bennett and Iossa, 2004; Hart, 2003). For instance, the private sector can take advantage of bundling contracts by using a design in their attempt to cut costs; however, this may align with quality erosion as well. Another example is that the private sector, due to the incompleteness of its initial contract terms in infrastructure,

its high potential risk and its work-in-progress, can make a renegotiation at the later stage, as evidenced in increasing motorway tolls or energy prices. Consequently, that imposes more financial pressure on final users or on social welfare as a whole.

In addition to the contrasting views on the effects of PPPs on the public sector, most of the previous studies tend to compare PPPs with traditional public procurements and decide, according to circumstance, which kinds of projects can maximize the social surplus. For example, in the feasibility studies on PPP projects, the value-for-money criteria is chosen to analyze PPP projects' effectiveness and efficiency (Burger and Hawkesworth, 2011; Tang et al., 2010). This method is conducted by comparing a proposed PPP project with a public-sector comparator: that is, a project implemented through a conventional public procurement. In this case, both PPPs and conventional public projects use the same single prescribed rate as a discount rate: that is, the government's risk-adjusted indicator is used to measure the net present value of the projects (Burger and Hawkesworth, 2011). Consequently, the results are obtained from the perspective of the government rather than that of the private sector, and these results attempt to explain the government's gains and losses from investing in PPPs.

2.6.2 Effects of Public–Private Partnerships on Partnering Private Firms

Along with the dominance of previous literature on the public sector, there are a few studies on how PPPs influence partnering private firms; however, these studies are still inconclusive about the private sector's advantages and disadvantages. In terms of financing, UNESCAP (2011) states that PPPs, through the project finance mechanism, can help private sector firms decrease financial risk, increase external financing and achieve more screening projects. This is because the characteristics of project finance allow high leveraged projects with corresponding high risk for lenders who may receive no guarantees beyond the cash flow generated from the projects. Therefore, lenders have to assess private borrowers carefully based on the borrowers' previous industry experience, their credit ratings and the viability of their projects. After the

financing agreements have been signed, lenders also need to apply strict controls in terms of a disbursement process as well as monitoring private borrowers' operation to ensure that the lenders' projects generate sufficient cash flow. Consequently, the private borrowers, in turn, can improve their financial performance in order to align with their lenders' requirements. By contrast, Engel et al. (2010) claim that the private sector has to keep a high proportion of equity until the end of its PPP projects. This triggers a high cost of capital and triggers the private sector's failure to catch up with new investment opportunities.

Regarding contract design and ownership, Besley and Ghatak (2001) develop a model to justify the actions of the private sector, the more caring party, granting an ownership in a PPP project increase both participating parties' investment incentives and their joint surplus. This is because the private sector, which owns human capital, can internalize cost through the bundle of construction and operation. This means that the prior investment in the building stage, together with the private sector's specialized management skills, can help lower its operation cost at the operation stage later (Engel et al., 2010; Maskin and Tirole, 2008). On the contrary, based on the theory of incomplete contracts, opponents of PPPs claim that bundling cannot develop its potential advantages in the context of high risk, information asymmetries or innovation. This is because in these cases, the incentives at the design and construction stage, which incorporate the life-cycle cost, cannot ensure that firms will be totally protected from productivity shock (Iossa and Martimort, 2012). As a result of an innovation in the design stage, these incentives of cutting the life-cycle costs occur at the operation stage. However, these incentives are further reduced through consequent renegotiations between the public and the private sector. This is due to the fact that the public sector, after uncovering information asymmetries, may realize that the high investment in the innovation in the design stage cannot be covered by revenue generated from projects in the operation stage. This is because an increase in demand risk leads to unexpected or fluctuated revenue. Or in other cases, the public sector may believe that by pursuing its incentives in the innovative design, the private sector may fulfil only its own aim of cost cutting. This differs from the public sector's desire, which is to fulfil quality improvement. Overall, the influence of PPPs on the private sector has been highly debatable,

and this debate is mainly explained by the theory of incomplete contracts, which questions how other traditional theories on firms can contribute and clarify this extant debate.

2.7 Effects of Government Reliance and Institutional Quality on Partnering Private Firms

The previous studies have been inconclusive on the influence of government involvement in PPP-partnering private firms. Advocates of PPP models claim that the private sector achieves numerous benefits when securing government support. The private sector can achieve the financial viability of its projects through some kinds of public investment, costless pledgeable government assets, government-guaranteed loans and government-subordinated loans (UNESCAP, 2011; Engel et al., 2010). Consequently, the private sector can eliminate financial risk, reduce default risk and debt burden and increase its credit ratings to attract more debt and equity capital. Moreover, regarding risk-sharing and risk-guarantee mechanisms, through government subsidies in the low-demand state or through governments' availability-based payment for a concessionaire in the high-demand state (Engel et al., 2010), the private sector can transfer partially or totally demand risk to the government. This enhances the commercial viability of PPP projects. Additionally, there are further benefits worth mentioning, like government support for land acquisition, tax exemption and exchange rate risk-sharing (UNESCAP, 2011). In contrast, opponents criticize it due to unexpected changes in policy frameworks, corruption, governments' intervention, complex approval systems and, especially, risk misallocation (Ke et al., 2013). This prevents the private sector from willingly investing in PPP projects because it knows it will have to face considerable delays and high transaction costs.

In addition to the government intervening in a direct manner, as noted above, the government can also indirectly influence partnering private sector firms through various types of contract mechanisms. For instance, the government can choose whether private sector firms award PPP projects according to one of the following bidding processes. One process is where

the firm is given more freedom to compete among private bidders; another process is where the government is given more freedom to interfere in PPP projects because the firm negotiates directly with the government. Yet another process is where the government can choose for a PPP infrastructure project to be run under a greenfield project (in which the private sector can build, operate and transfer a new infrastructure) or under a concession project (in which the private sector rehabilitate governments' assets). The concession project is assumed to be more highly reliant on the government than the greenfield project.

The literature on PPP-contract mechanisms focuses on four main components: (i) the types of contract in relation to ownership and bundling; (ii) contract payments and risk allocation; (iii) contract awarding methods; and (iv) the level of political connection.

Regarding the types of contract, from an incomplete contract perspective, theoretical studies indicate that a choice of contracts depends on the trade-off between efficiency enhancing (improving quality) and cost-cutting efforts (Dewatripont and Legros, 2005; Bennett and Iossa, 2004; Hart, 2003; Grossman and Hart, 1986). As these authors illustrate, if the quality of services is specified, PPPs dominate the conventional procurement in terms of maximizing the social surplus and vice versa. This accounts for the fact that the private sector is motivated by cost cutting, but this strategy can be used at the expense of service quality. When it comes to contract payments and risk allocation, previous studies focus on how an optimal contract design can be created to maximize social welfare (Engel et al., 2013; Athias and Soubeyran, 2012, e.g.). Athias and Soubeyran (2012) believe that the allocation of demand risk relies on choosing between the importance of public adaptation or the benefits of cost-reducing efforts. They indicate that if public adaptation is a crucial consideration, demand risk should be borne by the private sector and vice versa. The rationale for this finding is that when the private sector bears demand risk, the public authority can afford to uphold it and there is an incentive to invest in adaption (Athias and Soubeyran, 2012). Engel et al. (2013) continue the idea of risk allocation and project payment by designing the optimal contract in high, medium and low demand states. While in the high demand state, the private sector bears demand risk and collects user fees, the low demand state allows demand risk-sharing through government

subsidies. Concerning contract awarding methods, previous studies focus on exploring determinants that drive a choice between negotiations and competitive bidding. These factors are political scrutiny, levels of competitiveness and contractual characteristics such as the type, size and level of complexity (Chong et al., 2012; Bajari et al., 2008). Regarding the level of political connection, the previous literature supports the political corruption view that the securing of political ties can lead to social loss. For example, numerous previous studies show that corruption, which emerges through the mechanism of relationships or political ties, negatively influences infrastructure projects. This can be seen in terms of the increasing cost of infrastructure projects that reduces quality and economic returns. (Yehoue et al., 2006; Ke et al., 2013; Kenny, 2007).[1]

As indicated by many existing studies, an optimal contract design is chosen to maximize social welfare (Engel et al., 2013; Athias and Soubeyran, 2012; Dewatripont and Legros, 2005; Bennett and Iossa, 2004; Hart, 2003; Grossman and Hart, 1986). However, the highest total surplus does not mean the highest private benefits. For example, according to Athias and Soubeyran (2012), when the government wants to adapt or change the quality of services to satisfy a rising demand, demand risk should be borne by the private sector. If this situation happens, in spite of an increase in the social surplus, benefits of partnering private firms can be reduced significantly because they have to bear more demand risk as well as face more difficulties in cost-cutting. Therefore, from the perspective of the private sector, further studies on the contract design need to take the private sector's benefits into consideration - as an independent component. Previous studies pay attention to factors driving the choice of contract mechanisms (Bajari et al., 2008). A few studies, as in Lalive and Schmutzler (2011), test the effects of contract mechanisms on firm performance. For example, the study of Lalive and Schmutzler (2011) focuses only on the output of projects in terms of service price and quality. These studies have not yet provided a systematic evaluation of partnering firms' performance. Also, empirical studies on PPPs usually focus on evaluating the effect of one given type of PPP, in which a Build–Operate–Transfer (BOT) project is the most popular research objective (Ke

[1]It is estimated that about seven percent of project value in construction firms is used for bribing for winning bids and changing contractual terms in Eastern Europe and Central Asia (Kenny, 2007).

et al., 2009; Thomas et al., 2003; Zhang and Kumaraswamy, 2001; Tam, 1999).

Moreover, there have been some empirical articles to study the relationship between institutional quality and PPPs. The majority of these articles makes the best effort to identify the critical success factors (CSFs) and risk allocation for PPPs (Bing et al., 2005; Chan et al., 2010; Hwang et al., 2013; Zhang, 2005). Zhang (2005) conducts interviews with worldwide PPP academics and practitioners to rank the CSFs. The result shows that under the CSFs, a "favorable investment environment", political stability, government support and a reasonable framework achieve the three highest rankings. Meanwhile, Hwang et al. (2013) conduct a questionnaire survey in Singapore that reveals "well-organized public agency" to be recognized by practitioners as the most crucial CSF. In quantitative research, Hovakimian (2009) studies the determinants of PPPs in developing countries between 1990 and 2003 based on the World Bank' Private Participation in Infrastructure (PPI) database. Hovakimian (2009) finds that high institutional quality, such as a stable macroeconomy that shows little sign of corruption and an effective rule of laws, results in more PPP projects. Overall, the above literature focuses on discovering what kinds of institutional quality can help to attract more PPP projects and ensure their success rate on the macro level. However, less attention is drawn to how institutional quality can influence the benefits of partnering private sector firms on the micro level.

2.8 Conclusion

This chapter provides a basic knowledge of PPPs and their economic features including contract design, ownership, risk transfer and financing. Moreover, this chapter review previous literature on how PPPs influence two partnering parties, the public and the private sector, as well as their associated-determinants related to governments and institutions. This literature review documents some research gaps that exist in the previous studies:

Research gap 1. The dominance of previous research from a government perspective aims to evaluate the effects of PPPs on the public sector, and there is inconclusive evidence on the

advantages and disadvantages of partnering firms via PPPs. In particular, there is virtually no research on how PPPs influence partnering private sector firms in the corporate finance dimension.

Research gap 2. There is inconclusive evidence the opportunities offered to, and challenges faced by, partnering private firms when they are directly or indirectly influenced by government support. In this debate, the contract mechanism serves as an indicator of the varying degrees of government support for the private sector. The literature on this mechanism focuses on factors driving the choice of contract mechanisms; however, the impacts of these contract mechanisms on firm value have received less exploration.

Research gap 3: The literature on the relationship between institutional quality and PPPs focuses on exploring the kinds of institutional quality that helps attract more PPP investments for an economy as a whole; however, there is a shortage of research on how institutional quality has real impacts on partnering private sector firms on the micro level.

In order to fil these research gaps, I spends the following three crucial empirical chapters to uncover the influence of PPPs on partnering private sector firms. I do this in relation to the costs and benefits of private sector firms when engaging in PPPs and in relation to how the variation in the reliance on governments and institutions enhances/hinders the benefits of PPPs. More importantly, since the previous studies mainly use contract theory to argue for the impacts of PPPs, my thesis focuses on a less explored perspective on PPPs by using corporate finance theory to construct my hypotheses. Engaging in PPPs is one of the important investment decisions in addition to other joint ventures, diversification, and research and development (R&D). Accordingly, my thesis relies on the theory of investment efficiency and market valuation in the corporate finance literature to argue for the benefits of PPPs for partnering private sector firms. More importantly, since PPPs provide a unique setting with a clear social alignment to encourage the mutual benefits between the private sector and social welfare, my thesis contributes to the debate of government involvement and the theory of public choice by arguing that high reliance on governments can benefits both the private sector and the public sector. Furthermore, as PPPs establish a context in which political connections can be more active,

my thesis contributes to the theory of "law–finance–growth" in explaining financing capacity and financial benefits. The literature related to these theories is also reviewed in the following three chapters.

Chapter 3

Public–Private Partnerships, Investment Efficiency and Firm Market Valuation

3.1 Introduction

In the last two decades, emerging economies have experienced tremendous growth due to their growing populations, rapidly progressing urbanization, industrialization, and increasing integration into global supply chains. However, high growth has led to visible infrastructure gaps that hinder this tremendous growth trajectory. Projections from China and India's 12th Five-Year Plan indicate that US$1.03 trillion and US$1.025 trillion, respectively, should be invested to bridge the infrastructure gaps in these countries (Hongyan, 2010; India's Planning Commission, 2012). Given the failure of privatization programs and the limited capacity of both the private and the public sectors, Public–Private Partnerships (PPPs) are gaining popularity in these markets (Engel et al., 2008).

According to Wilkins et al. (2014), only about 15% of the funding for infrastructure in China came from private investors in 2012. Likewise, in India, under the 11th Five-Year Plan (2007-2011), private financing accounted for about 40% of total investment (High Level Committee on Financing Infrastructure, 2012). Such low interest by private sector firms motivates us to understand a less-explored rationale for private sector participation in PPP investments. Moreover, the existing literature mainly focuses on the efficacy of PPPs from a government or public welfare perspective (Burger and Hawkesworth, 2011; Engel et al., 2010; Hart, 2003).

The question I seek to answer in this study is whether PPPs, which have seen a nine-fold increase in emerging markets in the last decade, assist in reducing the capital constraints faced

by private sector firms. Government involvement provides costless pledgeable assets[1] for the partnering private firm, hence enhancing its borrowing capacity and also reducing its cost of raising capital. This benefits cash-starved private sector firms suffering from underinvestment and helps reduce the persistent investment–cash flow sensitivity problem in emerging markets. Hence, I hypothesized that PPPs benefit the private sector by reducing its underinvestment problem.

It is important to note that high investment–cash flow sensitivity can also imply another problem: overinvestment. Firms that aggressively invest can experience higher investment–cash flow sensitivity. In emerging markets, it is quite probable that cash-rich private sector firms with political connections can influence and secure PPP contracts (Khwaja and Mian, 2005). However, PPPs might also be hypothesized to reduce the private sector's overinvestment since the PPP contract mechanism prohibits resource transfer during its operation phase. Therefore, the PPP mechanism prevents the free cash flow generated from its projects from being diverted to fulfil managers' own ambitions, and thus it reduces agency problems (Engel et al., 2010). From these alternative perspectives, whether the private sector benefits from PPPs, through reduction in underinvestment or overinvestment, is an empirical question. By digging into how private sector firms with different investment opportunities (as indicators of under or overinvestment) react to PPP benefits, my study disentangles the attribution associated with investment–cash flow sensitivity.

I used the sample of PPP contracts in two of the world's largest emerging markets, namely China and India, to address this issue. India, for instance, has made approximately US 400 billion dollars' worth of PPP investments, almost half the market capitalization of the Indian capital market. However, there is virtually no research on the aspect of corporate finance in relation to these financial contracts. Understanding this aspect of PPP contracts allows me to shed light on whether these unique contractual agreements can reduce the unmet demand for capital in emerging markets.

[1]Costless pledgeable assets can be government assets that are taken over by partnering private sector firms to manage, build, rehabilitate and operate, and these work as collateral for bank loans (World Bank Group, 2012*b*). Costless pledgeable assets can be sourced from government equity participation, direct government support that covers projects costs, and government loan guarantee to secure the borrowings of partnering private sector firms.

PPP contracts are considered to be hybrid contracts as they share several features of both public and privatized public sector firms. Similar to public sector firms, PPPs have government backing in terms of legal and political risk, as the assets are owned by the government. Likewise, similar to privatized public sector firms, they are managed by the private sector with virtually no government intervention. Compared to traditional government contracting, where construction and operation are executed as separate contracts, PPPs allow bundling of contracts. In terms of risk sharing, PPPs can be considered as the middle path between conventional project finance and privatization programs. Different from conventional project financing arrangements and privatization programs, in the case of PPPs, the risk is shared between the public and private sectors rather than one party bearing the entire risk.

To my knowledge, this study is one of the first comprehensive studies on PPPs as it uses data from the two largest emerging markets in the world. My study contributes towards a better understanding of one of the major and one of the fastest growing infrastructure financing contracts in the world. My evidence provides insights into the possible benefits of these unique contractual agreements. It also attempts to examine whether the intended purpose of reducing underinvestment in the private sector can really be fulfilled through PPP contracts.

Using the Private Participation in Infrastructure (PPI) Project Database of the World Bank and the corporate announcements section of the stock exchanges' websites, I identified 138 and 124 PPP project announcements, spanning 25 years (1988-2013), belonging to firms listed in China and India, respectively. Then, I matched control group firms with PPP firms in terms of firm size, industry, and other firm-level variables from the DataStream database. This helped me isolate relative value addition through PPP contracts compared to those of competing non-PPP projects undertaken by other firms in the same product market. Using these details, I sought answers to the following main questions.

1. Do PPPs benefits partnering private sector firms?

1a. Do PPP announcements add value to participating private sector firms?

1b. Do PPP investments reduce the investment–cash flow sensitivity of partnering private

sector firms in the post-PPP investment period?

2. Does higher reliance on the government benefit partnering private sector firms?

2a. Does higher government equity participation reduce capital constraints for partnering private sector firms?

2b. Do political connections reduce capital constraints for partnering private sector firms?

2c. Do the variations in the contract mechanism explain the cross-sectional variation related to the benefits of PPP contracts?

I report the following main findings:

1. Investors consider PPP announcements by partnering private firms as good news, leading to increased firm value, with positive cumulative abnormal returns (CAR) of 1.87% and 2.11% in China and India, respectively.

2. The type of firm that opts for PPPs varies between China and India. In the case of China, firms with lower investment–cash flow sensitivity than their matched firms pursue PPPs, whereas in India, firms with higher investment–cash flow sensitivity or cash-constrained firms pursue PPPs. I also find that capital-constrained firms in India opting for PPPs have relatively higher growth opportunities than competing private sector firms not participating in PPPs (hereafter, referred to as non-PPP private sector firms or non-PPP counterparts). This implies that underinvestment is considered as a major factor for PPP investments by the private sector in India. In the post-PPP investment period, PPP investment reduces investment–cash flow sensitivity in both the Chinese and the Indian firms.

3. High government equity and political connections are beneficial for partnering private sector firms in China. On the contrary, the Indian private sector firms benefit more from low reliance on the government.

4. Political uncertainty, measured by whether the year is an election year and corresponding changes in the government, increase investment–cash flow sensitivity risk for PPP projects

awarded during such years in both China and India.

5. Contract mechanisms that require more government reliance benefit mainly the Chinese PPP private sector firms.

Overall, my results highlight the fact that PPP investments benefit the private sector; however, the nature of the firm and the institutional environment play a significant role in explaining these benefits. My results provide important guidance on the direction and viability of PPPs in China and India. My evidence can help initiate a policy debate on the infrastructure gap in these emerging markets.

The rest of this chapter is organized into four sections. I develop my hypotheses in Section 3.2. Section 3.3 provides the descriptions of the data and my empirical methodology. The empirical results are presented in Section 3.4. Section 3.5 concludes the chapter.

3.2 Literature Review and Hypotheses Development

I investigate whether PPPs and their mediating factors add value to partnering private firms. From the corporate finance perspective, firm value is affected by its performance and its valuation by investors (Kleinschmidt, 2007). In my research, firm value is evaluated by investment efficiency and market valuation. The choice of investment efficiency is based on the idea that PPPs are considered as important strategic investment decisions alongside joint ventures, mergers and acquisitions, research and development projects, and diversification. Therefore, examining investment efficiency through investment–cash flow sensitivity indicates how effectively this strategic investment works in private sector firms when the firms have a range of available investment choices but only have limited resources. The study also considers the firms' abnormal returns when they announce PPP projects in order to analyse how the stock market responds on PPP investments.

3.2.1 Investment Decisions and Market Valuation

Three established hypotheses can explain change in firm valuation due to new investment decisions. The Shareholder Value Maximization Hypothesis (SVMH), which is based on the traditional valuation theory, supports firms' positive returns after announcements of strategic decisions, attributing the same to a possible increase in raising future cash flow (Woolridge and Snow, 1990). On the contrary, the Institutional Investors Hypothesis supports possible negative returns on long-term investment announcements, attributing the same to the short-term focus of institutional investors who mainly prioritize quarterly earnings (Smith and Ellsworth, 1985). Meanwhile, the Rational Expectations Hypothesis predicts an insignificant stock return after an announcement of a strategic investment. This is attributed to the temporary and unstable competitive advantages of corporate expenditure coupled with initial positive unexpected cash flow (Woolridge and Snow, 1990). In summary, the predicted relationship between an investment decision and investors' reaction is inconclusive.

Participating in PPPs is considered as a strategic investment decision for firms; thus, it may influence stock market returns and the market value of partnering private sector firms. Compared to other investment projects, PPPs come with the benefits of government support and associated risk-sharing mechanisms, the operational freedom of partnering private firms through the bundling of contracts, and transparency during the duration of project finance (Besley and Ghatak, 2001; Engel et al., 2010; Hart, 2003). Besley and Ghatak (2001) develop a theoretical model to assert that investment incentives will be better if ownership is granted to the private sector (which cares more about investments) rather than the government (which cares more about investment technology). Accordingly, through PPPs, the private sector, with human capital and temporary ownership, can internalize cost through bundling, so prior investments in the design stage and private management skills can help lower operation cost (Engel et al., 2010; Maskin and Tirole, 2008). Therefore, PPP announcements are considered as good news and are expected to add value to partnering private firms. This is consistent with the SVMH. Moreover, the infrastructure sector sometimes provides firms with long-running

competitive advantages due to barriers against entering the market, namely, natural monopoly or government restrictions (Gomez, 2003). This discussion leads me to frame my hypothesis.

Hypothesis 1 *Stock markets will react positively to partnering private firms' announcements of PPP projects.*

3.2.2 Investment Decisions and Investment Efficiency

The literature on corporate investment and investment efficiency is based on the idea of imperfect capital markets. Accordingly, firm investments are determined not only by investment opportunities but also by the firms' ability to finance these possibilities (Pindado et al., 2011). Fazzari et al. (1988) indicate that when firms suffer from financial constraints, which are measured by low dividend payouts, the firms' investment relies on internal cash flow due to lack of external financing. This idea is supported by Myers and Majluf (1984), who claim that firms with high information asymmetries cannot be financed by external sources since they are not only too expensive but also unavailable. As a result, managers may forgo projects with positive net present value (NPV) and suffer from underinvestment. Investment–cash flow sensitivity is also explained by Jensen (1986) in terms of agency problems. Accordingly, owing to the conflict between managers and shareholders, managers use the free cash flow to pursuit projects with negative NPV (overinvestment) to serve their own best interests at their shareholders' expense. The over-reliance on internal funds leads to an increase in investment–cash flow sensitivity (Fazzari et al., 1988; Jensen, 1986; Myers and Majluf, 1984).

When it comes to PPPs, the investment–cash flow sensitivity of partnering firms is hypothesized to decrease by lowering more underinvestment or overinvestment problems than those of competing non-PPP counterparts. In terms of underinvestment problems, the government provides private sector firms with pledgeable assets to decrease their investment asymmetries, enhance borrowing capacity, and reduce financing cost. The private sector can also decrease demand risk and uncertainty of future cash flow through risk-sharing mechanisms, such as revenue guarantee and fixed payment from the government, in which the government bears a

portion of demand risk (Engel et al., 2010). PPPs also provide more unique investment opportunities than conventional investments through the reduction of regulatory hurdles, such as land acquisition for building roads or tax exemptions for private partners' income and fee (UNESCAP, 2011). This is even more significant in the infrastructure sector where the market's incompleteness and inefficiencies can intensify underinvestment problems and deter the private sector's ability to access external financing due to high life-cycle costs and regulatory hurdles. Otherwise, regarding overinvestment problems, the SPV allows PPP investments to be independent of private firms' internal cash flow. According to Engel et al. (2010), PPPs do not have excess cash flow, so there are fewer opportunities for PPP projects' cash flow to be diverted from repaying creditors and to be directed towards managers who can then fund for their own potential projects. This lack of excess cash flow helps to reduce overinvestment problems in PPP partnering private sector firms. This is in contrast to the case of their competing private firms when their projects may be operated in such a way that the divisions within their large corporation, which allows resources to be expropriated for the managers' own use. Therefore, it is argued that investing in PPPs will reduce the investment–cash flow sensitivity of participating private sector firms compared to competing non-PPP private sector firms in the same product market. This rationale leads to the hypothesis.

Hypothesis 2 *In the post-PPP investment period, the investment–cash flow sensitivity of PPP private sector firms will reduce compared to competing non-PPP private sector firms in the same product market.*

3.2.3 Role of Reliance on the Government

The literature on government involvement in firm value shows the extent of debate on this topic. Advocates for government involvement argue that governments have a positive impact on firm value. Firms gain government support for accessing external financing, especially debt financing. Borisova and Megginson (2011) indicate that governments, because of their ownership, can guarantee firms' debt repayment for creditors, which increases debt financing

and reduces capital cost correspondingly. This argument is even more realizable in a country with a weak institutional environment, where these kinds of firms can obtain access to domestic bank debt at a low cost (Fan et al., 2008; Leuz and Oberholzer-Gee, 2006). Governments also mitigate firms' information asymmetries when acting as the firms' venture capitalist, evaluating and monitoring firms before and after financing by the state becomes a reality (Lerner, 2000). On the contrary, opponents of government involvement claim that government intervention can lower firm value because it usually pursues the government's social/political aims rather than firm value maximization (Shleifer and Vishny, 1994). Governments' power and subsidies to persuade firms to implement political goals, especially in countries with high corruption, distorts firms' investment behavior and decreases their investment efficiency (Chen et al., 2011). Government support also raises agency problems owing to an increase in managers' moral hazard when firms obtain government debt warranties (Chen et al., 2011; Qingquan et al., 2007).

One of the most important reasons for private sector firms to engage in PPPs is that they can secure government support for undertaking risky and large infrastructure projects. Firms secure their reliance on the government in several ways. The direct method involves negotiating government equity in the PPP project. However, there are several indirect methods for securing high reliance on the government. Negotiating favorable contract mechanisms and establishing strong political connections are the major indirect methods of securing government reliance. I explore three important mediating factors to gain more insights into the significance of private sector firms relying on the government for the success or failure of PPP projects.

First, the government can directly participate in PPPs through equity participation. It assures government support for the implementation and operation of the PPP. Equity participation helps in many ways. It may be an important source to supplement equity provided by the private sector firm, particularly when equity capital from other sources is not available. It helps to achieve a more favourable debt–equity ratio, which is necessary to keep the debt service obligations manageable in the initial years of project operation (Engel et al., 2010). It may give comfort to debt financiers and consequently reduce the cost of capital, thereby lessening

reliance on internal cash flow. Moreover, it acts as a good signaling device in securing public support for projects that are politically sensitive and strategically important. Hence, I hypothesize that higher equity participation by the government reduces the long-term investment–cash flow sensitivity of the partnering private sector firm.

Second, political connections play an important role in emerging markets. Politically connected firms have a higher likelihood than non-politically connected firms of not only getting a loan (Khwaja and Mian, 2005) but also receiving a bailout for loan defaults (Faccio et al., 2006). Leuz and Oberholzer-Gee (2006) state that a strong political connection is an alternative means to create firm value. Hence, there are incentives for firms to connect to powerful politicians. Such relationships are important in government-related contracts like PPPs. Similar to the government's equity participation initiative, political connections give comfort to lenders and also increase the chances of obtaining cheaper loans, consequently reducing the cost of capital and lessening reliance on internal cash flow. Hence, I hypothesized that political connections can lead to the reduction in investment–cash flow sensitivity during the post-PPP investment period.

Third, the contract mechanism plays a significant role in the success of PPP ventures. According to World Bank Group (2012*b*), PPP contracts can be mainly classified based on the awarding method, the nature of the project and the method of sharing revenue. PPPs can be awarded either through a *competitive bidding* process or through *direct negotiations* with the government. Based on the nature of the project, PPPs can be broadly classified as *greenfield* or *concession* projects. Based on the revenue sharing agreement, future revenues from PPP projects can be shared either through *fixed payments* from the government or from revenue sharing by imposing a *user fee* on the customers. Projects that are awarded through competitive bidding, greenfield projects, or projects that generate revenue through user fees are more independent as they rely less on the government. On the other hand, if the projects are awarded through direct negotiations and receive government concessions, they are more dependent on or tend to have a higher reliance on the government. Having a higher reliance on the government reduces the risk of future cash flow as firms can have more reliable estimates

on their future cash flow. The above rationale leads to my third hypothesis and corresponding sub-hypotheses:

Hypothesis 3 *Higher reliance on the government reduces the long-term investment–cash flow sensitivity of PPP-partnering private sector firms.*

Hypothesis 3a *Higher equity participation by the government reduces the long-term investment–cash flow sensitivity of PPP-partnering private sector firms.*

Hypothesis 3b *Having political connection reduces the long-term investment–cash flow sensitivity of PPP-partnering private sector firms.*

Hypothesis 3c *PPP-partnering private firms with a contract mechanism that allows closer association with the government will experience lower long-term investment–cash flow sensitivity.*

3.3 Data and Methodology

3.3.1 Data Sources

I created a comprehensive database by integrating several data sources. Information on PPP projects, government equity participation in PPP projects, and contract mechanisms were sourced from the World Bank's PPI Project Database. Information related to financial and stock prices data of partnering private firms was obtained from Datastream. To measure political connections, I obtained historical information relating to the firms' board of directors from annual reports of partnering private sector firms in China and India. For the Indian firms, in addition to annual reports, I used the list of members in India's bicameral Parliament: that is, members both from the Upper House (Rajya Sabha) and from the Lower House

(Lok Sabha). Indicators of institution quality were sourced from the Worldwide Governance Indicators created by Kaufmann et al. (2011).[2]

Regarding the event study analysis undertaken in this study, the announcement dates of the PPPs were sourced from the corporate announcements section of stock exchange websites. For the years between 1988 and 2013, I obtained 138 announcements for China and 124 announcements for India. The daily stock prices of the selected firms and market indexes for the selected stock markets were collected from Datastream.

For the investment–cash flow sensitivity analysis, I focused on both the year of the PPP announcement and the five-year post-PPP investment period. These short- and long-term analyses helped me understand the nature of firms that engage in PPPs and the consequent effects of PPP investment on their future investment–cash flow sensitivity relationship. For the years between 1988 and 2013, I obtained 169 firm–year observations for China and 215 firm–year observations for India. However, owing to the exclusion of overlapping PPP investments during the five-year periods, for the long-term post-PPP analysis, I was left with 50 firm–year observations for China and 55 firm–year observations for India.

In order to reduce the potential identification problem, I created a control group of competing non-PPP firms. Applying the propensity score matching, I obtained one-to-one matched firms (for the firms investing in PPPs), matched by firm size and industry (based on the sector level of the FTSE/Dow Jones Industrial Classification Benchmark [ICB] in Datastream). I applied the nearest-neighbour matching method to capture the bias in the estimated treatment effects when matching PPP firms and non-PPP firms. See Figure 3.1 for a summary of the data collection process mentioned earlier.

3.3.2 Descriptive Analysis

Table 3.1 reports on whether PPP firms are significantly different in terms of firm characteristics compared to their competing non-PPP private firms. The main objective of this mean difference

[2]See the Appendices A for more details.

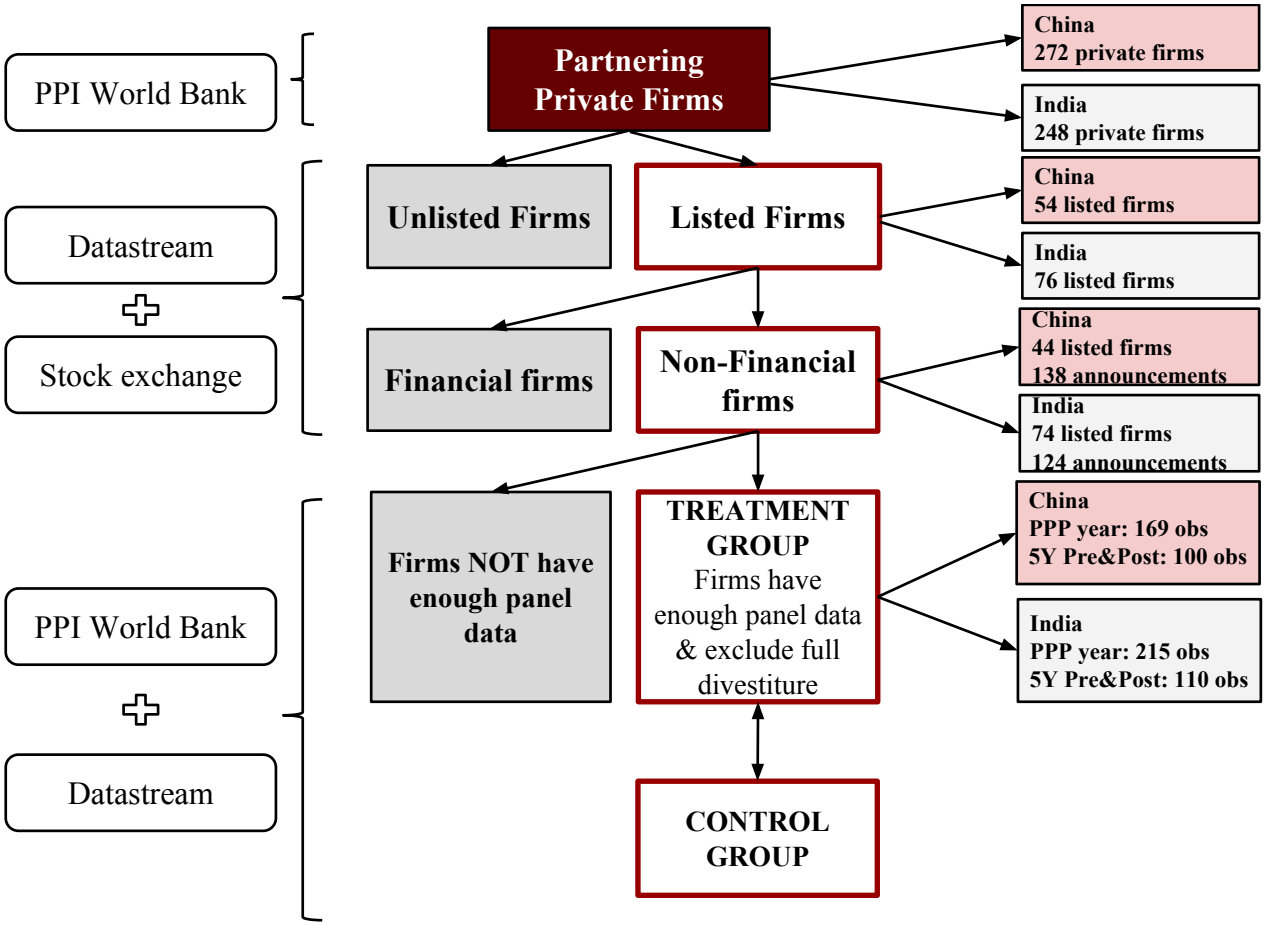


Figure 3.1: Data Collection Process for the Analysis of Investment Efficiency

analysis is to understand how the treatment and control group firms vary at the time of PPP investments and in the post-PPP investment period (five years).

As shown in the table, PPP firms in both China and India are slightly larger than their competing non-PPP firms. The Chinese PPP firms are valued better than their counterparts who do not invest in PPPs. Such a difference does not exist in India. Also, the Chinese PPP firms are older than non-PPP firms. On the contrary, the Indian PPP firms are younger. It is important to note that owing to a lower leverage ratio, the Chinese PPP firms are less debt-burdened compared to non-PPP counterparts. However, the trend is exactly the opposite in India where the Indian PPP firms are more debt burdened.

These results highlight the nature of firms that engage in PPPs in both economies. In China, older, more mature, better valued, and high cash flow firms, relative to their matched

firms, engage in PPPs. On the other hand, in India, firms that are younger and have a relatively higher debt burden than their matched counterparts engage in PPPs. This indicates that on a relative basis, the Indian firms that invest in PPPs might consider PPPs as a method of reducing their underinvestment problem.

Table 3.2 reports the descriptive analysis based on PPP firm–year observations. The results are arranged in three groups. Panel A reports the distribution of PPP observations based on the contract mechanism. Panel B reports reliance on government-based measures, and Panel C reports the various mean values of institutional quality measures during the sample period.

Panel A's statistics indicate that the majority of PPP contracts in both China and India are greenfield contracts. However, based on the awarding method, most of the Chinese firms prefer direct negotiations with the government. The Indian firms prefer the competitive bidding process. This indicates that the Chinese firms are more comfortable dealing with the government directly than those in India.

Panel B reports reliance on the government through two variables: namely, political connections and government equity participation. The mean value of political connections for the Chinese firms is 0.88 (88% of the sample firms have a political connection, past or current, through a board member), whereas for India, the corresponding value is 0.22 (or 22%). This indicates that the Chinese private sector firms participating in PPPs are more politically connected than their Indian counterparts. This could be one reason for the Chinese firms' higher preference for direct negotiations with the government. Also, the Chinese government, by providing a mean public equity of around 27%, provides higher support than the Indian government whose average public equity is only 4%.

Panel C reports the mean institutional quality values through several measures. All the values are scaled and fall between -2.5 and +2.5. The higher the value, the higher the institutional quality during the PPP years. The values reported indicate that China has lower institutional quality compared to India in terms of accountability and the rule of law. India has a lower rating in terms of political stability and government effectiveness.

Table 3.1: Descriptive Analysis – PPP and Non-PPP Firms in the PPP Years and the Five-Year Post-PPP Investments

This table provides the mean of firm-level variables and the difference of means between PPP firms and non-PPP firms along with t-tests. Panels A and B report the results of descriptive analysis on the Chinese and Indian firms, respectively, in the PPP years. Panels C and D report the results of descriptive analysis on the Chinese and Indian firms, respectively, in the five-year post-PPP period. *Investment* was measured by the changes in gross fixed assets, divided by the previous years' fixed assets. *Cash flow* denoted income before extraordinary items, depreciation and amortization, divided by the previous years' fixed assets. *Size* was measured by the natural logarithm of total assets. *Leverage* was calculated by total debt divided by total assets. *Age* was measured from the year of a firm's incorporation. *Tobin's q* (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. ***,**,* indicate significance at 1%, 5% and 10% levels, respectively.

Variable	PPP	Non-PPP	Difference	t-test	N	
Panel A: Chinese firms in the PPP years					PPP	Non-PPP
Investment	0.544	1.810	-1.266	-1.105	159	140
Cash flow	0.659	5.677	-5.018	-0.998	159	140
Size	7.062	6.867	0.195	1.970**	168	148
Leverage	0.265	0.302	-0.037	-1.657*	168	148
Age	12.485	8.689	3.796	4.594***	169	148
Tobin's q	2.212	1.580	0.632	2.410**	147	122
Panel B: Indian firms in the PPP years						
Investment	1.422	0.291	1.131	1.584	194	145
Cash flow	0.881	0.996	-0.115	-0.292	192	144
Size	7.665	7.538	0.127	1.763*	213	149
Leverage	0.400	0.311	0.089	4.626***	213	149
Age	7.772	9.383	-1.611	-2.975***	215	149
Tobin's q	2.511	2.063	0.448	0.772	175	133
Panel C: Chinese firms in the five-year post-PPP period						
Investment	0.246	0.222	0.024	0.256	50	45
Cash flow	0.359	0.192	0.167	1.280	50	45
Size	7.385	7.044	0.341	1.955*	50	45
Leverage	0.219	0.294	-0.075	-2.350**	50	45
Age	15.400	10.333	5.067	4.256***	50	45
Tobin's q	2.210	1.944	0.266	0.423	50	45
Panel D: Indian firms in the five-year post-PPP period						
Investment	0.198	0.218	-0.020	-0.413	52	45
Cash flow	0.251	0.378	-0.127	-3.016***	52	45
Size	7.939	7.887	0.051	0.360	52	46
Leverage	0.422	0.280	0.142	4.315***	52	46
Age	11.273	11.182	0.091	0.101	55	55
Tobin's q	1.288	1.971	-0.683	-1.564	52	52

Table 3.2: Descriptive Analysis of Contract Mechanism, Government Involvement and Institutional Quality for PPP Firms in the PPP Years

This table reports the descriptive analysis of the mediating factors for government reliance in PPP firms in China and India. Panel A reports the distribution of PPP observations based on the contract mechanism. Panel B reports reliance on government-based measures. Panel C reports the various mean values of institutional quality measures during the sample period.

Panel A: Contract mechanisms	China	India
N	169	215
Types of PPPs		
1. Concessions	15.43	37.38
2. Greenfield projects	57.41	51.40
3. Management and lease contracts	0.62	0.47
4. Partial divestiture	4.32	1.40
5. Multiple types in an observation year	22.22	9.35
Awarding methods		
1. Competitive bidding	19.66	64.22
2. Direct negotiation	60.68	29.41
3. Multiple methods in an observation year	19.66	6.37
Revenue sources		
1. Fixed payments from government	47.44	43.11
2. User fees	47.44	34.13
3. Multiple sources in an observation year	5.13	22.75

Panel B: Government reliance	China: Mean	China: Std.Dev	India: Mean	India: Std.Dev
Public equity	0.273	0.236	0.041	0.122
Political connection	0.881	0.325	0.223	0.417

Panel C: Institutional quality	China: Mean	China: Std.Dev	India: Mean	India: Std.Dev
Accountability	-1.535	0.121	0.410	0.036
Political stability	-0.458	0.111	-1.201	0.110
Government effectiveness	0.012	0.112	-0.044	0.085
Regulatory quality	-0.243	0.109	-0.344	0.083
Rule of law	-0.435	0.064	0.022	0.121
Control of corruption	-0.495	0.127	-0.467	0.096

3.3.3 Methodology

Event Study

My study used the event study to evaluate the effects of PPP announcements on firm market returns. In my event study, daily returns were adjusted by expected returns to obtain abnormal returns in which adjustments were estimated by the market model (Brown and Warner, 1985). Cumulative abnormal returns were also calculated over different windows, including (-10,+10),(-1,+1),(0,+5), and (0,+1). This was to capture early or delayed market response. According to Ramiah et al. (2013), non-believers in the efficient market hypothesis think market participants may not react immediately on the first day of the announcement, or they may subsequently adjust their over or under-reaction. My study next used t-tests to test whether the abnormal returns were significant different from zero or not.

$$AR_i = R_i - E(R_i) \tag{3.1}$$

$$CAR_i = \sum AR_i \tag{3.2}$$

$$t_{critical} = AAR/SE \tag{3.3}$$

$$AAR = \sum AR_i/n \tag{3.4}$$

$$SE = \sqrt{(\sum SE_i^2)/n^2} \tag{3.5}$$

Where AR_i were abnormal returns, R_i were daily returns calculated by the first natural logarithmic difference of given stock prices. $E(R_i)$ were expected returns estimated by the market

model with a 250-day estimation window, CAR_i were cumulative abnormal returns. AAR were average abnormal returns and equal to $\sum AR_i/n$ with n which was the number of announcement dates. SE were unadjusted cross-sectional errors, which were equal to $\sqrt{(\sum SE_i^2)}/n^2$.

For the robustness tests, I followed Barber and Lyon (1997) to calculate abnormal returns by applying the matched firm approach. Accordingly, abnormal returns were calculated as the difference between Holding Period Returns (or Buy-and-Hold Returns) on PPP firms and those of the non-PPP matched firms. I applied the propensity score matching to match the treatment and the control group. Accordingly, the competing non-PPP firms were one-to-one nearest matched with each partnering private firms by size, price-to-book value and industry. Accordingly, Barber and Lyon's abnormal returns (BLAR) were calculated by adjusting the daily returns of the PPP private sector firms by daily returns of the non-PPP matched firms . The Barber and Lyon cumulative abnormal returns (BLCAR) and the Buy-and-Hold abnormal returns (BAH) were then calculated across different windows, including -10 to +10,0 to +1, -1 to +1, -5 to +5. The t-test was conducted to test whether these abnormal returns were significantly different from zero or not.

Investment–Cash Flow Sensitivity Analysis

Following Fazzari et al. (1988) and Hovakimian (2009), I ran the following regression to estimate the differences in investment–cash flow sensitivity between the PPP and non-PPP firms.

$$\begin{aligned}(\frac{I}{K})_{it} &= \alpha + \beta_1(\frac{CF}{K})_{it} + \beta_2 PPP + \beta_3(\frac{CF}{K})_{it} \times PPP \\ &+ f(Control\,variables) + \delta_i + \delta_t + \epsilon_{it}\end{aligned} \tag{3.6}$$

In Equation (3.6), I denoted investment measured by the changes in gross fixed assets, while CF was cash flow measured by income before extraordinary items, depreciation, and amortization. Both were standardized by being divided by the previous year' fixed assets (K).

The PPP dummy took value 1 for private sector firms investing in PPP (a treatment group) and zero for competing non-PPP private sector firms (a control group). An interaction

between $Cash\,flow$ and the PPP dummy was to capture the differences in investment–cash flow sensitivity between the two groups.

$$PPP = \begin{cases} 1 & \text{if firms participate in PPPs (the treatment group)} \\ 0 & \text{if firms do NOT participate in PPPs (the control group)} \end{cases} \tag{3.7}$$

I used a list of $Control\,variables$ that were expected to affect investment–cash flow sensitivity. They were $Size$, $Leverage$, Age, and $Tobin's\,q_{t-1}$ (Hovakimian, 2009)[3]. $Firm\,size$ and Age were used as proxies to capture the ability to raise funds. Smaller and younger firms usually face more difficulties in raising external funds because of higher borrowing costs (Hovakimian, 2009) and adverse selection problems (Myers and Majluf, 1984). Therefore, smaller and younger firms are expected to have higher investment–cash flow sensitivity. According to the corporate life-cycle hypothesis (Hovakimian, 2009), firms have more investment opportunities but less cash flow when they are young and vice versa. Hence, a negative relationship between cash flow and investment is expected when firms become more mature. The variable $Leverage$ can influence investment–cash flow sensitivity in two contrasting ways. High leverage can limit potential possibilities to raise external funds (Myers and Majluf, 1984) because of high risk, but it also considered to lower financial constraints and lessen cash flow issues, thus reducing agency problems (Hovakimian, 2009). $Tobin's\,q_{t-1}$ (with a one-year lag) (hereafter referred to as $Tobin's\,q$) was used to capture investment opportunities. To deal with unobservable fixed effects, δ_i, δ_t were used to capture firm fixed-effects and time effects. The standard errors were clustered by industry to address the within-industry correlation.

3.3.4 Disentangling the Cause for Investment–Cash Flow Sensitivity: Underinvestment or Overinvestment

One potential interpretation problem associated with investment–cash flow sensitivity is that it can be attributed to both underinvestment and overinvestment. The idea of investment–

[3]See the Appendix for the definitions of these variables

cash flow sensitivity is supported by Myers and Majluf (1984), who claim that firms with high information asymmetries cannot be financed by external sources since they are too expensive and unavailable. As a result, managers may forgo projects with positive NPV and suffer from underinvestment. Investment–cash flow sensitivity is also explained by Jensen (1986) in terms of agency problems. Accordingly, owing to the conflict between managers and shareholders, managers use the free cash flow to pursue projects with negative NPVs (or they overinvest) for their own interest, which results in higher dependence of investment on internal cash flow.

I addressed this potential interpretation problem by exploring whether investment–cash flow sensitivity is caused by underinvestment or overinvestment. Firms with high investment opportunities (high Tobin's q) may suffer more information asymmetries and have less pledged assets, resulting in high dependence on internal cash flow (Myers and Majluf, 1984; Pawlina and Renneboog, 2005). Meanwhile, according to Jensen and Meckling (1976), managers tend to overinvest free cash flow to pursue their pecuniary and non-pecuniary benefits of larger firm size. Firms with low growth opportunities (low Tobin's q) have more overinvestment problems due to the shortage of projects with positive NPV, leading to high investment–cash flow sensitivity.

I used Tobin's q with a one-year lag to capture investment opportunities and then followed Dawson and Richter (2006) to interpret the three-way interaction *PPP*Tobin's q*Cash flow*. I first ran the regression seen below regarding the three-way interaction.

$$(\frac{I}{K})_{it} = \alpha + \beta_1(\frac{CF}{K})_{it} + \beta_2 PPP + \beta_3 Tobin's\, q + \beta_4(\frac{CF}{K})_{it} \times PPP + \beta_5(\frac{CF}{K})_{it} \times Tobin's\, q$$
$$+ \beta_6 PPP \times Tobin's\, q + \beta_7 PPP \times Tobin's\, q \times (\frac{CF}{K})_{it} + f(Control\, variables) + \delta_i + \delta_t + \epsilon_{it} \tag{3.8}$$

Subsequently, to distinguish the overinvestment and underinvestment problem, I computed simple slopes of the variable *Investment* on the variable *Cash flow*, where the moderator variables *PPP* and *Tobin's q* were held constant at different combinations of high and low values. I then compared these simple slopes and tested whether their differences were significant from zero in predicting the *Investment* variable. I conducted the Bonferroni correction to reduce

the probability of type I errors by calculating the adjusted-p value. The adjusted-p value was measured by dividing the critical p-value by the number of simultaneous tests (Dawson and Richter, 2006; Miller, 1966).

This procedure generated a total of six pairs of slopes:

(1) (PPP and high Tobin's q) - (PPP and low Tobin's q)

(2) (PPP and high Tobin's q) - (Non-PPP and high Tobin's q)

(3) (PPP and low Tobin's q) - (Non-PPP and low Tobin's q)

(4) (Non-PPP and high Tobin's q) - (Non-PPP and low Tobin's q)

(5) (PPP and high Tobin's q) - (Non-PPP and low Tobin's q)

(6) (PPP and low Tobin's q) - (Non-PPP and high Tobin's q)

In order to correctly interpret the results on whether the differences in investment–cash flow sensitivity in PPP firms were caused by underinvestment or overinvestment, I focused on the first three pairs (i.e.Pair 1 to 3). These pairs allowed me to assess differences in investment–cash flow sensitivity of PPP firms with varying degree of investment opportunities (as in Pair 1), or to compare PPP firms with their non-PPP counterparts in the same degree of investment opportunities (as in Pairs 2 and 3). A visual interpretation is illustrated in Figures 3.2 and 3.3.

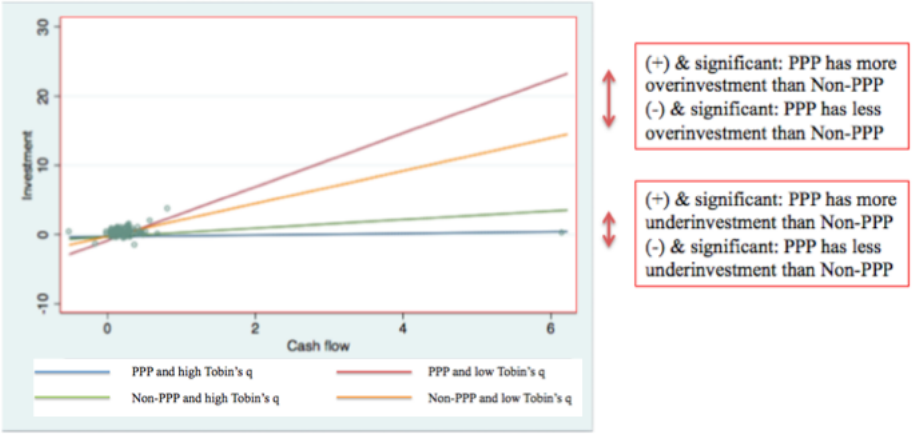
Figure 3.2: Hypothesis Development Matrix on Causes of Investment–Cash Flow Sensitivity

This figure presents the 3 x 2 matrix for distinguishing whether investment–cash flow sensitivity is caused by underinvestment or overinvestment. Each cell (or entry) shows the value of changes in simple slopes when combining the moderators PPP and Tobin's q. I consider two different values, comprising of positively and negatively statistically significant ones, to interpret the value in each cell.

	PPP (1)	Non-PPP (2)	PPP - Non-PPP (3)
High q (1)			(+) PPP has more underinvestment than non-PPP (-) PPP has less underinvestment than non-PPP
Low q (2)			(+) PPP has more overinvestment than non-PPP (-) PPP has less overinvestment than non-PPP
High q- Low q (3)	(+) PPP has underinvestment problems (-) PPP has overinvestment problems	(+) Non-PPP has underinvestment problems (-)Non-PPP has overinvestment problems	No prediction

Figure 3.3: Graph of Slopes Indicating the Causes of Investment–Cash Flow Sensitivity

This figure visualizes the simple slopes of the variable *Investment* on the variable *Cash flow*, where the moderator variables *PPP* and *Tobin's q* were held constant at different combinations of the high and low levels.



In Figure 3.2, the entry for (3,1) (the entry in Row 3 and Column 1), which refers to Pair 1, captures the differences of simple slopes when I kept the moderator *PPP* constant and let the moderator *Tobin's q* changed from a high value to a low one (one standard deviation above and below the mean, respectively) (Dawson and Richter, 2006). The entry for (3,1) is visualized in Figure 3.3 by the slope differences between the blue regression line (PPP and high Tobin's q) and the red regression line (PPP and low Tobin's q). A positive and statistically significant value for (3,1) indicate that PPP firms experience higher investment–cash flow sensitivity when the investment opportunities (*Tobin's q*) are higher. In other words, such firms may face a higher underinvestment problem as they are constrained by capital (for investments) even with high growth investment opportunities. Conversely, if the entry for (3,1) is negative and significant, this could mean that firms with low investment opportunities are more reliant on their internal cash flow compared to those with high investment opportunities. According to Vogt (1997), these kinds of firms may face overinvestment problems since they may overuse their abundant internal cash flow for an ineffective (or even negative NPV) projects.

Likewise, the entry for (1,3), regarding Pair 2, illustrates the difference of simple slopes when the moderator *PPP* dummy variable changed from the high value of 1 (i.e. PPP firms) to the low value of zero (i.e. non-PPP firms), while keeping the moderator *Tobin's q* constant

at the high level (one standard deviation above the mean) (Dawson and Richter, 2006) in both cases. This is captured in Figure 3.3 by the slope differences between the blue regression line (PPP and high Tobin's q) and the green regression line (Non-PPP and high Tobin's q). The positive difference indicates that PPP firms with high q have higher sensitivity of cash flow to investments than non-PPP firms. This supports the underinvestment hypothesis (Pawlina and Renneboog, 2005; Vogt, 1994).

In cell (2,3) for Pair 3, the moderator *PPP* dummy changed from the high value of 1 to the low value of zero, and the moderator *Tobin's q* was low (one standard deviation below the mean) (Dawson and Richter, 2006) in both cases. This is captured in Figure 3.3 by the slope differences between the red regression line (PPP and low Tobin's q) and the orange regression line (Non-PPP and low Tobin's q). In this case, a higher sensitivity implies overinvestment, as PPP firms with low q show higher demand for investment.

3.3.5 Does More Reliance on the Government Benefit Private Sector Firms?

I investigated the impacts of three important mediating factors indicating reliance on the government, including government equity participation, political connections, and the contract mechanism.

Role of Government Equity Participation on Investment–Cash Flow Sensitivity of Private Sector Firms

To indicate the effects of government equity participation on firms investing in PPPs, I ran the following regression.

$$(\frac{I}{K})_{it} = \alpha + \beta_1(\frac{CF}{K})_{it} + \beta_2 Public\,equity + \beta_3(\frac{CF}{K})_{it} \times Public\,equity + f(Control\,variables) + \delta_i + \delta_t + \epsilon_{it} \tag{3.9}$$

In Equation 3.9, data on *Public Equity* were sourced from the World Banks' PPI Project database by subtracting the proportion of private investment from the value of 1. This variable was measured by government equity participation in PPP projects of each partnering private sector firm. I also used *State ownership* to measure annual government equity participation in partnering private firms in the five-year post-PPP period. By using this variable, I was able to compare the government influence on PPP partnering private sectors firms with those on their non-PPP counterparts.

Role of Political Connections on Investment–Cash Flow Sensitivity of Private Sector Firms

To indicate the effects of political connections on PPP firms, I ran the following regression:

$$(\frac{I}{K})_{it} = \alpha + \beta_1(\frac{CF}{K})_{it} + \beta_2 Political\,connection + \beta_3(\frac{CF}{K})_{it} \times Political\,connection + f(Control\,variables) + \delta_i + \delta_t + \epsilon_{it} \quad (3.10)$$

In Equation 3.10, *Political Connection* (Pol) is a dummy variable that took 1 for firms whose chair and executive directors were formerly or are currently officers in the government, parliament, or military (Chen et al., 2011). With the Indian firms, I only accepted one firm to be politically connected if its chair or executive directors in the partnering private firms were currently members of the Indian Parliament (the Upper and Lower Houses). This is because there are differences in the political system of the two countries. While the Chinese firms operate under a stable, centrally run state and a unitary party, India has more political parties as it was influenced by the Western rational system (Desai, 2005; Almond, 1956). In India, the party that obtains the majority in the Parliament after a general election forms the government. Therefore, firms have actual political connections only if they have a connection with the current parliament.

I also tested the effects of institution quality, including *Public uncertainty*, *Accountability*, *Political stability*, *Government effectiveness*, *Regulatory quality*, *Rule of law*, and

Control of corruption[4] using the same method.

To clarify the actual effects of the public sector on PPP firms, I again followed Dawson and Richter (2006) to interpret a three-way interaction *Public variable*Tobin's q*Cash flow(CF)*. First, I ran the regression seen below for the three-way interaction.

$$
\begin{aligned}
(\frac{I}{K})_{it} &= \alpha + \beta_1(\frac{CF}{K})_{it} + \beta_2 Tobin's\, q + \beta_3 Public\, variable + \beta_4(\frac{CF}{K})_{it} \times Tobin's\, q \\
&+ \beta_5(\frac{CF}{K})_{it} \times Public\, variable + \beta_6 Tobin's\, q \times Public\, variable \\
&+ \beta_7 Tobin's\, q \times Public\, variable \times (\frac{CF}{K})_{it} + f(Control\, variables) + \delta_i + \delta_t + \epsilon_{it}
\end{aligned}
\tag{3.11}
$$

In Equation (3.11), *Public variables* can be *Public Equity* or *Political Connection*.

Subsequently, I computed simple slopes of the variable *Investment* on the variable *Cash flow* when the moderator variables *Public variable* and *Tobin's q* were held constant at different combinations of high and low values. I then compared these simple slopes and tested whether their differences were significant from zero in predicting the *Investment* variable. Following this, I then interpreted these results and linked them with underinvestment and overinvestment problems.

Role of Contract Mechanism on Investment–Cash Flow Sensitivity of Private Sector Firms

To indicate the effects of the contract mechanism on firms investing in PPPs, I ran the following regression:

$$
\begin{aligned}
(\frac{I}{K})_{it} &= \alpha + \beta_1(\frac{CF}{K})_{it} + \beta_2 Project\, dummy + \beta_3(\frac{CF}{K})_{it} \times Project\, dummy + f(Control\, variables) \\
&+ \delta_i + \delta_t + \epsilon_{it}
\end{aligned}
\tag{3.12}
$$

In Equation (3.12) , the *Project dummy* can be categorized by types of PPPs, awarding

[4]See the Appendix A for the definitions of these variables

methods, or sources of revenue:

Regarding the types of PPPs,

$$Project\,dummy = \begin{cases} O & \text{if Concession} \\ 1 & \text{if Greenfields} \end{cases} \tag{3.13}$$

Regarding the awarding methods,

$$Project\,dummy = \begin{cases} O & \text{if Competitive bidding} \\ 1 & \text{if Direct negotiation} \end{cases} \tag{3.14}$$

Regarding the sources of revenue,

$$Project\,dummy = \begin{cases} O & \text{if Fixed payments} \\ 1 & \text{if User fees} \end{cases} \tag{3.15}$$

A major obstacle to using the fixed-effects model is that it can sweep out the effects of time-invariant variables such as project dummy variables. In these cases, according to Chatelain and Ralf (2010), the pre-test estimator should be applied to choose a suitable estimation from among the Mundlak–Krishnakumar, Hausman Taylor, and restricted generalized least squares (GLS) estimators. The pre-test, which is based on the Mundlak–Krishnakumar estimator, was conducted as seen below:

$$y_{it} = \beta_1(X_{1it}) + \beta_2(X_{2it}) + \beta_3(X_{3it}) + \pi_1\bar{X}_{1i} + \pi_2\bar{X}_{2i} + \pi_3\bar{X}_{3i} + \gamma Z_i + \alpha_i + \epsilon_{it} \tag{3.16}$$

3.4 Empirical Results and Discussion

3.4.1 Public–Private Partnerships and Market Valuation

Event Study

Table 3.3 presents the results of the event study that aims to evaluate market responses to PPP investment announcements that are made by listed private sector firms in China and India. The results confirm that, on average, announcements of PPP investment decisions have a significant positive impact on firm value. Both the Chinese and the Indian PPP-invested private sector firms experience statistically significant positive average abnormal returns (AAR) on the PPP announcement day (Day 0). The Chinese (Indian) private sector firms experience 0.43% (0.94%) abnormal returns on the announcement date. For a ten-day cumulative abnormal return (CAR) window, the cumulative abnormal returns are 1.87% and 2.11% for the Chinese and Indian firms, respectively. This indicates that PPP investment decisions are economically significant in both countries. Also, these results are generally consistent with the SVMH and the traditional valuation theory, which associate strategic investment decisions with a possible increase in future cash flows (Woolridge and Snow, 1990). Therefore, these results lend support to the hypothesis that stock markets react positively to the announcements partnering private firms make about PPP projects.

Figure 3.4 depicts the trend of CAR over the event window from t = -10 to t = 10. Overall, the Chinese and Indian firms witness the significant increase in their wealth. However, there appears to be a leakage of information in China as the Chinese firms react much earlier to news of the investment: that is, before the public announcement date. As can be seen in Figure 3.4, the Chinese firms' CAR experiences a significant increase from Day -10 to Day 10, apart from some slight decreases on Day -1, Day 4 and Day 9. Meanwhile, in India, the PPP firms experience a dip in CAR from Day -10 to Day -4 before experiencing a dramatic surge to reach a peak at roughly 2.6 on Day 6. Therefore, compared with the Chinese CAR, the Indian CAR

Table 3.3: Chinese and Indian Firms - Event Study

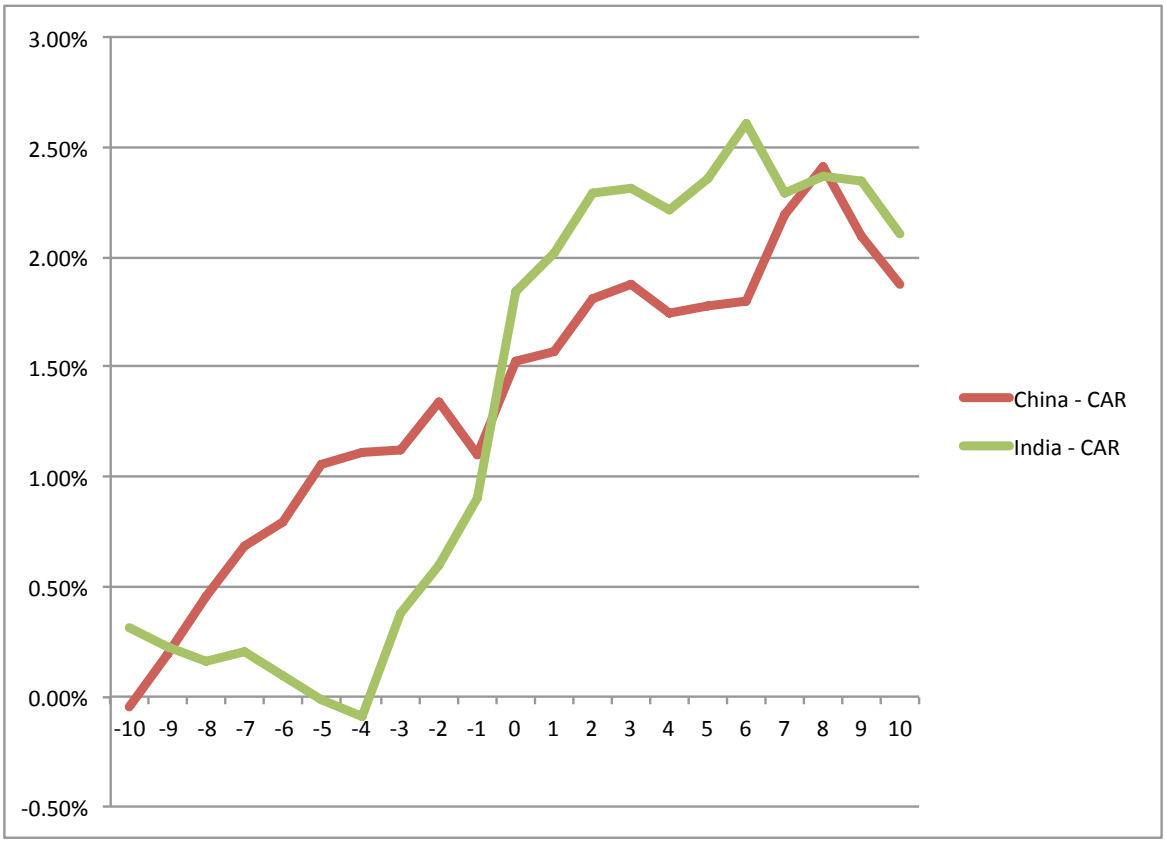
The table presents the results of the event study to evaluate the effects of 138 PPP announcements of Chinese firms and 124 PPP announcements of Indian firms on firm market value. The event window was ten days before and after the PPP announcements. An abnormal return was calculated by adjusting daily return by expected return, which is approximated by the market model with the 250-day estimate window. In Panel A, an average abnormal return (AAR) was measured by averaging the abnormal returns over PPP announcements on the same day in the event window. A cumulative abnormal return (CAR) was calculated over 20 days from t = -10 to t = 10. In Panel B, $CARs$ were calculated over different windows, including -10 to +10, -1 to +1, 0 to +5, 0 to +1. The t-test was used to test whether average abnormal returns are significant different from zero or not. ***,**,* indicate significance at 1%, 5% and 10% levels, respectively.

Panel A	**China**			**India**		
Day relative to the event	**AAR**	**t-test**	**CAR**	**AAR**	**t-test**	**CAR**
-10	-0.05%	-0.245	-0.05%	0.32%	1.322	0.32%
-9	0.24%	1.145	0.19%	-0.08%	-0.350	0.23%
-8	0.27%	1.258	0.46%	-0.08%	-0.316	0.16%
-7	0.23%	1.076	0.69%	0.04%	0.180	0.20%
-6	0.11%	0.506	0.80%	-0.11%	-0.445	0.09%
-5	0.26%	1.210	1.05%	-0.11%	-0.449	-0.01%
-4	0.06%	0.274	1.11%	-0.08%	-0.328	-0.09%
-3	0.01%	0.040	1.12%	0.47%	1.958*	0.37%
-2	0.22%	1.018	1.34%	0.22%	0.917	0.59%
-1	-0.24%	-1.137	1.10%	0.32%	1.322	0.91%
0	**0.43%**	**2.023****	**1.53%**	**0.94%**	**3.939*****	**1.85%**
1	0.04%	0.186	1.57%	0.18%	0.735	2.02%
2	0.25%	1.162	1.82%	0.27%	1.121	2.29%
3	0.06%	0.262	1.87%	0.03%	0.105	2.31%
4	-0.13%	-0.598	1.74%	-0.10%	-0.429	2.21%
5	0.03%	0.132	1.77%	0.15%	0.611	2.36%
6	0.03%	0.142	1.80%	0.25%	1.030	2.60%
7	0.40%	1.853	2.20%	-0.31%	-1.307	2.29%
8	0.21%	1.004	2.41%	0.07%	0.301	2.36%
9	-0.32%	-1.488	2.09%	-0.02%	-0.082	2.34%
10	-0.22%	-1.047	1.87%	-0.24%	-0.990	2.11%

Panel B	**China**		**India**		**No of announcements**	
Windows	**CAR**	**T-stat**	**CAR**	**T-stat**	**China**	**India**
(-10,+10)	1.87%	8.7373***	2.11%	8.846***	138	124
(0,+5)	0.68%	3.167***	1.45%	6.082***		
(0,+1)	0.47%	2.210**	1.11%	4.673***		
(-1,+1)	0.23%	1.081	1.43%	5.996***		

Figure 3.4: Chinese and Indian Firms - Cumulative Abnormal Returns (CAR) Graph

This figure presents graphs of Cumulative abnormal returns (CAR) with the event window from t = -10 to t = 10 of 138 PPP announcements in China and 124 announcements in India. The figure for CAR is based on Table 3.3



seems to be lower on the pre-PPP announcement dates but outnumbers the Chinese CAR on the days after the PPP announcements.

Barber and Lyon Matched-Firm Approach

For the robustness tests, I followed Barber and Lyon (1997) to calculate abnormal returns by the matched firm approach. The results are presented in Table 3.4. Most of the abnormal returns indicate positive and significant means over different windows, apart from those in the (-10,+10) windows The results further confirm that announcements of PPPs add value to private sector firms in the partnership compared with non-PPP competing firms in the same industry.

Table 3.4: Chinese and Indian Firms: Barber and Lyon Cumulative Abnormal Returns and Buy-and-Hold Abnormal Returns

The table evaluates the effects of 138 PPP announcements of the Chinese firms and 124 PPP announcements of the Indian firms on firm market value as the robustness test in addition to the event study. Following Barber and Lyon (1997), a Barber and Lyon abnormal return ($BLAR$) was calculated by adjusting the daily Holding Period Return of the sample firm by those of the control firm, with the latter matched by *Size*, *Price-to-book value* and *Industry*. Barber and Lyon cumulative abnormal returns ($BLCARs$) were then calculated over different windows, including -10 to +10, 0 to +1, -1 to +1, -5 to +5. I also calculated the Buy-and-Hold abnormal returns (BAH) over different windows. The t-test was used to test whether the average abnormal returns were significantly different from zero or not. ***,**,* indicate significance at 1%, 5% and 10% levels, respectively.

Panel A: China	Mean	t-test	N	Panel B: India	Mean	t-test	N
BLAR0	0.68%	2.617***	138	BLAR0	0.89%	2.531**	124
BLCAR(-10,+10)	1.59%	0.877	138	BLCAR(-10,+10)	1.37%	1.121	124
BLCAR(0,+1)	1.03%	1.894*	138	BLCAR(0,+1)	1.07%	2.601**	124
BLCAR(-1,+1)	1.02%	1.696*	138	BLCAR(-1,+1)	1.69%	3.721***	124
BLCAR(-5,+5)	1.62%	1.481	138	BLCAR(-5,+5)	1.96%	2.16**	124
BAH(-10,+10)	2.48%	1.039	138	BAH(-10,+10)	1.61%	1.263	124
BAH(0,+1)	1.05%	1.909*	138	BAH(0,+1)	1.06%	2.595**	124
BAH(-1,+1)	1.06%	1.721*	138	BAH(-1,+1)	1.66%	3.640***	124
BAH(-5,+5)	1.96%	1.699*	138	BAH(-5,+5)	2.04%	2.163**	124

Determinants of Wealth Effects Arising from PPP Announcements

Tables 3.5 and 3.6 report the regression results, which guides me in understanding the determinants of wealth effects associated with the decision to invest in PPPs. This was done by regressing the dependent variable, the two-day (0,+1) cumulative abnormal return ($CAR01$) on the groups of variables, including firm characteristics, government reliance and institutional quality. The firm-level variables, similar to investment–cash flow analysis, include $Tobin's\, q_{t-1}$, *Size*, *Leverage* and *Age*. $Tobin's\, q_{t-1}$ was used to capture investment opportunities. $Cash\, flow$, *Size*, and *Age* reflect the effects of overinvestment and underinvestment problems, which can influence the market valuation of investment (Hovakimian, 2009; Jensen, 1986; Vogt, 1997). *Leverage* was considered to be an index of credible pre-commitment, which reduces the expected cost of free cash flow. It was expected to have a positive relation with market responses (Jensen, 1986). The standard errors were clustered by industry to control for within-industry correlation.

For the Chinese firms, as indicated in Panel B of Table 3.5, after controlling for firm characteristics, I find that firms that are politically connected experience significantly higher positive announcement effects than nonpolitically connected firms. Regarding institutional quality, as indicated in Panel C of Table 3.5, political uncertainty, measured as the year of change in government or government officers, has adverse effects on firms investing in PPPs during those years in China. However, in the context of higher regulatory quality and higher corruption control, the Chinese PPP firms benefit more from their announcements.

In the case of the Indian firms, as indicated in Panel B of Table 3.6, unlike China, political connections do not have significant effects, while higher regulatory quality has adverse effects. As indicated in Panel C of Table 3.6, these Indian firms are similar to the Chinese firms in that, for both countries, political uncertainty has adverse impacts on firm value. Additionally, accountability matters in India, as higher accountability is correlated with higher wealth effects being associated with PPP announcements. Overall, these results highlight the varying effect of political connections on PPP investments.[5]

3.4.2 Public–Private Partnerships and Investment–Cash Flow Sensitivity

Table 3.7 compares investment–cash flow sensitivity between PPP and non-PPP firms in the PPP investment year and the five-year post-PPP investment. The objective of this analysis is to explain the influence on firm characteristics and, in particular, their internal cash flow, on firm investments. I find that at the time of engaging in PPP contracts, as seen in Column 1, the Chinese firms suffer from the investment–cash flow sensitivity problem. This is evident from the positive and significant coefficient for the variable *Cash flow*. The coefficient equals 0.215, which indicates that, on average, investments are dependent by 21%, for every one unit increase in

[5]For the sensitivity test, I used the two-day Barber and Lyon cumulative abnormal returns (BLCAR01) and the two-day Buy-and-Hold abnormal returns (BAH01) as the dependent variables to replace the cumulative abnormal returns (CAR01). The results are shown in Appendix B. The Chinese firms still experience the positive and significant effects of political connections and high regulatory quality on abnormal returns, whereas, in the Indian firms, political connections have adverse effects.

Table 3.5: Chinese Firms: Cumulative Abnormal Returns, Reliance on the Government and Institution Quality

This table presents the effect of government reliance and institution quality on the cumulative abnormal return of PPP firms. $CAR01$, the dependent variable, was the cumulative abnormal return of day 0 and day +1. $Cash\ flow$ denoted income before extraordinary items, depreciation and amortization, divided by the previous year's fixed assets. $Size$ was measured by the natural logarithm of total assets. $Leverage$ was calculated by the total debt divided by the total assets. Age was measured from the year of a firm's incorporation. $Tobin's\ q$ (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. $Public\ uncertainty$ (PU) was a dummy variable, which took value 1 for PPP firms in general election years, or else zero for PPP firms in non-election years. $Public\ equity$ (PE), which was measured by the proportion of total PPP investment that belongs to the government, captured government equity participation in PPP projects. $Political\ connection$ (Pol) was a dummy variable, which took value 1 for firms that had a chair and executive directors who were formerly or are currently officers in the government, the parliament or the military. $Accountability$, $Political\ stability$, $Government\ effectiveness$, $Regulatory\ quality$, $Rule\ of\ law$ and $Control\ of\ corruption$ capture institution quality. The t-statistics are in parentheses. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

CAR01	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Firm-characteristic variables										
Cash flow	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.0001	-0.001
	(-1.00)	(-1.32)	(-1.09)	(-1.05)	(-0.91)	(-0.77)	(-1.00)	(-0.82)	(-0.12)	(-0.79)
Leverage	0.009	0.019	0.002	0.009	0.006	0.014	0.002	-0.008	-0.002	0.025
	(0.75)	(1.67)	(0.24)	(0.72)	(0.34)	(0.99)	(0.09)	(-0.32)	(-0.15)	(1.61)
Size	-0.022*	-0.022*	-0.022*	-0.022*	-0.022*	-0.025*	-0.021*	-0.024*	-0.019	-0.030**
	(-1.87)	(-1.95)	(-1.96)	(-1.96)	(-1.80)	(-2.15)	(-1.89)	(-2.02)	(-1.62)	(-2.46)
Age	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002*
	(1.29)	(1.42)	(1.31)	(1.35)	(1.13)	(1.52)	(1.12)	(1.51)	(1.09)	(1.92)
Tobin's q	-0.001	-0.001	-0.001	-0.0004	-0.001	-0.001	-0.001	-0.001	0.0003	-0.002
	(-0.67)	(-0.44)	(-0.99)	(-0.27)	(-0.62)	(-0.71)	(-0.60)	(-0.35)	(0.18)	(-0.98)
Panel B: Government involvement variables										
Public equity		0.023								
		(0.78)								
Political connection			0.022***							
			(4.67)							
Panel C: Institution quality variables										
Public uncertainty				-0.012**						
				(-2.65)						
Accountability					-0.012					
					(-0.43)					
Political stability						0.014				
						(1.14)				
Government effectiveness							0.024			
							(0.60)			
Regulatory quality								0.053*		
								(1.82)		
Rule of law									-0.134**	
									(-2.61)	
Control of corruption										0.047**
										(2.31)
Constant	0.150*	0.152**	0.135*	0.153*	0.133	0.176**	0.149*	0.182*	0.072	0.219**
	(2.07)	(2.28)	(1.97)	(2.15)	(1.63)	(2.52)	(2.17)	(2.10)	(0.90)	(2.89)
R-squared	4.74	5.68	5.04	5.45	5.09	5.1	5.23	6.17	6.62	5.73
N	124	124	121	124	117	117	117	117	117	117

Table 3.6: Indian Firms: Cumulative Abnormal Returns, Reliance on the Government and Institution Quality

This table presents the effect of government reliance and institution quality on the cumulative abnormal return of PPP firms. $CAR01$, the dependent variable, was the cumulative abnormal return of day 0 and day +1. $Cash\ flow$ denoted income before extraordinary items, depreciation and amortization, divided by the previous year's fixed assets. $Size$ was measured by the natural logarithm of total assets. $Leverage$ was calculated by the total debt divided by the total assets. Age was measured from the year of a firm's incorporation. $Tobin's\ q$ (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. $Public\ uncertainty$ (PU) was a dummy variable, which took value 1 for PPP firms in general election years, or else zero for PPP firms in non-election years. $Public\ equity$ (PE), which was measured by the proportion of total PPP investment that belongs to the government, captured government equity participation in PPP projects. $Political\ connection$ (Pol) was a dummy variable, which took value 1 for firms that had a chair and executive directors who were formerly or are currently officers in the government, the parliament or the military. $Accountability$, $Political\ stability$, $Government\ effectiveness$, $Regulatory\ quality$, $Rule\ of\ law$ and $Control\ of\ corruption$ captured institution quality. The t-statistics are in parentheses. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

CAR01	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Firm-characteristic variables										
Cash flow	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003
	(0.57)	(0.53)	(0.47)	(0.50)	(0.62)	(0.59)	(0.57)	(0.56)	(0.48)	(0.47)
Leverage	-0.003	-0.005	-0.003	-0.004	-0.006	-0.004	-0.003	-0.005	-0.009	-0.008
	(-0.16)	(-0.24)	(-0.17)	(-0.23)	(-0.28)	(-0.19)	(-0.16)	(-0.25)	(-0.41)	(-0.38)
Size	-0.009	-0.008	-0.009	-0.008	-0.009	-0.009	-0.009	-0.009	-0.008	-0.008
	(-1.17)	(-1.07)	(-1.16)	(-1.12)	(-1.15)	(-1.18)	(-1.14)	(-1.18)	(-1.08)	(-1.10)
Age	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(1.35)	(1.30)	(1.35)	(1.30)	(1.31)	(1.33)	(1.27)	(1.25)	(1.20)	(1.27)
Tobin's q	-0.0003	-0.0003	-0.0003	-0.0004	-0.0004	-0.0004	-0.0004	-0.0003	-0.0003	-0.0003
	(-1.11)	(-1.08)	(-1.13)	(-1.17)	(-1.20)	(-1.10)	(-1.12)	(-1.03)	(-1.05)	(-1.04)
Panel B: Government involvement variables										
Public equity		-0.013								
		(-1.29)								
Political connection			-0.004							
			(-0.30)							
Panel C: Institution quality variables										
Public uncertainty				-0.007**						
				(-2.59)						
Accountability					0.052*					
					(1.96)					
Political stability						-0.007				
						(-0.31)				
Government effectiveness							-0.002			
							(-0.11)			
Regulatory quality								-0.050***		
								(-7.26)		
Rule of law									-0.016	
									(-1.82)	
Control of corruption										-0.022
										(-1.25)
Constant	0.069	0.064	0.068	0.067	0.047	0.061	0.069	0.053	0.068	0.057
	(1.40)	(1.30)	(1.40)	(1.36)	(0.93)	(0.97)	(1.36)	(1.12)	(1.36)	(1.12)
R-squared	3.28	3.7	3.8	3.44	3.51	3.34	3.28	4.37	3.55	3.57
N	98	96	98	98	98	98	98	98	98	98

the firms' internal cash flow. Further, the sensitivity increases to 88% (coefficient of 0.886), five years after the PPP investment period. However, for firms investing in PPPs, the interaction variable between the PPP dummy and internal cash flow shows that there is significantly lower sensitivity, evident from the negative and significant coefficient for the interaction variable. This indicates that the PPP firms in China, on average, exhibit lower investment–cash flow sensitivity than their competing non-PPP firms. The post-PPP investment sensitivity changes from 22% to 75%, relative to the non-PPP firms. This indicates that PPP investment by private sector firms has significant economic benefit. Their reliance on internal cash flow reduces substantially compared to their competing non-PPP firms. To give some perspective, if a firm has to make an investment of $100 million, on average, the firm in China use $21 million from their internal cash flow. However, a firm investing in PPPs needs 22% less internal cash flow in the investment year (compared to a non-PPP firm). Later, the reliance reduces further by 75% in the post-PPP period, supporting Hypothesis 2.

The results for the Indian market contrast with those for the Chinese firms. The Indian firms investing in PPPs suffer from higher investment–cash flow sensitivity. On average, the Indian firms investing in PPPs need 227% higher internal cash flow (the interaction coefficient 2.27) than their non-PPP firms. This clearly indicates that cash-constrained firms opt for PPP in India, possibly owing to the underinvestment problem. The post-PPP investment period results indicate no significant difference in investment–cash flow sensitivity between the PPP and the non-PPP firms. However, the overall sensitivity is quite high for both types of firms. This suggests that the Indian firms, on average, suffer from underinvestment problems. This result corroborates with those in Table 3.1, indicating that the Indian PPP firms are relatively more cash burdened when they opt for PPP investment.[6]

Now, I turn my analysis to whether overinvestment or underinvestment drives high cash flow sensitivity in China and India.

[6]I also used sales growth, measured by the changes in net sales divided by previous net sales, as the alternative measure of investment opportunities instead of Tobin's q. I arrive at the same results. See Table C6 in the Appendix C for more details.

Table 3.7: Chinese and Indian Firms: Investment–Cash Flow Sensitivity: PPP and Non-PPP Firms in the PPP Investment Years and the Five-Year Post-PPP Investment Period

This table compares investment–cash flow sensitivity between PPP firms and non-PPP firms. Columns (1) and (2) indicate the Chinese firms. Columns (3) and (4) indicate the Indian firms. *Investment* was measured by the changes in gross fixed assets, divided by the previous year's fixed assets. *Cash flow* denoted income before extraordinary items, depreciation and amortization, divided by the previous year's fixed assets. *Size* is measured by the natural logarithm of total assets. *Leverage* was calculated by the total debt divided by the total assets. Age was measured from the year of firm's incorporation. *PPP* was a dummy variable, which took value 1 for firms invested in PPP projects, else zero for firms which were matched by industry and firm size. *Tobin's q* (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. The t-statistics are in parentheses. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

	China PPP year	China five-year post-PPP	India PPP year	India five-year post-PPP
Investment	(1)	(2)	(3)	(4)
Cash flow	0.216***	0.886***	0.006	0.989***
	(169.38)	(3.25)	(0.44)	(5.13)
Leverage	2.076	0.100	1.944***	0.266
	(0.90)	(0.26)	(3.03)	(1.41)
Size	-1.360	-0.029	0.063	0.119**
	(-1.43)	(-0.38)	(0.22)	(2.6)
Age	0.081	-0.100***	0.045	-0.012*
	(1.07)	(-3.3)	(0.95)	(-1.94)
Tobin's q	-0.444	0.004**	-0.040***	-0.060***
	(-1.26)	(0.38)	(-2.06)	(-3.74)
PPP	0.440**	0.212	-1.269**	0.155
	(2.08)	(1.36)	(-2.65)	(1.46)
PPP*Cash flow	-0.222***	-0.751***	2.271***	-0.503
	(-13.87)	(-3.28)	(3.39)	(-1.36)
Constant	9.196	0.324	-1.177	-0.921***
	1.55	0.86	-0.77	-3.45
R-squared	88.97	9.56	77.72	19.26
N	267	95	303	97

3.4.3 Underinvestment vs Overinvestment

In order to explore the reasons for the differences in investment–cash flow sensitivity for China and India, as discussed in Section 3.3.4, I used the three-way interaction *PPP*Tobin's q*Cash flow* method and drew inferences by comparing simple slopes. I then applied the slope difference method in Tables 3.8.

During the year of the PPP investment (PPP year), as shown in Panel A of Table 3.8, the

Table 3.8: Chinese and Indian Firms: Reason for the Differences in Investment–Cash Flow Sensitivity - PPP and Non-PPP Firms

This table uses the Slope Difference Test to show whether the differences between PPP and non-PPP firms in investment-cash flow sensitivity are caused by underinvestment or overinvestment. Panels A and B reports the results of the Chinese firms in the PPP investment year and the 5-year post-PPP period, respectively. Panels C and D reports the results of the Indian firms in the PPP investment year and the 5-year post-PPP period, respectively. PPP was a dummy variable which took value 1 for firms invested in PPP projects, or else zero for firms which were matched by industry and firm size. $Tobin's\, q$ was measured by the market to book value of total assets in order to capture investment opportunities. The adjusted-p was a Bonferroni adjusted p-value which accounted for the fact that there are six post-hoc tests. This was a conservative adjustment by multiplying each p-value by the number of tests. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Chinese firms in the PPP year	Coef.	Std. Err.	t-test	p-value	Adjusted-p
(PPP & high q)-(PPP & low q)	-0.091	0.028	-3.25	0.006	0.036**
(PPP & high q)-(Non-PPP & high q)	-0.298	0.351	-0.85	0.411	2.466
(PPP & low q)-(Non-PPP & low q)	-0.137	0.024	-5.73	0.000	0.000***
(Non-PPP & high q)-(Non-PPP & low q)	0.070	0.363	0.19	0.850	5.100
(PPP & high q)-(Non-PPP & low q)	-0.228	0.013	-17.77	0.000	0.000***
(PPP & low q)-(Non-PPP & high q)	-0.207	0.370	-0.56	0.585	3.510
Panel B: Chinese firms in the post-PPP	Coef.	Std. Err.	t-test	p-value	Adjusted-p
(PPP & high q)-(PPP & low q)	-3.763	1.333	-2.82	0.005	0.030**
(PPP & high q)-(Non-PPP & high q)	-0.504	0.259	-1.94	0.052	0.312
(PPP & low q)-(Non-PPP & low q)	3.401	2.031	1.67	0.094	0.564
(Non-PPP & high q)-(Non-PPP & low q)	0.142	0.719	0.2	0.844	5.064
(PPP & high q)-(Non-PPP & low q)	-0.362	0.866	-0.42	0.676	4.056
(PPP & low q)-(Non-PPP & high q)	3.259	1.578	2.07	0.039	0.234
Panel C: Indian firms in the PPP year	Coef.	Std. Err.	t-test	p-value	Adjusted-p
(PPP & high q)-(PPP & low q)	2.653	0.063	42.09	0.000	0.000***
(PPP & high q)-(Non-PPP & high q)	2.739	0.079	34.54	0.000	0.000***
(PPP & low q)-(Non-PPP & low q)	0.260	0.018	14.59	0.000	0.000***
(Non-PPP & high q)-(Non-PPP & low q)	0.175	0.115	1.51	0.150	0.900
(PPP & high q)-(Non-PPP & low q)	2.913	0.0470	62.03	0.000	0.000***
(PPP & low q)-(Non-PPP & high q)	0.085	0.127	0.67	0.512	3.072
Panel D: Indian firms in the post-PPP	Coef.	Std. Err.	t-test	p-value	Adjusted-p
(PPP & high q)-(PPP & low q)	-1.195	0.522	-2.29	0.022	0.132
(PPP & high q)-(Non-PPP & high q)	-0.476	0.132	-3.59	0.000	0.000***
(PPP & low q)-(Non-PPP & low q)	0.346	0.757	0.46	0.648	3.888
(Non-PPP & high q)-(Non-PPP & low q)	-0.372	0.304	-1.22	0.221	1.326
(PPP & high q)-(Non-PPP & low q)	-0.848	0.322	-2.64	0.008	0.048**
(PPP & low q)-(Non-PPP & high q)	0.718	0.634	1.13	0.257	1.542

Chinese firms experience a negative and significant slope difference between PPP firms with high *Tobin's q* and PPP firms with low *Tobin's q*. This suggests that the Chinese PPP firms with low investment opportunities may have a higher cash burden than those with high investment opportunities. This result supports the overinvestment hypothesis of Jensen (1986), indicating that the Chinese PPP firms may overinvest. However, Panel A of Table 3.8 show that Chinese firms witness significant negative slope differences between PPP and non-PPP firms with low *Tobin's q*. This indicates that PPP firms with low *Tobin's q* experience lower investment–cash flow sensitivity than non-PPP firms with low *Tobin's q*. This indicates that Chinese firms with lower overinvestment problems opt for PPP projects. Now, I turn to the post-PPP period. As shown in Panel B of Table 3.8, the statistical significant slope difference only holds between PPP firms with high *Tobin's q* and PPP firms with low *Tobin's q*, suggesting that the overinvestment problem for PPP firms in China persists even after five years of participation in PPP projects. Overall, the results suggest that Chinese firms investing in PPPs exhibit high investment–cash flow sensitivity due to the overinvestment problem.

During the PPP years, there is evidence of both underinvestment and overinvestment for Indian firms investing in PPPs, as indicated in Panel C of Table 3.8. This is evident from the positive and significant slope differences between PPP firms and non-PPP firms when I kept the moderator variable *Tobin's q* constant (at both the high and the low levels), as shown in Pairs 2 and 3 in Panel C of Table 3.8. Within the PPP firms, the slope difference between PPP firms with high *Tobin's q* and PPP firms with low *Tobin's q* is also positive and significant, as shown in Pair 1 of Panel C. This indicates that PPP firms with high *Tobin's q* experience higher investment–cash flow sensitivity than PPP firms with low *Tobin's q*. This result supports the underinvestment hypothesis (Vogt, 1994). The results of the PPP sensitivity analysis for India are in line with those in Tables 3.1 and 3.7, suggesting that the Indian PPP firms depend considerably on internal cash flow to circumvent the adverse selection problem (Vogt, 1994; Myers and Majluf, 1984; Stiglitz and Weiss, 1981).The post-PPP sensitivity analysis, as reported in Panel D of Table 3.8, shows a significant negative slope difference between PPP firms with high *Tobin's q* and non-PPP firms with high *Tobin's q*. The slope difference between PPP

firms with low *Tobin's q* and non-PPP firms with low *Tobin's q* is not significant. Therefore, in India, the lower investment–cash flow sensitivity of PPP firms compared to non-PPP firms only occurs in the sub-group of firms with high *Tobin's q* or high growth opportunities. This result supports the underinvestment hypothesis. Thus, private sector firms appear to benefit through lower underinvestment constraints compared to non-PPP firms in the post-PPP period, supporting Hypothesis 2.

3.4.4 Which Firms Prefer Political Connections?

My second moderating variable, as discussed in Section 3.3.5, indicates the extent of political connections of the participating firms investing in PPPs. Before I gained an understanding of the role of political connections, I needed to appreciate which firms investing in PPPs were more likely to have political connections. Table 3.9 reports the results based on a logit regression, which uses the firms' political connections as the binary dependent variable. Columns 1 and 3 report the results for the Chinese and the Indian PPP firms, respectively. In China, PPP firms with high leverage and large investments in PPPs are more likely to have political connections. This is evident from the positive and significant coefficients for *Leverage* and *Total investment*. In India, PPP firms with low internal *Cash flow* and high *Size* seem to be more likely to seek political connections. These findings are in line with the idea above that the Indian PPP firms facing capital constraints and making political connections may be considered as a mechanism to alleviate liquidity problems faced in PPP projects. The Indian PPP firms with higher government equity participation in PPPs and multiple PPP projects are also more likely be politically connected. This is evident from the positive and significant coefficients for *Multiple projects* and *Public equity*.

Table 3.9: Chinese and Indian Firms: Firm-Level Characteristics and Project-Level Characteristics for Politically Connected Firms in the PPP Years

This table presents the results of logit regression to illustrate what certain kind of firms and PPP projects are more likely to have political connections. *Political connection* (Pol) was a dummy variable that took value 1 for firms that had a chair and executive directors who were formerly or are currently officers in the government, the parliament or the military. $Cash\,flow$ denoted income before extraordinary items, depreciation and amortization, divided by the previous year's fixed assets. *Size* was measured by the natural logarithm of total assets. *Leverage* was calculated by total debt divided by total assets. *Age* was measured from the year of firms' incorporation. $Tobin's\,q$ (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. *Total investment* was measured by the logarithm of the sum of investment in physical assets and payments to the government of a given PPP firm in a given year. *Public equity* (PE) was measured by the proportion of total PPP investment that belongs to the government. $Multiple\,project$ was a dummy variable that took value 1 if PPP firms had more than one PPP projects or zero else. The t-statistics are in parentheses. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Political connection	China (1)	India (2)
Cash flow	-0.014	-1.035**
	(-0.69)	(-2.21)
Leverage	7.054***	0.561
	(2.76)	(0.18)
Size	0.452	1.444**
	(0.73)	(2.24)
Age	-0.014	-0.033
	(-0.25)	(-0.61)
Tobin's q	0.077	-0.053
	(0.52)	(-0.80)
Total investment	0.006***	-0.0003
	(6.75)	(-1.66)
Multiple project	-0.222	1.708**
	(-0.26)	(2.53)
Public equity	-1.131	5.855
	(-0.80)	(2.51**)
Constant	-2.766	-13.684***
	(-0.75)	(-3.40)
N	127	163

3.4.5 Role of Reliance on the Government on Investment–Cash Flow Sensitivity

As PPP projects involve the public sector, government commitment and political uncertainty can have a significant impact on the cash flow position of the participating private firms. I tested this conjecture using equity participation by the government as a measure of government commitment or involvement in a given PPP venture. I also tested whether political connections and changes in institutional quality through governance indicators influence PPP firms' investment efficiency in the post-PPP period.

Tables 3.10 and 3.11 report the results of the regression on Equation 3.9 for the five-year post-PPP contract period. I used the duration of the five-year period in order to keep the election cycle in perspective.

In terms of public equity, I find that, as indicated in Column 1 of Tables 3.10 and 3.11, for the Chinese firms investing in PPPs, higher equity contribution from the government reduces their investment–cash flow sensitivity in the post-PPP period, which supports Hypothesis 3. However, in the case of the Indian firms, it is exactly the opposite: higher equity contribution from the government increases the participating private sector firms' investment–cash flow sensitivity. This indicates that higher commitment from the government can have mixed results.

Table 3.12 clarifies the reasons for the influence of public equity on the firms' investment–cash flow sensitivity. As can be seen from Panel A and the hypothesis matrix in Table 3.12, for the Chinese firms, there is a significant negative slope difference between firms with high *Public equity* and low *Tobin's q*, and firms with low *Public equity* and low *Tobin's q*. This indicates that firms with higher government investment have less overinvestment or that government involvement helps Chinese firms reduce overinvestment. The results for the Indian firms, as indicated in Panel B, are insignificant.

I also use *State ownership* to reconfirm the influence of goverment equity participation in private sector firms, and the results are reported in Tables 3.13. Panel A of these tables uses

Table 3.10: Chinese Firms: Investment–Cash Flow Sensitivity, Government Reliance and Institution Quality in the Five-Year Post-PPP Period

This table presents the effect of government reliance and institution quality on the investment–cash flow sensitivity of PPP firms in the five-year post-PPP period. *Investment* was measured by the changes in gross fixed assets, divided by the previous year's fixed assets. $Cash\,flow$ denoted income before extraordinary items, depreciation and amortization, divided by the previous years' fixed assets. *Size* was measured by the natural logarithm of total assets. *Leverage* was calculated by total debt divided by total assets. *Age* was measured from the year of firms' incorporation. $Tobin's\,q$ (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. *Public uncertainty* (PU) was a dummy variable which took value 1 for PPP firms in general election years, or else zero for PPP firms in non-election years. *Public equity* (PE), which was measured by the proportion of the total PPP investment that belonged to the government, captured government involvement in PPP projects. *Political connection* (Pol) was a dummy variable which took value 1 for firms that had a chair and executive directors who were formerly or are currently officers in the government, the parliament or the military. *Accountability*, *Political stability*, *Government effectiveness*, *Regulatory quality*, *Rule of law* and *Control of corruption* captured institution quality. The t-statistics are in parentheses. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Investment	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Firm-characteristic variables									
Cash flow	5.156***	3.129**	0.129***	4.432	-4.824	0.368	-4.626***	-4.434	-0.535
	(9.36)	(2.29)	(4.03)	(0.93)	(-1.54)	(0.99)	(-5.22)	(-0.94)	(-0.19)
Leverage	0.688	1.399	0.796	4.390	4.733**	4.770*	4.290**	5.265*	5.013*
	(0.76)	(1.54)	(1.32)	(1.5)	(2.3)	(1.67)	(2.19)	(1.84)	(1.76)
Size	0.035	-0.083	0.322***	1.107**	2.810***	1.113**	0.096	0.641	-0.122
	(0.3)	(-0.7)	(4.11)	(2.26)	(3.52)	(2.25)	(0.2)	(0.95)	(-1.42)
Age	-0.016	0.020	-0.033***	-0.062	-0.234***	-0.068	-0.047	-0.051	1.687
	(-1.21)	(1.3)	(-6.49)	(-1.14)	(-2.79)	(-1.37)	(-1.38)	(-0.55)	(1.60)
Tobin's q	0.003	-0.014	0.006**	0.015***	-0.018	0.015***	-0.012**	0.018***	0.007
	(0.42)	(-0.64)	(2.68)	(4.24)	(-0.92)	(3.08)	(-2.34)	(2.67)	(1.1)
Panel B: Government involvement variables									
Public equity	3.414***								
	(9.53)								
Public equity*Cash flow	-12.644***								
	(-8.93)								
Political connection		0.354							
		(1.2)							
Political connection*Cash flow		-3.045**							
		(-2.22)							
Panel C: Insititution quality variables									
Public uncertainty			-0.560*						
			(-1.89)						
Public uncertainty*Cash flow			4.911***						

			(4.68)						
Accountability				0.529					
				(0.46)					
Accountability*Cash flow				2.648					
				(0.91)					
Political stability					1.636				
					(1.28)				
Political stability*Cash flow					-10.243				
					(-1.57)				
Government effectiveness						-0.299			
						(-0.14)			
Government effectiveness*Cash flow						-1.846			
						(-0.74)			
Regulatory quality							6.366***		
							(3.21)		
Regulatory quality*Cash flow							-36.494***		
							(-5.42)		
Rule of law								3.289	
								(0.62)	
Rule of law*Cash flow								-13.320	
								(-0.97)	
Control of corruption									-1.192**
									(-2.02)
Control of corruption*Cash flow									-1.150
									(-0.22)
Constant	-1.356	-2.087***	-0.399	-7.353*	-17.147***	-8.187**	0.001	-3.863	-12.040*
	(-1.51)	(-2.91)	(-0.42)	(-1.91)	(-3.61)	(-2.35)	(0.00)	(-0.76)	(-1.76)
R-squared	62.11	69.05	57.31	47.79	59.13	47.48	70.53	51.06	48.15
N	50	50	50	45	45	45	45	45	45

Table 3.11: Indian Firms: Investment–Cash Flow Sensitivity, Government Reliance and Institution Quality in the Five-Year Post-PPP Period

This table presents the effect of government reliance and institution quality on the investment–cash flow sensitivity of PPP firms in the five-year post-PPP period. *Investment* was measured by the changes in gross fixed assets, divided by the previous year's fixed assets. *Cash flow* denoted income before extraordinary items, depreciation and amortization, divided by the previous years' fixed assets. *Size* was measured by the natural logarithm of total assets. *Leverage* was calculated by total debt divided by total assets. *Age* was measured from the year of firms' incorporation. *Tobin′sq* (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. *Public uncertainty* (PU) was a dummy variable which took value 1 for PPP firms in general election years, or else zero for PPP firms in non-election years. *Public equity* (PE), which was measured by the proportion of the total PPP investment that belonged to the government, captured government involvement in PPP projects. *Political connection* (Pol) was a dummy variable which took value 1 for firms that had a chair and executive directors who were formerly or are currently officers in the government, the parliament or the military. *Accountability*, *Political stability*, *Government effectiveness*, *Regulatory quality*, *Rule of law* and *Control of corruption* captured institution quality. The t-statistics are in parentheses. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Investment	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Firm-characteristic variables									
Cash flow	0.341	-0.107	0.075	6.439***	1.385	0.616	-0.621	0.642	-0.558
	(0.74)	(-0.60)	(0.35)	(3.15)	(0.74)	(1.20)	(-0.48)	(0.97)	(-0.40)
Leverage	0.124	-0.213	0.013	0.891	0.281	0.449	0.218	0.286	0.328
	(0.44)	(-1.64)	(0.05)	(0.77)	(0.24)	(0.38)	(0.19)	(0.24)	(0.29)
Size	0.1361***	0.042	0.146***	0.599	0.890	0.688	1.007	1.045	-0.065
	(7.27)	(0.67)	(3.62)	(0.91)	(1.15)	(1.23)	(1.74)	(1.41)	(-1.03)
Age	-0.021***	-0.013	-0.031**	-0.072	-0.063	-0.084*	-0.074	-0.085	0.998
	(-3.05)	(-1.47)	(-2.46)	(-1.22)	(1.00)	(-1.77)	(-1.56)	(-1.11)	(1.49)
Tobin's q	-0.130**	-0.135***	-0.100**	-0.115**	-0.082	-0.080*	-0.028	-0.068	-0.065
	(-2.83)	(-3.89)	(-2.28)	(-1.66)	(-1.38)	(-1.74)	(-0.44)	(-1.06)	(-0.96)
Panel B: Government involvement variables									
Public equity	-0.523***								
	(-3.64)								
Public equity*Cash flow	3.016***								
	(8.81)								
Political connection		-0.404***							
		(-2.73)							
Political connection*Cash flow		1.663***							
		(3.21)							
Panel C: Insititution quality variables									
Public uncertainty			-0.927***						
			(-3.3)						
Public uncertainty*Cash flow			2.668***						

			(4.64)						
Accountability				5.923***					
				(2.69)					
Accountability*Cash flow				-14.524***					
				(-2.85)					
Political stability					-0.326				
					(-0.44)				
Political stability*Cash flow					0.592				
					(0.3)				
Government effectiveness						0.9778192			
						(0.86)			
Government effectiveness*Cash flow						-8.681***			
						(-2.98)			
Regulatory quality							-0.006		
							(-0.01)		
Regulatory quality*Cash flow							-3.575		
							(-1.01)		
Rule of law								-0.515	
								(-0.47)	
Rule of law*Cash flow								-0.629	
								(-0.25)	
Control of corruption									0.333
									(0.25)
Control of corruption*Cash flow									-2.554
									(-0.83)
Constant	-0.596*	-0.490	0.335	-6.452	-6.812	-4.673	-7.192*	-7.321	-7.056
	(-1.8)	(-1.4)	(0.78)	(-1.23)	(-1.07)	(-1.06)	(-1.76)	(-1.36)	(-1.42)
R-squared	26.53	42.72	32.92	32.66	21.2	35.09	35.92	23.93	21.66
N	52	52	52	52	52	52	52	52	52

Table 3.12: Chinese and Indian Firms: Reasons for the Effects of Public Equity on Investment–Cash Flow Sensitivity in the Five-Year Post-PPP Period

This table uses a Slope Difference Test to show whether high government involvement in PPP projects lead firms to suffer overinvestment or underinvestment problems. *Public equity* (PE), which was measured by the proportion of the total PPP investment that belonged to the government, captured government involvement in PPP projects. *Tobin's q* (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. The adjusted-*p* was the Bonferroni adjusted *p*-value which accounted for the fact that there were six post-hoc tests. This was a conservative adjustment made by multiplying each *p*-value by the number of tests. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: China - Slopes	Coef.	Std. Err.	*t*-test	*p*-value	Adjusted-*p*
(high q & high PE)-(high q & low PE)	1.404	1.240	1.13	0.257	1.542
(high q & high PE)-(low q & high PE)	0.916	1.383	0.66	0.508	3.048
(high q & low PE)-(low q & low PE)	-4.637	1.453	-3.19	0.001	0.006***
(low q & high PE)-(low q & low PE)	-4.148	1.523	-2.72	0.006	0.036**
(high q & high PE)-(low q & low PE)	-3.232	1.179	-2.74	0.006	0.036**
(high q & low PE)-(low q & high PE)	-0.489	0.155	-3.16	0.002	0.012**
Panel B: India - Slopes	Coef.	Std. Err.	*t*-test	*p*-value	Adjusted-*p*
(high q & high PE)-(high q & low PE)	0.811	0.393	2.06	0.039	0.234
(high q & high PE)-(low q & high PE)	-1.127	0.605	-1.86	0.062	0.372
(high q & low PE)-(low q & low PE)	-1.127	0.605	-1.86	0.062	0.372
(low q & high PE)-(low q & low PE)	0.811	0.393	2.06	0.039	0.234
(high q & high PE)-(low q & low PE)	-0.316	0.993	-0.32	0.750	4.500
(high q & low PE)-(low q & high PE)	-1.937	0.235	-8.25	0.000	0.000***

Hypotheses Development Matrix			
Panel C: China - Tobin's q	High PE - High PE	High PE - Low PE	Low PE - Low PE
High q - Low q	Not significant	No prediction	(-): Low PE has overinvestment
High q - High q	No prediction	Not significant	No prediction
Low q - Low q	No prediction	(-): High PE has less overinvestment	No prediction
Panel D: India - Tobin's q	High PE - High PE	High PE - Low PE	Low PE - Low PE
High q - Low q	Not significant	No prediction	Not significant
High q - High q	No prediction	Not significant	No prediction
Low q - Low q	No prediction	Not significant	No prediction

Table 3.13: Chinese and Indian Firms: The Effects of State Ownership on Investment–Cash Flow Sensitivity in the Five-Year Post-PPP Period – A Comparison of PPP and Non-PPP Firms

This table reports the comparison of PPP and non-PPP firms under the effects of state ownerships in firms. Panel A reports the regression results of the investment–cash flow sensitivity analysis with the influence of state ownership. Panels B and C report the results of a Slope Difference Test to show whether high state ownership leads firms to suffer overinvestment or underinvestment problems for PPP firms and non-PPP firms, respectively. *Investment* was measured by the changes in gross fixed assets, divided by the previous years' fixed assets. *Cash flow* denoted income before extraordinary items, depreciation and amortization, divided by the previous years' fixed assets. *Size* was measured by the natural logarithm of total assets. *Leverage* was calculated by the total debt divided by the total assets. *Age* was measured from the year of the firms' incorporation. *Tobin′sq* (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. *State ownership* (SO) was measured by the proportion of partnering private sector firms that belongs to the government. The adjusted-p was the Bonferroni adjusted p-value which accounted for the fact that there were six post-hoc tests. This was a conservative adjustment made by multiplying each p-value by the number of tests. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Regression results	China		India	
	PPP	Non-PPP	PPP	Non-PPP
Investment	(1)	(2)	(3)	(4)
Cash flow	2.871**	0.235	0.356	1.085**
	(2.149)	(0.141)	(0.762)	(2.531)
Leverage	3.169**	0.404	0.112	0.550***
	(2.352)	(0.826)	(0.381)	(2.902)
Age	0.054	-0.091	0.142***	0.075
	(1.124)	(-1.477)	(7.157)	(0.644)
Size	0.197	0.602	-0.021***	0.001
	(0.354)	(1.846)	(-3.037)	(0.006)
Tobin's q	0.017***	0.039	-0.127***	-0.058*
	(3.205)	(0.737)	(-2.717)	(-1.753)
State ownership	7.426*	0.575	-0.696***	0.125
	(1.886)	(0.572)	(-3.151)	(0.581)
State ownership * Cash flow	-4.804*	3.134	4.382***	-0.041
	(-1.968)	(0.917)	(9.352)	(-0.080)
Constant	-4.537	-3.651**	-0.649**	-0.846
	(-1.190)	(-2.638)	(-2.065)	(-1.102)
R-squared	68.77	27.4	26.03	31.45
N	50	45	52	45

Panel B: Slope Differences for PPP Firms	China					India				
	Coef.	Std. Err.	t-test	p-value	Adjusted-p	Coef.	Std. Err.	t-test	p-value	Adjusted-p
(high q & high SO) - (high q & low SO)	-1.257	0.321	-3.92	0	0***	2.503	1.664	1.5	0.132	0.792
(high q & high SO) - (low q & high SO)	-1.371	0.660	-2.08	0.038	0.228	1.308	0.935	1.4	0.162	0.972
(high q & low SO) - (low q & low SO)	-4.210	1.282	-3.28	0.001	0.006*	-1.316	1.421	-0.93	0.354	2.124
(low q & high SO) - (low q & low SO)	-4.096	0.654	-6.27	0	0***	-0.121	0.597	-0.2	0.84	5.04
(high q & high SO) - (low q & low SO)	-5.467	1.185	-4.61	0	0***	1.187	0.487	2.44	0.015	0.09*
(high q & low SO) - (low q & high SO)	-0.114	0.775	-0.15	0.883	5.298	-1.195	0.850	-1.41	0.16	0.96
Panel C: Slope Differences for Non-PPP Firms	Coef.	Std. Err.	t-test	p-value	Adjusted-p	Coef.	Std. Err.	t-test	p-value	Adjusted-p
(high q & high SO) - (high q & low SO)	2.031	0.440	4.62	0	0***	-0.542	0.643	-0.84	0.399	2.394
(high q & high SO) - (low q & high SO)	0.979	0.133	7.37	0	0***	-0.600	0.441	-1.36	0.174	1.044
(high q & low SO) - (low q & low SO)	-2.067	1.577	-1.31	0.19	1.14	0.173	0.428	0.4	0.687	4.122
(low q & high SO) - (low q & low SO)	-1.014	1.270	-0.8	0.425	2.55	0.230	0.614	0.38	0.707	4.242
(high q & high SO) - (low q & low SO)	-0.036	1.236	-0.03	0.977	5.862	-0.370	0.589	-0.63	0.53	3.18
(high q & low SO) - (low q & high SO)	-1.053	0.351	-3	0.003	0.018**	-0.058	0.765	-0.08	0.94	5.64

the investment–cash flow sensitivity analysis in the 5-year post-PPP period to compare the effects of state ownerships on PPP firms with those on non-PPP firms.

Regarding the Chinese firms, for PPP firms, those with higher state ownership have lower investment–cash flow sensitivity as justified by the negative coefficient in the interaction term between $State\,ownership$ and $Cash\,flow$ in Column 1. However, for non-PPP counterparts, as indicated in Column 2, there is an insignificant result. I further explain this difference in Panels B and C by investigating whether state ownership helps firm reduce underinvestment or overinvestment. Panel B indicates results for PPP firms while Panel C indicates results for non-PPP firms. I focus more on the pair of slopes in which $State\,ownership$ (SO) changes from high to low level while $Tobin's\,q$ is kept constant to see how changes in state ownership benefit firms. As can be seen in Panel B of Table 3.13, for PPP firms, there are negative and significant slope differences between high $State\,ownership$ (high SO) and low $State\,ownership$ (low SO) when the moderator $Tobin's\,q$ is held constant at a high or a low level. This indicates that high state ownership may help PPP-invested firms reduce both overinvestment and underinvestment. Whereas, in the case of non-PPP counterparts, as seen in Panel C of Table 3.13, positive and significant slope differences between high $State\,ownership$ (high SO) and low $State\,ownership$ (low SO) became evident when the moderator $Tobin's\,q$ is held constant at a high level. This result shows that non-PPP firms with high state ownership may still underinvest. Overall, as stated by these results above, for the Chinese firms, participating in PPPs enhances the benefits of higher government equity participation for partnering private sectors firms.

By contrast, for the Indian firms, as indicated in Panel A of Table 3.13, PPP-partnering private sector firms experience a higher investment–cash flow sensitivity when involving in higher state ownership. This is evident by the positive and significance of the interaction term between $State\,ownership$ and $Cash\,flow$ as seen in Column 3. There is no such significant result for non-PPP counterparts as seen in Column 4. When I decompose further into the underinvestment and overinvestment problems, as seen in Panels B and C of Table 3.13, there is almost no significance for both PPP and non-PPP firms. These results in the Indian firms again confirming the overall results in India that PPPs are even detrimental to partnering

private sector firms when receiving higher government equity participation.

The effects of political connections are indicated in Panel A of Table 3.14. Columns 1 and 2 is for PPP and non-PPP firms in China, Columns 3 and 4 is for PPP and non-PPP in India, respectively. The Chinese PPP firms with political connections have less investment sensitivity than those without such connections. This is evident from the negative and significant coefficient of the interaction variable between *Political connection* and *Cash flow* in Column 1. This result strongly supports Hypothesis 3. On the contrary, in India, politically connected PPP firms have more investment–cash flow sensitivity as indicated in Column 3; or in other words, political connections may be risky for private sector firms in PPPs. I conducted the same analysis on the influence of political connection on non-PPP private sector firms, as also seen in Columns 2 and 4 in Panel A of Table 3.14 for the Chinese and the Indian non-PPP firms, respectively. I found no evidence of the significant influence of political connection on the non-PPP competitors' investment–cash flow sensitivity, as evident by the insignificance results of the interaction term between *Political connection* and *Cash flow* in the non-PPP counterparts.

I delve into the reasons for these differences. Tables 3.14 explore whether political connections affect the investment–cash flow sensitivity of PPP firms and their non-PPP counterparts (as seen in Panels B and C respectively) by dealing with underinvestment or overinvestment.

For PPP firms, the results of the slope differences in the Chinese PPP firms, as indicated in Panel B of Table 3.14, suggesting that politically connected firms have less underinvestment and overinvestment than their nonpolitically connected counterparts. This is evident from the negative and significant slope differences between *Political connection* and *Nonpolitical connection* when the moderator *Tobin's q* is held constant at a high or a low level. By contrast, in the Indian firms investing in PPPs, as also indicated in Panel B of Table 3.14, politically connected firms have more overinvestment than their nonpolitical counterparts.

Regarding non-PPP counterparts, the same analysis on the influence of political connection was conducted. For the Chinese firms, as reported in Panel C of Table 3.14, no positive effects are evident on the effects of political connections on investment efficiency of non-PPP firms,

Table 3.14: Chinese and Indian Firms: The Effects of Political Connection on Investment–Cash Flow Sensitivity in the Five-Year Post-PPP Period - A Comparison of PPP and Non-PPP Firms

This table reports the comparison of PPP and non-PPP firms under the effects of Political connection. Panel A reports the regression results of investment–cash flow sensitivity analysis with the influence of Political connection. Panels B and C report the results of a Slope Difference Test to show whether political connections lead firms to suffer overinvestment or underinvestment problems for PPP firms and non-PPP firms, respectively. *Investment* was measured by the changes in gross fixed assets, divided by the previous years' fixed assets. *Cash flow* denoted income before extraordinary items, depreciation and amortization, divided by the previous years' fixed assets. *Size* was measured by the natural logarithm of total assets. *Leverage* was calculated by total debt divided by total assets. *Age* was measured from the year of firms' incorporation. *Tobin′sq* (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. *Political connection* (Pol) was a dummy variable which took value 1 for firms that had a chair and executive directors who were formerly or are currently officers in the government, the parliament or the military. The adjusted-p was the Bonferroni adjusted p-value which accounted for the fact that there were six post-hoc tests. This was a conservative adjustment made by multiplying each p-value by the number of tests. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Regression results	China		India	
	PPP	Non-PPP	PPP	Non-PPP
Investment	(1)	(2)	(3)	(4)
Cash flow	3.129**	0.532	-0.107	1.037**
	(2.286)	(0.918)	(-0.601)	(2.557)
Leverage	1.399	-0.218	-0.213	0.217
	(1.535)	(-0.860)	(-1.641)	(0.532)
Age	0.020	-0.043***	-0.013	-0.012
	(1.296)	(-6.992)	(-1.471)	(-0.517)
Size	-0.083	0.136***	0.042	0.223
	(-0.699)	(7.143)	(0.674)	(0.898)
Tobin's q	-0.014	0.005	-0.135***	-0.059*
	(-0.644)	(0.164)	(-3.893)	(-1.896)
Political connection	0.354	-0.246*	-0.404***	0.003
	(1.202)	(-1.953)	(-2.739)	0.010
Political connection * Cash flow	-3.045**	0.759	1.663***	-0.475
	(-2.215)	(1.419)	(3.206)	(-0.928)
Constant	-0.399	-0.317***	0.335	-1.681
	(-0.422)	(-5.026)	(0.782)	(-1.126)
R-squared	57.31	32.34	32.92	31.07
N	50	45	52	45

Panel B: Slope differences for PPP firms	China					India				
	Coef.	Std. Err.	t-test	p-value	Adjusted-p	Coef.	Std. Err.	t-test	p-value	Adjusted-p
(high q & high Pol) - (high q & low Pol)	-1.735	0.160	-10.85	0	0***	-0.652	0.333	-1.960	0.051	0.306
(high q & high Pol) - (low q & high Pol)	0.066	0.340	0.19	0.847	5.082	-2.699	0.554	-4.870	0.000	0.000***
(high q & low Pol) - (low q & low Pol)	-2.983	0.863	-3.46	0.001	0.006*	-0.192	0.424	-0.450	0.651	3.906
(low q & high Pol) - (low q & low Pol)	-4.784	0.867	-5.52	0	0***	1.855	0.571	3.250	0.001	0.006*
(high q & high Pol) - (low q & low Pol)	-4.718	0.952	-4.96	0	0***	-0.844	0.544	-1.550	0.121	0.726
(high q & low Pol) - (low q & high Pol)	1.801	0.398	4.53	0	0***	-2.047	0.293	-6.990	0.000	0.000***
Panel C: Slope Differences for non-PPP firms	Coef.	Std. Err.	t-test	p-value	Adjusted-p	Coef.	Std. Err.	t-test	p-value	Adjusted-p
(high q & high Pol) - (high q & low Pol)	1.964	0.391	5.02	0	0***	-1.372	0.653	-2.1	0.036	0.216
(high q & high Pol) - (low q & high Pol)	1.046	0.111	9.38	0	0***	-1.546	0.584	-2.64	0.008	0.048**
(high q & low Pol) - (low q & low Pol)	-1.856	1.500	-1.24	0.216	1.296	0.057	0.472	0.12	0.904	5.424
(low q & high Pol) - (low q & low Pol)	-0.936	1.219	-0.77	0.442	2.652	0.230	0.631	0.36	0.715	4.29
(high q & high Pol) - (low q & low Pol)	0.108	1.201	0.09	0.928	5.568	-1.316	0.802	-1.64	0.101	0.606
(high q & low Pol) - (low q & high Pol)	-0.918	0.325	-2.82	0.005	0.03**	-0.173	0.610	-0.28	0.777	4.662

both in terms of reducing underinvestment and overinvestment problems. Therefore, in China, PPPs help partnering private sector firms improve their government-backed benefits compared with those of their non-PPP counterparts. For the Indian non-PPP firms, as also shown in Panel C of Table 3.14, the results do not witness any benefits of political connections. Hence, for the Indian PPP firms, participating in PPPs may even hinder their investment efficiency whereas in case of their non-PPP counterparts, I cannot see the evidence of such obstacles.

Overall, reliance on the government and on political connections benefit the Chinese firms by lowering their overinvestment problem; however, these kinds of connections are risky for the Indian firms since political connections exacerbate the overinvestment problem. These results, which highlight the opposing effects of political connections on the Chinese and Indian firms, are consistent with the above results on the determinants of wealth effects arising from PPP announcements.

The possible rationale for the contrasting results of the influence of government support on PPPs in China and India is each country's distinct political setup. In China, my results are consistent with the findings of Bai et al. (2005); Chen et al. (2011) and Li et al. (2008) who claim that the Chinese economy and banking system are controlled and regulated by the Chinese government; therefore, private sector firms seek political ties to ensure better growth opportunities, succeed in the approval process and gain easier access to bank lending. Hence, the more government support, the higher bank loans that private sector firms can access to fulfil their investment demand, which in turn reduces the possibility of over-reliance on internal cash flow. According to Jiang and Zeng (2014), Chinese state-owned banks have a disciplining role for private sector firms with low growth opportunities, so that their monitoring role will alleviate the overinvestment problems of private firms with high debt financing. Moreover, my findings about the Chinese firms are aligned with Bai et al. (2006) and Cull and Xu (2005) who argue that China's extensive regulation of interest rates in some cases prevents the price of external financing from being exceeded by that of internal financing. For example, in the case of PPPs, the government can provide subsidized loans for partnering private sector firms at a lower cost than normal. Therefore, the Pecking Order Hypothesis, which indicates that

owners prefer internal cash flow to external financing, may not operate in China. As a result, higher and preferred bank lending in firms with more government support may reduce more the overuse of internal cash flow compared to firms who do not experience government interference.

My results for the Indian firms suggest that, unlike in China, political connections are detrimental to PPP-partnering private sector firms in that they impose more overinvestment than they do with the nonpolitical counterparts. This difference of these two countries may be attributed to the differences in their political systems. While China pursues a unitary polity, India belongs to a federal system. Desai (2005) emphasizes that which China has a stable centrally run state that ensures the success of government pursuing a single goal with full commitment. Meanwhile, India's federalism along with alternative changes of the party in power makes it difficult for the country to deliver a strong focused government. As a result, in the case of social projects like PPPs in China, the mutual benefits between governments (social welfare) and private sector firms may be easy to achieve through political ties, since the government can provide another discipline role for ensuring the smoothness of a project without any disturbance from cash flow assigned to the managers' private purposes. By contrast, the two-level government structure of Indian federalism means that politically connected firms are not fully favored or manipulated by both ruling political parties, neither at the center nor at the state level (Datta and K. Ganguli, 2014). Consequently, politicians are more likely to pursue their own interests to extract advantages as much as possible even though this can harm the social welfare as a whole. This argument is aligned with Gerring et al. (2006) who state that the absence of unity in the early federal system may encourage individualistic behavior towards personal short-term goals rather than general long-term political goals. Overall, the contrasting results of government involvement in the Chinese and Indian firms suggest that the institutional environment is working as a crucial mediator for the success of PPP partnering private sector firms.

Therefore, my study now turns to an exploration of the institutional effects as measured by the indicators of *Public uncertainty* and *Governance* in Columns 3 to 9 of Tables 3.10 and 3.11. I used the election year dummy as my public uncertainty indicator. I conjectured

that PPPs that entered into contracts in the election year would face higher uncertainty as possible policy changes of the new government can impact the cash flow associated with the PPP investments. In the case of political uncertainty, the results are similar for both China and India: PPP projects awarded during the election year face higher investment–cash flow sensitivity. Regarding the governance indicators, as indicated in Column 7 of Table 3.10, the Chinese PPP firms are seen to have lower investment–cash flow sensitivity when regulatory quality improves. As indicated in Columns 4 and 6 of Table 3.11, the Indian PPP firms can have lower investment–cash flow sensitivity when *Accountability* and *Government effectiveness* is high. It is interesting to find that accountability matters more in India than China. Given that accountability is measured by the ability to practise citizens' freedom of expression and to select their preferred government (Kaufmann et al., 2011), the results are consistent with the idea that the political set-up in India—democracy—is mirrored in the Indian firms as well. In China, however, regulatory quality, measured as the ability of the government to promote the private sector (Kaufmann et al., 2011), matters more. This is consistent with the benefits of high reliance on the government in China.

In summary, my results indicate that reliance on the government is beneficial in China, whereas it can be detrimental in India. Better institution quality is favorable for both the Chinese and the Indian firms. Both countries benefit from better institutional quality although their favorable assessment criteria for institutional quality are not similar.

3.4.6 Role of Contractual Agreements on Investment–Cash-Flow Sensitivity

My final analysis explores the role of contractual agreements on investment–cash flow sensitivity, as shown in Table 3.15. The contractual methods are mainly classified into three groups. The first classification is based on whether the project is a new or greenfield project with full autonomy of the private partner or a concession project, where the private partner takes over the management of the existing public sector firm. I find that greenfield projects experience

higher investment–cash flow sensitivity in China, whereas the opposite prevails in India. This is consistent with the result of the level of government participation in terms of equity in the previous section. It suggests that the Chinese private sector firms benefit from higher reliance on the government, whereas the Indian private sector firms benefit more from independent projects with total autonomy. This finding also supports Hypothesis 3.

The second classification is based on the method of awarding the PPP contract. As discussed earlier, PPPs can be awarded either through competitive bidding or through direct negotiations with the government. The results indicate that the awarding method matters in China. The Chinese private sector firms benefit from lower investment–cash flow sensitivity when PPP contracts are awarded through direct negotiations, supporting Hypothesis 3. However, the awarding method is not significant in India.

The final classification is based on the source of revenue for the private partner. The private partner in a PPP project can collect revenue directly by charging a fee from the customers, or it can receive a fixed payment from the government. In both China and India, higher uncertainty exists for partnering private firms that collect directly from future users of the project; contracts that collect future revenue through user fee experience higher investment–cash flow sensitivity during the post-PPP investment period. This is consistent with Hypothesis 3.

In summary, one interesting finding from the contracting method analysis is that the Chinese firms benefit more from relying on the government.

3.4.7 Robustness Tests

Heckman Two-Stage Analysis to Control for Selection Bias Arising from the Choice of Awarding Methods

One major issue with my analysis has been a potential endogeneity problem that may have arisen due to unobservable firm-level productivity and its corresponding success in securing PPP contracts. For instance, there is every chance that only those firms that are top perform-

Table 3.15: Chinese and Indian Firms: the Effects of Contract Mechanism on Investment–Cash Flow Sensitivity in PPP Firms in the Five-Year Post-PPP Period

This table presents the effects of PPP contract mechanisms on the investment–cash flow sensitivity. *Investment* was measured by the changes in gross fixed assets, divided by the previous years' fixed assets. *Cash flow* (CF) denoted income before extraordinary items, depreciation and amortization, divided by the previous years' fixed assets. *Size* was measured by the natural logarithm of total assets. *Tobin's q* (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. Leverage was calculated by the total debt divided by the total assets. *Type PPP* was a dummy variable which took value 1 for PPP firms with greenfield projects and took value zero for those with concession projects. *Awarding method* was a dummy variable which takes value 1 for PPP firms whose projects awarded by direct negotiations, and took value zero for those whose projects awarded by competitive biddings. *Revenue sources* was a dummy variable which took value 1 for PPP firms receiving a fixed payment from the government, and took value zero for those having revenue from user fees. The t-statistics are in parentheses. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Investment	China (1)	China (2)	China (3)	India (4)	India (5)	India (6)
Cash flow (CF)	0.106	4.968***	0.113	1.397	-0.245	-0.370
	(1.58)	(7.86)	(1.67)	(0.72)	(-0.26)	(-0.67)
Leverage	3.250***	2.745***	2.490***	0.154	-0.136	-0.038
	(3.04)	(3.22)	(2.78)	(0.24)	(-0.11)	(-0.07)
Size	-0.342*	-0.001	-0.280	0.533	1.735*	-0.033
	(-1.74)	(0.00)	(-1.32)	(1.52)	(1.75)	(-0.09)
Age	0.008	-0.022	0.002	-0.033	-0.118	-0.058**
	(0.5)	(-0.96)	(0.11)	(-1.36)	(-1.51)	(-2.36)
Tobin's q	0.019	-0.213*	0.017	-0.104*	-0.077	-0.104
	(1.02)	(-1.75)	(0.95)	(-1.72	(-0.82)	(-1.64)
Type PPP=Greenfields	-0.151			-0.053		
	(-0.340)			(-0.060)		
Greenfields*CF	3.012***			-0.497		
	(6.200)			(-0.260)		
Awarding method=Direct negotiations		0.687			1.508	
		(1.610)			(1.300)	
Direct negotiations*CF		-4.749***			1.176	
		(-7.6)			(1.1)	
Revenue sources==User fees			-1.356***			-1.869*
			(-3.19)			(-2.00)
User fees*CF			3.0786***			3.930***
			(6.26)			(3.45)
Constant	1.399	-0.056	1.826	-3.571	-15.394*	0.972
	(1.02)	(-0.03)	(1.26)	(-1.52)	(-1.79)	(0.35)
N	50	45	50	52	40	52

ers may end up securing PPP contracts. In that case, the reduction in the investment–cash flow sensitivity can be due to the firms' inherent qualities rather than the PPP investment effect. I attempted to understand this issue by exploiting the endogeneity in the contract awarding methods. Fortunately, my data allowed me to observe whether the PPP contract was awarded through the direct negotiation method or the competitive bidding method. My hypothesis in this context is that personal negotiation-based awarding is less transparent and hence may not follow the strict, objective, and transparent criteria of the competitive open bidding process of awarding PPP contracts. In that case, I expect competitive bidding-based PPP contracts to experience higher reduction in investment–cash flow sensitivity to account for their productivity- as well as PPP-related gains. On the other hand, if negotiation-based contracts experience relatively higher reduction of investment–cash flow sensitivity due to PPP engagement, then it can be argued that the PPP effect is over and above the productivity effect.

Following Heckman (1976), I conducted the two-stage model to circumvent the above explained endogeneity and self-selection concerns. In the first stage, I ran the probit model to estimate the probability of PPP projects being awarded by competitive bidding or direct negotiation.

$$\begin{aligned}(Awarding\,method)_{it} &= \alpha + \beta_1(Size)_{it} + \beta_2(Leverage)_i t + \beta_3(Tobin's\,q)_{it} \\ &+ \beta_4(Control\,of\,corruption)_{it} + \delta_i + \delta_t + \epsilon_{it}\end{aligned} \tag{3.17}$$

In Equation 3.17, the *awarding method* is a dummy variable that takes 1 for partnering private firms when PPP projects are awarded through direct negotiation, and zero for those through competitive bidding. I assumed that the winning bidders may have higher productivity, innovation, and dynamism (Construction Industry Council, 2000). Therefore, I included some firm-level variables that may determine firm-level innovation, like $Size$, $Leverage$, and $Tobin's\,q$, in the first-stage model. This is because firms that are larger have high investment opportunities and high external financing and tend to be more innovative and dynamic (Ayyagari et al., 2012). Moreover, I followed Chong et al. (2012) and Spiller (2008, 2013) to argue that government and third-party opportunism exert effects on public contracting, and the government prefers

auctions to avoid corruption and favoritism. Hence, I controlled for the level of corruption, as in Kaufmann et al. (2011), to control for the influence of third party opportunism on the choice of PPP contract awarding methods.

I then obtained the inverse Mills' ratio from Equation 3.17 and included it in the second-stage model (based on Equation 3.12). The purpose of the second-stage model was to estimate the effects of contract mechanisms on PPP firms' investment–cash flow sensitivity after controlling for the selection bias of the awarding methods.

The results for the two-stage model are presented in Table 3.16. Panel A of this table illustrates the probit estimates of the awarding methods. I find that the larger private sector firms in both China and India are more likely to opt for PPP through the competitive bidding method. More importantly, only the Chinese firms who have higher debt burdens and who are facing more stringent regulatory oversight during corruption crackdowns are more likely to be awarded PPP projects through competitive bidding. This is consistent with the observations presented in Ayyagari et al. (2012); Chong et al. (2012) and Spiller (2008, 2013). Panel B presents the effects of the awarding methods on investment–cash flow sensitivity after Mills' ratio was included in the regression to control for selection bias. The coefficient of Mills' ratio is negative and significant in both the Chinese and the Indian firms. This indicates that selection bias might exist in both samples. After controlling for this selection concern in the Chinese firms, the effects of the awarding method on investment–cash flow sensitivity are qualitatively similar to the results reported in Table 3.15. The Chinese private sector firms with projects awarded through direct negotiation experience higher reduction in investment–cash flow sensitivity than firms whose projects are awarded through competitive bidding. This confirms that the PPP effect is greater than the productivity effect in the Chinese firms. In contrast, after controlling for selection bias in the Indian PPP firms, I find that firms with projects awarded by direct negotiation experience higher investment–cash flow sensitivity. This indicates that negotiation-based contracting is more beneficial for the Chinese private sector firms. This result is in line with the general evidence that compared to the Indian private sector firms, Chinese private sector firms benefit to a greater degree from contract mechanisms that

involve more reliance on the government.

Heckman Two-Stage Model to Capture Endogeneity Issue Arising from Political Ties Associated with the Choice of PPP Private Partners

In addition to unobserved firm-level productivity, there is potential endogeneity concern associated with the political ties of PPP partnering private firms. PPP projects in infrastructure are implemented to fulfil not only the economic goals but also the social and political goals of the government; hence, they may tend to choose the winners with political ties to ensure that they can easily establish more control and intervention on projects. Political connections are proved to bring preferential access to external financing (Claessens et al., 2008; Cull and Xu, 2005; Faccio et al., 2006; Faccio, 2010; Khwaja and Mian, 2005; Li et al., 2008); therefore, in that case, the reduction in the investment–cash flow sensitivity can be due to both political connections and PPP investment effects. To deal with this endogeneity issue, I again conducted the Heckman two-stage model to control the effects of political connections on the choice of PPP private partners before testing the effects of PPPs on the firms' investment efficiency. In the first stage, a probit model was used to estimate the determinants of private sector firms' participation in PPP projects.

$$\begin{aligned} PPP = {} & \alpha + \beta_1 Cash\,flow + \beta_2 Size + \beta_3 Age + \beta_4 Leverage + \beta_5 Tobin's\,q \\ & + \beta_6 Political\,connection + \epsilon \end{aligned} \tag{3.18}$$

In addition to *Political connection*, I also included firm-level variables in the first stage model to determine the nature of private sector firms that opt for PPPs, including $Cash\,flow$,$Size$,Age, $Leverage$, and $Tobin's\,q$. This was due to the above evidence that the nature of private sector firms that go for PPPs is considerably different between the two economies. In China, older, mature, and better-valued firms with lower debt burdens (than their matched firms) engage in PPPs while in India, younger firms with higher debt burdens and lower cash flow engage in PPPs. Later, Mills' ratio from Equation 3.18 was obtained and included in the second-stage model (Equation 3.6) to test the effects of PPPs on partnering private sector firms. The

Table 3.16: Heckman Two-Stage Analysis to Control for Selection Bias Arising from the Choice of Awarding Methods

This table presents the two-stage model to circumvent the self-selection concerns of project awarding methods. Panel A indicates the first-stage model in which I ran the probit model to estimate the probability of PPP projects being awarded by competitive biddings or direct negotiations. *Awarding method* was a dummy variable, which took value 1 for partnering private firms when PPP projects were awarded through direct negotiation, or else zero for those through competitive bidding. I included *Size*, *Leverage*, *Tobin's q*, and *Control of corruption* as the factors driving the choice of awarding methods. Panel B presents the investment–cash flow analysis where I included Mills' ratio, estimated by Panel A, to control for self-selection problems of awarding methods. The t-statistics are in parentheses. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: The probit estimate of awarding methods		
Awarding method	China	India
	(1)	(2)
Size	-3.084**	-8.221*
	(-2.00)	(-1.70)
Leverage	-23.230**	6.699
	(-2.01)	(0.79)
Tobin's q	-0.231	-0.682
	(-0.18)	(-0.44)
Control of corruption	-12.299**	18.355
	(-2.04)	(1.26)
Constant	21.605*	69.889
	(1.69)	(1.68)
Likelihood ratio	16.00***	22.55***
N	45	40
Panel B: The effects of awarding method on investment–cash flow sensitivity after controlling for self-selection problem		
Investment	China	India
	(1)	(2)
Cash flow	5.411***	-1.107***
	(6.510)	(-2.970)
Size	0.025	-0.056
	(0.170)	(-1.140)
Leverage	1.163**	0.779*
	(2.410)	(1.750)
Age	0.012**	0.003
	(2.28)	(0.22)
Tobin's q	-0.278***	-0.120***
	(-3.44)	(-3.19)
Awarding method = Direct negotiations	0.826***	-0.894**
	(4.52)	(-2.35)
Direct negotiations * Cash flow	-5.203***	2.393**
	(-6.33)	(2.68)
Mills' ratio	-0.056*	-0.541***
	(-1.68)	(-3.19)
Constant	-1.097	1.175***
	(-0.96)	(2.98)
R-squared	78.55	36.86
N	45	40

Table 3.17: Robustness Tests to Deal with the Endogeneity of the Choice of PPPs

This table presents the results of the robustness tests to deal with the endogeneity of the choice of PPPs. Columns 1 and 2 report the results of the Heckman two-stage model to circumvent the endogeneity issue associated with the political ties of PPP partnering private firms in China and India, respectively. Columns 3 and 4 report the results of the instrument-variable model in China and India, respectively. Panel A indicates the first-stage model in which I ran the probit model to predict the probability of private partners award PPP projects. *PPP* was a dummy variable, which takes value 1 for firms invested in PPP projects, else zero for firms which were matched by industry and firm size. For the Heckman two-stage model (as in Columns 1 and 2), I included *Size*, *Leverage*, *Age*, *Tobin's q*, and *Political connection* in the first-stage of as the factors driving the choice of PPP private partners. Then panel B (as in Columns 1 and 2) presents the investment–cash flow analysis where I included the Mills' ratio, estimated by Panel A, to control for the endogeneity concern of PPP choice. For the instrument-variable model (as in Columns 3 and 4), I included the instrument variable *Privatization* as being measured by the proportions of a privatization deal that is in the same industry and year as the PPP projects. Panel B presents the investment–cash flow analysis when replacing the endogenous variable *PPP* with its predicted value from the first stage. The t-statistics are in parentheses. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Stage 1-The probit estimate of PPPs				
	Heckman two-stage model		Instrument variables	
PPP	China	India	China	India
	(1)	(2)	(3)	(4)
Cash flow	0.546	-0.170	2.339	0.312
	(0.558)	(-0.103)	(0.523)	(0.108)
Leverage	-3.350**	7.247***	-1.678	9.033**
	(-2.470)	(4.025)	(-0.350)	(2.994)
Age	0.161***	0.201**	0.323*	0.231*
	(2.919)	(2.859)	(1.957)	(1.877)
Size	-0.082	-0.667	0.069	-0.936
	(-0.312)	(-1.004)	(0.068)	(-0.742)
Tobin's q	(-0.023)	(-0.250)	0.012	-0.390
	(-0.407)	(-1.559)	(0.061)	(-1.409)
Political connection	0.396*	0.830		
	(1.904)	(1.045)		
Privatization			-7.448*	0.748
			(-1.687)	(0.202)
Constant	-0.281	-0.671	-2.555	0.597
	-0.157	-0.155	(-0.346)	(0.069)
N	95	97	95	97
Panel B: Stage 2-The effects of PPPs on investment–cash flow sensitivity				
	Heckman two-stage model		Instrument variables	
Investment	China	India	China	India
	(1)	(2)	(3)	(4)
Cash flow	1.114***	0.972***	4.044**	0.769**
	(4.343)	(5.148)	(3.126)	(2.012)
Leverage	-0.082	0.217	0.384	0.082
	(-0.192)	(1.096)	(0.484)	(0.332)
Size	-0.023	0.118**	0.033	-0.014**
	(-0.249)	(2.480)	(0.795)	(-2.103)
Age	0.001	-0.013**	-0.205	0.104**
	(0.174)	(-2.037)	(-1.300)	(2.689)
Tobin's q	0.011	-0.058***	0.047	-0.040
	(0.884)	(-3.458)	(1.628)	(-1.355)
Mills' ratio	0.219*	-0.020		
	(1.767)	(-0.375)		
PPP	0.291***	0.143	-0.319	0.218
	(2.913)	(1.267)	(-0.273)	(1.230)
PPP*Cash flow	-0.946***	-0.488	-3.929**	-0.359
	(-4.097)	(-1.337)	(-3.030)	(-0.644)
Constant	-0.076	-0.862**	0.868	-0.735**
	(-0.118)	(-2.568)	(0.881)	(-2.126)
R-squared	10.71	19.41	9.10	16.3
N	95	97	95	97

results are presented in Columns 1 and 2 of Table 3.17 for the Chinese and Indian firms, respectively. Overall, after controlling for endogeneity concerns of PPP private sector firms arising from political ties, the results from comparing PPP firms and their competing non-PPP firms are qualitatively the same as before: in the post-PPP analysis, both the Chinese and Indian PPP firms experience lower investment–cash flow sensitivity compared with their non-PPP counterparts; however, the statistical significance is witnessed in the Chinese firms only.

Instrument Variables to Deal with the Endogeneity of the Choice of PPP Partnering Private Firms

In addition to the endogenous political ties mentioned above, other unobserved firm-characteristics that cause private sector firms to choose PPP projects may also influence the firms' investments. Therefore, the increase in the firms' investments are attributed to both PPP investment choices and other unobserved effects. To deal with this endogeneity issue, I used the instrument-variable (IV) method to isolate the exogenous variation of PPP investments. To do that, I considered privatization deals in the same industry and year with my sample PPP projects, then the instrument variable *Privatization* I chose was the proportion of the total privatization deals. I used the Privatization database of the World Bank to calculate this variable. There is every chance that the government may alternate between PPPs and privatization to conduct their infrastructure projects. Therefore, it is hypothesized that a decrease in privatization deals will increase the choice of PPP investments. However, from an intuitive view, other new privatized firms may be unlikely to affect PPP-partnering private firms' investments in other ways. Hence, following Bennedsen et al. (2007), I used *Privatization* as the instrument variable to estimate the probability of private firms opting for PPPs (the first stage model) and included the predicted value of PPP choices to estimate the private firms' investments (the second stage model). By doing that, I isolated the causal effects of PPPs on firms' investments.

Table 3.17 reports the results of the IV method in Columns 3 and 4 for the Chinese and

the Indian firms, respectively. As indicated in Panel A of Table 3.17, private sector firms in China are more likely to opt for PPPs when the privatization deals decrease. This is evident in the negative and significant coefficient of the variable *Privatization* in the probit estimate of PPP choices after controlling for other firm-level characteristics. Subsequently, after isolating the exogenous variation of PPP choices, as indicated in Panel B of Table 3.17, for the Chinese firms, the IV estimates a negative and significant coefficient of the interaction term between PPP and $Cash\,flow$. This coefficient is insignificant for the Indian firms. These results are qualitatively similar to those in the original results (Table 3.7). Moreover, the magnitude of the negative coefficient of the IV estimates is higher than that in the original model. This suggests that the reduction in the government's focus on privatization may create more chances for PPP-partnering private sector firms to be granted a preferential government guarantee, which in turn reduces the firms' capital constraints.

Probability of Default as an Alternative Measure of Investment Efficiency

I used an alternative measure to capture investment efficiency for the robustness purposes. I expected that the default risk of PPP private sector firm would reduce during the government's involvement in providing guarantees and partial funding for the project. The lending banks would foresee lower default risk due to the involvement of the Government. Hence, the overall investment efficiency would improve to lower financing costs for the PPP private sector firms. I tested this conjecture by using the Thomson Eikon database that provided default risk estimates of private sector firms in China and India. I was able to obtain the default risk estimates for all firms in the period between 2006 and 2013. Later, I devised a difference-in-difference regression for analysing the effect of PPP contracts on the firm's default risk.

The differences were calculated between PPP and matched non-PPP firms. The dependent variable measured the difference in the default risk estimates between PPP and non-PPP firms for all the seven years of the data period. I used a dummy variable to capture the effect of PPP contract on the default risk probabilities. The dummy variable takes value 1 for the year in which a firm received PPP contract; otherwise it takes zero.

Table 3.18: Probability of Default as an Alternative Measure of Investment Efficiency

This table report the results on how PPPs influence the probability of default of the partnering private sector firms. The dependent variable was the difference in the default probability in between PPP partnering private sector firms and their non-PPP counterparts. The independent variables included the PPP year dummy and the diferences in *Size*, *Leverage*, *Age*, $Tobin's\, q$ in between the PPP and non-PPP firms. The PPP year dummy was the dummy variable which took value 1 at the year the private sector engages in a PPP project, or else zero. The t-statistics are in parentheses.***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Difference in Probabilities of Default	China	India
	(1)	(2)
Difference in Size	0.059	0.087
	(0.905)	(0.386)
Difference in Leverage	-0.449	1.834***
	(-1.519)	(4.024)
Difference in Age	0.003	0.030**
	(0.704)	(3.274)
Difference in Tobin's q	0.020***	0.001
	(3.113)	(0.096)
PPP year dummy	-0.041***	-0.164***
	(-2.674)	(-2.970)
Constant	-0.011	-0.739***
	(-0.552)	(-10.996)
R-squared	14.366	1.673
N	240	536

The results are reported in the Table 3.18. As reported in the table, both Chinese and Indian PPP firms exhibit the reduction in the probability of default risk, compared to non-PPP firms in the year of entering into PPP contracts. This is evident from the negative and significant coefficients of the $PPP\, year\, dummy$. This further supports my hypothesis that PPP contracts benefit the private sector firms by improving their investment efficiency.

3.5 Conclusion

PPPs are gaining significance as a major investment partnership between the public and private sectors. They are aimed at addressing the growing infrastructure gap in emerging markets. PPPs come with the benefit of readily pledgeable government assets that can help the private

sector invest in large infrastructure projects which would otherwise increase their investment–cash flow sensitivity.

I test whether this inherent benefit really reduces the underinvestment problem, which is evident from the reduction in the investment–cash flow sensitivity of private sector firms. I use data from two of the world's largest emerging markets, India and China, to test this conjecture. I also try to understand whether changes in investment–cash flow sensitivity are driven by underinvestment or overinvestment. This is important as any reduction in the investment–cash flow sensitivity does not guarantee reduction in the underinvestment problem. If the reduction is experienced mainly by a subgroup of firms with low growth opportunities, then it reflects a potential overinvestment problem.

My results indicate that the Chinese private sector firms that invest in PPPs are those that have less dependency on their cash flow for investment. The investment–cash flow sensitivity of these firms further reduces in the post-PPP investment period. I find this economically significant. I further support this argument in my exploration of the possibly dependent relationship that the Chinese private firms have with the government. I find that higher dependency on the government, in the form of government investment, contractual arrangements, and political connections, benefits the Chinese private sector firms through a reduction in their investment–cash flow sensitivity. However, such benefits are mainly exploited by private sector firms that have lower growth opportunities.

In the case of India, private sector firms, with a high sensitivity of investment to their cash flow, invest in PPPs. I find that, unlike the Chinese private sector firms, the Indian private sector firms who invest in PPPs mainly suffer from underinvestment. The Indian private sector firms may reduce their underinvestment problem in the post-PPP investment period. Contrary to the experience of their Chinese counterparts, the Indian firms find that a high reliance on the government is detrimental.

In summary, my research highlights that PPP investments made by private sector firms are generally perceived as value-enhancing investments by investors. However, the real benefits

associated with reduced reliance on internal cash flow, and consequently, the reduced under-investment problem of private sector firms in emerging markets are not that straightforward. Such benefits are affected by the extent of government equity participation, political connections of participating firms, contract mechanisms and the institutional quality of the country. Therefore, the following two chapters will explore more clearly how the reliance on governments and the institutional and political structures of economies may affect the sustainability of PPP contracts.

Chapter 4

Public–Private Partnerships, Political Connections and Social Lending Objectives

4.1 Introduction

Private sector firms have become increasingly crucial for accelerating economic growth in emerging markets. For instance, in the case of the Chinese economy, as a result of a gradual shift from total dependence of state-owned enterprises to a mixed economy, private sector firms have grown significantly from the starting point of nearly zero in the late 1970s to 50% of total employment and 60 % of industrial output by 2004 (Li et al., 2008). In order to sustain a high economic growth rate, the Chinese economy is encouraging private sector firms to undertake social infrastructure projects. However, the success of such high-risk, large infrastructure projects depends on the conducive relationships between the private sector and the government. Such synergistic relationships between the government and private sector firms are evident through political connections, where politicians undertake senior roles in the corporate boards. Such connections, especially in emerging markets, allows firms to have better access to external finances from banks and financial institutions (Cole, 2009; Dinç, 2005; Khwaja and Mian, 2005; Sapienza, 2004).

On the positive side, social lending in the form of preferential treatment to politically connected firms can be considered as an efficient resource allocation exercise by the government. However, empirical evidence does not justify such altruistic motives. Khwaja and Mian (2005) present direct evidence against the social lending view in their findings that, in contrast to banks

that have social motives, politically connected firms gain preferential access only to those banks that have profit motives. The most supported view on the role of political connections in the empirical literature is that such connections for private benefits of private sector firms are often misused. Cole (2009); Dinç (2005) and Sapienza (2004) illustrate some mechanisms, such as the increase of lending in election years or lending at a lower cost in politically preferred areas, to highlight the negative side of political connections.

However, one of the major issues while testing such a Social Lending Hypothesis (SLH) is the problem associated with the identification of the nature of the project. There is every chance that political connections might work if there is a clear alignment of the nature of the project and economic objectives of the economy. Political connections might work better in nation building projects than in private-owned projects. The general corporate lending by banks, which is used for testing the SLH (Khwaja and Mian, 2005), is not directly aligned with national building objectives. Hence, there is a higher likelihood of the SLH being rejected. This implies that using a sample where the average corporate firm may not engage in nation building project, is not a good sample for testing the SLH.

My study contributes to the literature by using a sample of Public–Private Partnerships (PPPs) in the two largest emerging markets, China and India, respectively. Both the Chinese and Indian governments are struggling to maintain their high economic growth rates. It is estimated that infrastructure demand will rise to US$ 19.2 trillion by 2030, with Asia needing the lion's share of US$ 15.8 trillion. Such a huge requirement highlights the possible issues related to unmet demand for capital in emerging economies. Projections from China and India's 12th Five-Year Plan indicate that US$1.03 trillion and US$1.025 trillion should be invested to bridge the infrastructure gaps in the respective countries (Hongyan, 2010; India's Planning Commission, 2012). Given the failure of privatization programs and the limited capacity of both the private and the public sectors, PPPs are gaining popularity in these markets (Engel et al., 2008).

PPPs have clear a social lending alignment. The private sector firm undertakes otherwise inefficient government projects that are expected to result in higher overall social welfare. Given

the complexity of managing such large and high-risk PPP projects, if the private sector was to develop a closer connection with the government, such as having politicians on the firm's board, this would smooth out such project-related issues. Hence, I argue that PPPs, which are undertaken by private sector firms rather than by their non-PPP counterparts, provide a better sample for testing the SLH. As per the SLH, politically connected PPP private sector firms tend to have better access to bank lending compared to their matched firms, who are politically connected but who do not engage in PPP projects. In addition to that, such higher bank lending access of the PPP partnering private sector firms with political connections help to alleviate their underinvestment problem. On the contrary, if corruption dominates in the bank lending market, bank loans are likely to favor politically connected PPP private firms that overinvest and thus leads to social welfare loss.

China and India provide an ideal setting for testing the SLH. Both economies command the lion's share in social infrastructure projects with active private sector participation. PPP investments in China and India account for about 30% of the total number of PPP projects and 21% of the total PPP investments in developing countries in 2012 (World Bank Group, 2016*b*). In China, considerable development has occurred since 1988, when the market matured and privatization expanded massively (Urio, 2010). Moreover, highlighted by the government-issued guidelines on commercial banks' due diligence performance in 2005, both state and commercial banks significantly increased their commercial lending (Chen et al., 2013). The Indian economy also witnessed significant investments in infrastructure projects after liberalization in the year 1991.

Using 169 and 215 PPP projects for China and India, respectively, for the years between 1988 and 2013, my study finds that politically connected PPP firms, on average, have higher access to bank loans than their matched non-PPP firms. This indicates that the SLH holds in both markets. However, when investigating whether such higher lending to PPP projects is welfare maximizing, my study finds that the more productive Chinese PPP firms with political connections receive higher bank loans than those in non-PPP politically connected firms. In the case of the Indian market, my study does not find such a marked difference, based on

firm level productivity. When I examined this more closely to investigate whether political connections lead to a firm-level overinvestment problem, I found that PPP firms with political connections overinvested in India and not in the Chinese market. I further tested my result for robustness by running Regression Discontinuity Design (RDD) around political election events. I found that firms that are politically connected benefit more through higher bank loans when the incumbent party or leaders regain their seats in the government. My results suggest that, within the context of the SLH, political connections are beneficial for the Chinese Government and, on the contrary, the same political connections are costly for the Indian government.

A key implication from my study is that political influence for easy bank loans access to high-risk projects should be exercised with caution. Although such access enables an efficient allocation of resources, it can also lead to overinvestment in some cases.

The rest of the chapter is organized into six sections. This section is followed by the literature review and hypotheses development in Section 4.2. Section 4.3 presents my methodology. Data and preliminary results are presented in Section 4.4. Section 4.5 presents my main empirical results. Section 4.6 concludes this chapter.

4.2 Literature Review and Hypotheses Development

4.2.1 Access to Bank Loans in Emerging Markets

One commonly known reason for limited access to bank loans in emerging markets is that there is a high level of information asymmetries between lenders and borrowers. Pindado et al. (2011) review three fundamental ideas of information asymmetries in the literature. First, shareholders tend to invest in riskier projects than those indicated in loan conditions as this enables them to obtain higher expected returns due to existing post-contract information asymmetries (Jensen and Meckling, 1976). Second, in the case of information asymmetries arising from moral hazard (due to a firm making a payment to lenders prior to shareholders while the firm is bankrupt), shareholders may even not invest in positive NPV projects if their

NPV is lower than debt issued. However, this strategy is at the expense of lenders because they have to bear unexpectedly large losses transferred from shareholders (Myers and Majluf, 1984). Third, adverse selection occurs when lenders are without symmetric information and hence find it difficult to distinguish between "good" or "bad" borrowers (Stiglitz and Weiss, 1981). In transition economies like China or India, the problems of these three types of information asymmetries are more severe than those in developed economies due to the low informational content of balance sheets, inexperienced bank staff or an insufficiently sophisticated banking technology that fails to serve as a screening device (Hainz, 2003).

The second stream of literature shows that poor protection of private properties in emerging markets hinders the capacity and the willingness of the private sector to obtain external financing. López de Silanes et al. (1998) argue that firms with strong legal protection can achieve both high value and broad markets for their external finance. Johnson et al. (2002) explain the other side of property rights when indicating that the weak protection of properties reduces firms' incentives to invest, resulting in a limited demand for external financing. Cull and Xu (2005) expand those previous ideas by listing two proxies for the protection of property rights, consisting of the risk of expropriation by the government and the reliability of contract enforcement. These two components influence firms' reinvestment decisions, which in turn are positively associated with access to bank loans.

The third strand of literature emphasizes that the private sector firms are discriminated against while accessing external sources of financing in emerging markets. Brandt and Li (2003) conducted a bank-firm survey in China between 1994 and 1997, and they report that private sector firms are discriminated in the formal loan market when compared to state enterprises. They also highlight that the main source of this discrimination is the bank managers' incentives, which are associated with maintaining a good relationship with the government. Similarly, private sector firms find it difficult to secure bank loans, as many external sources are reserved to state-owned enterprises or restricted by the government's strict regulations (Johnson et al., 2000; McMillan and Woodruff, 2003).

4.2.2 Political Connections and Bank Lending

In the context of high information asymmetries, poor protection of private properties, expropriation and discrimination, seeking for higher reliance on the government is considered as a last resort for successfully achieving external financing (Bai et al., 2006; Li et al., 2008; Firth et al., 2009). This is because the government can influence firms' financing by various approaches. They include making direct subsidies, regulating private banks so as to lend money to politically desirable projects or owning banks so as to allocate and control external financing to private firms (La Porta et al., 2002).

In PPPs, these strategies have been fully or partially implemented, since the PPP and project finance mechanisms allow private sector firms to cooperate directly with the government and obtain their funds as well as their guarantee to get external financing (Engel et al., 2010). Government involvement provides costless pledgeable assets for the partnering private firm. Government concessions or revenue guarantees reduces demand risk and also the uncertainty of future cash flows. These factors complement each other in reducing an information asymmetry problem and hence enhancing borrowing capacity. They also reduce the cost of borrowing compared to similar non-PPP projects of partnering private firms. Therefore, initially, I hypothesized that PPP-partnering private sector firms may have higher access to bank loans than their non-PPP counterparts.

Research question 1c. Do PPP investments increase partnering private firms'access to bank loans?

Hypothesis 4 *PPP-partnering private sector firms should have higher access to bank loans than their non-PPP counterparts.*

There is a body of literature that studies how political connections influence firms' access to financing (Claessens et al., 2008; Cull and Xu, 2005; Faccio et al., 2006; Faccio, 2010; Khwaja and Mian, 2005; Li et al., 2008). Faccio et al. (2006) explain some fundamental reasons for why preferential access to bank loans is given to firms with political connections. In addition

to the implicit government guarantee mentioned above, lenders may receive direct economic support from the government or even be forced to make loans to politically connected firms. Faccio (2010) show empirical evidence that companies with political connections have higher leverage than nonpolitically connected firms. Claessens et al. (2008) document that after the elections in 1998 and 2002, Brazilian firms that contribute to federal deputies, in comparison with their matched firms, were able to increase their bank leverage. Li et al. (2008) use data from the nationwide survey of Chinese private firms in the year 2002 and report that private sector firms with party memberships can increase their loan from banks. Johnson and Mitton (2003) conduct research on Malaysian firms in the Asian financial crisis period and report that imposing capital controls mainly benefit firms with close ties to their prime minister, in terms of increased firm market value and higher debt-to-asset ratio.

The extant literature thus provides enough justification to suggest that private sector firms can have preferential access to bank loans through higher reliance on the government. However, it is hard to tease out whether political connections alleviate external financing concerns, thereby decreasing underinvestment problems in the economy (the SLH) or whether they collude with firms by providing higher external financing to corrupt firms and thereby increase overinvestment problems in the economy (the Political Corruption Hypothesis [PCH]). The literature mostly identifies the negative effects of political connections due to possible corruption in the political circles. The dark side of social proximity in relation to the allocation of credit dates back to Adam Smith who, in *Wealth of Nations*, warned about the adverse effects of this due to potential collusion in social networks. Social connections may lead to rent-seeking and favouritism, thus distorting the allocation of credit (Bandiera et al., 2009; Kramarz and Thesmar, 2013). Existing empirical evidence about the preferential treatment of politically connected firms does not support the altruistic SLH. Most of the evidence supports the PCH. Khwaja and Mian (2005) use the example of corporate lending in Pakistan from 1996 to 2002 to present direct evidence against the social lending explanation. They find that government banks that are financially profitability witness a large and significant political preference for corporate lending, this does not appear to be the case within explicit social government banks.

The most supported view on the PCH is the misuse of such connections for private benefits of private sector firms (Cole, 2009; Dinç, 2005; Sapienza, 2004) through some mechanisms, such as increasing lending in election years or lending at a lower cost in politically preferred areas.

From the social lending view, political connections tend to work better in nation-building private sector projects like PPPs than those in private-owned projects: PPPs have a clear social alignment whereas the private sector overtakes high-risk infrastructure projects to fulfil the huge infrastructure gap and expected economic growth of governments. Existing research tests the SLH by using a sample of general corporate lending by banks that are not directly aligned with national building objectives (Khwaja and Mian, 2005). Hence, there is a higher likelihood of the SLH being rejected. Given the complexity of PPPs, in terms of managing such large and high-risk projects, a closer connection with the government, in the form of having politicians on the firms' boards, would smooth out the issues related to project execution, which in turn would bring mutual benefits to both partnering parties. Hence, I argue that PPPs that are undertaken by private sector firms, relative to non-PPP matched private sector firms, provide a better sample for testing the SLH. As per the SLH, politically connected PPP private sector firms have better access to bank lending than those non-PPP firms that are politically connected, but which do not engage in PPP projects. With the above discussion in perspective I framed the following hypotheses:

Research question 2b. Do political connections reduce capital constraints for private sector firms?

Hypothesis 5 *Politically connected private sector firms, on average, should have higher access to bank loans than nonpolitically connected private sector firms.*

Hypothesis 6 *Politically connected PPP private sector firms, on average, should have higher access to bank loans than their competing politically connected non-PPP private sector firms.*

Hypothesis 7 *Politically connected PPP private sector firms, that receive higher bank loans, on average would overinvest compared to their competing politically connected non-PPP private*

sector firms.

My Hypothesis 7 is directional due to stronger evidence on the negative effects of political connections in the literature.

4.3 Methodology

4.3.1 Methodology for Endogeneity Issues

Heckman Two-Stage Model

One issue while testing the relationship between political connections and firm characteristics was that of the potential endogenous ties associated between successful firms and politicians. There is every chance that successful firms that have political ties are in a good position to successfully secure PPP projects. PPP projects in infrastructure are implemented to fulfil not only the economic goals but also the social, political goals of governments; hence, governments may choose the winners to ensure that they can easily establish more control and intervention in their projects. Following Heckman (1976), the Heckman two-stage model enabled me to circumvent the endogeneity problem arising from the relationship between unobservable firm-level characteristics and the firms' success to secure PPP projects. In the first stage, a probit model was used to estimate the determinants of private sector firms' participation in PPP projects.

$$\begin{aligned} PPP = \alpha + \beta_1 Size + \beta_2 Age + \beta_3 Leverage + \beta_4 Tobin's\, q \\ + \beta_5 Political\, connection + \epsilon \end{aligned} \tag{4.1}$$

In Equation 4.1, PPP was a dummy variable that took 1 for PPP investment firms, and zero for non-PPP matched private sector firms. $Political\, Connection$ (Pol) is a dummy variable that takes 1 for firms whose chair and executive directors who were formerly or currently officers in the government, parliament or military (Chen et al., 2011). $Political\, Connection$ captured

how political ties influence the chance of private sector firms award PPP projects. Firm-level variables determined the nature of private sector firms that opted for PPPs, including $Size$,Age, $Leverage$, and $Tobin's\, q$[1] were included in the first-stage model. This is because there is evidence that the nature of private sector firms that go for PPPs is considerably different for each of the two economies. In China, older, mature, and better-valued firms, relative to their matched firms, engage in PPPs while in India, younger firms with higher debt burdens engage in PPPs.

Later, Mills' ratio from Equation 4.1 was obtained and included in the second-stage model (Equation 4.2). The purpose of the second-stage model was to estimate the effects of PPP investments on the capability of private sector firms to access bank loans after controlling for the endogeneity and the selection bias of PPP firms. Following Chen et al. (2013) the following regression model was run to obtained unbiased estimates:

$$Bank\, loans/sales = \alpha + \beta_1 Size + \beta_2 Age + \beta_3 Tobin's\, q + \beta_4 Insider\, ownership + \beta_5 PPP + \beta_6 Political\, connection + \beta_7 PPP * Political\, connection + \beta_8 Mills'\, ratio + \epsilon \tag{4.2}$$

In Equation 4.2, $Bankloans/sales$ was the dependent variable to indicate the ability to access to bank loans. Following Chen et al. (2013), I included $Size$,Age, $Insider\, ownership$, and $Political\, connection$ as control variables that may influence bank financing. Chen et al. (2013) use the lagged return on sales (ROS) to capture the endogeneity issue arising from the relationship between firm performance and bank financing. For my regression, I included $Tobin's\, q$ (with one year lag) rather than the lagged ROS to capture the additional effects of investment opportunities while still controlling the endogeneity between firm value and bank financing. The interaction term between PPP and $Political\, connection$ was included in the regression to determine how easy PPP politically connected firms accessed bank loans. It should be noted that in both models (Equations 4.1 and 4.2), I also controlled for the industry effects by including industry dummy variables to account for the government's preferential alloca-

[1]See Appendices A for the definition of these variables

tion to strategic industries. For example, the 12th Five-Year Plan in China indicates strategic emerging industries, with some of these covering new energy, new material, new generation information technology (Ruibo, 2010). Likewise, in India, Ghosh (2013) indicate five emerging and enabling technologies as a wide-ranging application for economic growth, including biotechnology, nanotechnology, micro and nanoelectronics, photonics, and advanced materials.

Slope Differences to Explore Overinvestment Problems

In order to test Hypothesis 7, I needed to investigate whether PPP investments can help private sector firms to alleviate the difficulties associated with accessing bank financing. As discussed earlier, higher access bank loans brings significant economic benefits to private sector firms. Alternatively, because of their political support, these firms use these funds to pursue some overinvestment strategies without the rational of investment opportunities and without paying the banks back the entire amount that was borrowed. The literature confirms that the same situation is happening with state-owned enterprises, especially in the context of weak institutional economies. For instance, in China, Ying et al. (2013) argue that, compared with private sector firms, state-owned enterprises can easily access bank loans; however sometimes the purpose for these loans is controlled by the government and directed towards the pursuit of its social or political goals. In many cases, even, the loans are utilized to undertake negative NPV projects as long as these kinds of projects can bring more employment and economic growth to the areas in which they are implemented (Ying et al., 2013); in other cases, these kinds of projects are developed to attract more support from voters before the next election. However, this strategy might be at the expense of state-owned enterprises if considered from the perspective of the economic benefits gained by the firms.

The main side effect of political influence is the overinvestment problem that arises due to easy access to capital. Jensen (1986) argues that managers can overuse their free cash flow to pursue their pecuniary and non-pecuniary benefits. Stulz (1990) argues that managerial discretion enables managers to overinvest because of its perquisites with increased investment and because firms lack control over the management team. Based on these articles, Ding et al.

(2016) find empirical evidence that state-owned enterprises overinvest due to poor monitoring by banks. This is consistent with Stulz (1990) who points out that the overinvestment of private firms is explained by the free cash flow hypothesis.

I developed a regression model to see whether private sector firms with political connections overinvest. To do that, first, I divided my sample into two groups of firms, namely, firms with high Tobin's q (above the median) and firms with low Tobin's q (below the median). I then ran the main regression (Equation 4.2) separately on two groups. Second, I used a three-way interaction $PPP * Political\,connection * Tobin's\,q$ term to understand the influence of politically connected PPP firms (compared to politically connected non-PPP firms) on firm-level productivity.

$$Bank\,loans/sales = \alpha + \beta_1 Size + \beta_2 Age + \beta_3 Tobin's\,q + \beta_4 Insider\,ownership + \beta_5 PPP + \beta_6 Political\,connection + \beta_7 PPP * Political\,connection + \beta_8 Mills'\,ratio + \beta_9 PPP * Tobin's\,q + \beta_{10} Tobin's\,q * Political\,connection + \beta_{11} Tobin's\,q * Political\,connection * PPP + \epsilon \tag{4.3}$$

Following Dawson and Richter (2006), I measured the slope differences to interpret the three-way interaction term. I computed simple slopes of the variable $Bank\,loans/sales$ on the variable PPP when the moderator variable $Political\,connection$ and $Tobin's\,q$ were held constant at different combinations of high and low values. The simple slopes were computed and tested to see whether their differences were significant from zero in predicting the $Bank\,loans/sales$ variable. Consequently, there were six pairs of slopes:

(1) (Political connections and high Tobin's q) - (Political connections and low Tobin's q)

(2) (Political connections and high Tobin's q) - (Nonpolitical connections and high Tobin's q)

(3) (Political connections and low Tobin's q) - (Nonpolitical connections and low Tobin's q)

(4) (Nonpolitical connections and high Tobin's q)-(Nonpolitical connections and low Tobin's

q)

(5) (Political connections and high Tobin's q) - (Nonpolitical connections and low Tobin's q)

(6) (Political connections and low Tobin's q) - (Nonpolitical connections and high Tobin's q)

According to Jensen (1986), firms with low growth opportunities (low Tobin's q) are more susceptible to overinvestment problem due to lack of positive NPV projects. Hence, such firms overuse additional cash flow for excess investment spending, maybe on value-destroying projects (Vogt, 1994; Pawlina and Renneboog, 2005). Therefore, to examine the overinvestment problem, I focused on the third pair *(Political connections and low Tobin's q) - (Nonpolitical connections and low Tobin's q)* where the moderator variable, $Tobin's q$ was kept at low and the moderator variable $Political\,connections$ changed from the high level of 1 to the low level of 0.

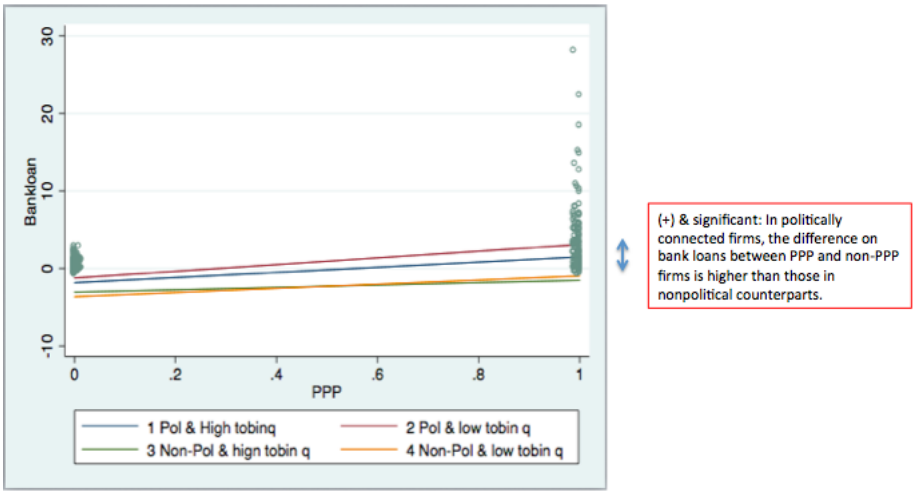
This is captured in Figure 4.1 by the slope differences between the red regression line (Political connections and low Tobin's q) and the orange regression line (Nonpolitical connections and low Tobin's q). In this case, if the significant and positive difference on the slope only occurs in the sub-group of firms with low $Tobin's\,q$ or low growth opportunities, this implies that, in politically connected firms, the difference in bank loans between PPP and non-PPP firms is higher than those in nonpolitical counterparts. However, the higher bank financing of politically connected firms only happens in low-investment-opportunity group. Therefore, political connections may exacerbate the overinvestment problem in PPP private sector firms. This supports the negative view that political connections may lead to rent-seeking and favoritism, thus distorting the allocation of credit.

Regression Discontinuity Design as an Identification Strategy

In order to draw casual inference on whether political connections cause the increase in bank loans, I use the RDD. Given that election result is an exogenous shock, I examined whether bank

Figure 4.1: The Graph of Slopes to Disentangle Overinvestment

This figure visualizes the simple slopes of the variable *Bank loans/sales* on the variable *PPP*, where the moderator variables *Political connection* and *Tobin's q* were held constant at different combinations of the high and low levels.



loans significantly increase if the same government wins the elections and the same political can extend their influence in securing bank loans. This analysis provided a more direct attribution of political connections to excess bank loans. The RDD is a quasi-experimental design to estimate treatment effects where the treatment is assigned by an observed variable (also called a forcing or running variable) above a known cutoff point (Lee and Lemieux, 2009). The RDD allows for the estimating of effects near the cutoff point in which the probability of obtaining the treatment or not is quite the same. This is like a coin-flip experiment or, in other words, the treatment variations are more likely to be randomized (Lee and Lemieux, 2009).

The RDD was conducted based on the hypothesis that private sector firms with political connections can have higher access to bank loans if they have projects awarded during the election year when the incumbent government continues to maintain their power. Government allows preferential bank financing to pursue their current political, social purposes, to attract voting or to award politically connected firms owing to their support for sustaining the incumbent government power. Therefore, in my RDD, the benefits of the election event (the treatment) were assigned if firms had projects in or after the election event when the incumbent government continued to win. Lee and Lemieux (2009) indicate that the crucial assumption for the validity of the RDD is that individuals cannot "precisely" manipulate the assignment

variable. Because receiving the treatment may benefit them, individuals may make more efforts to obtain the benefits. If this happened, I could not isolate the treatment effects from other individual effects in the outcome. However, in my scenario, this assumption could be supported because the election event and even the PPP project awarding time were scheduled and determined ex-ante by the government; hence, there was little likelihood that private sector firms could manipulate this fixed schedule. In the absolutely rare cases, when private sector firms try to adjust the project awarding time to fit the election event, there is no guarantee for their behaviors being beneficial if their supported party cannot win in the election. Moreover, even if this happened, the RDD allowed me to estimate the treatment effects near the threshold; therefore, the variation of treatment was randomized even when few individuals still manipulated the running variable in an imprecise way (Lee and Lemieux, 2009).

I chose the Indian election event in 2009 and the Chinese election event in 2008 for this study. In case of India, the last two decades experienced the interchange of political power between the United Progressive Alliance (UPA) (the coalition of the centre-left political party) and the National Democratic Alliance (NDA) (the coalition of the centre-right political party). The general election in 1999 experienced the win of NDA, after that, the UPA won two consecutive general elections, in 2004 and 2009, to form a new government. However, the 2014 general election witnessed a substantial transfer of political power when the NDA again became the winner. In China, although the political power is in hands of Communist Party, there was a transfer of power from President Jiang Zemin to President Hu Jintao in 2003. Hu Jintao maintained his position in the 2008 election before this was passed on to the new leader XiJinping in 2013. The study only considers the five-year period leading up to and following the election event to take into account the five-year election cycles in China and India, and to ensure the dominance of the current government in two consecutive cycles. I also conducted RDD separately into four groups: PPP politically connected firms, PPP nonpolitically connected firms, non-PPP politically connected firms and non-PPP nonpolitically connected firms. This classification was designed to explore whether the effects of the election event varied among different kinds of private sector firms (PPP or not, and politically connected or not).

The most basic model of the RDD is

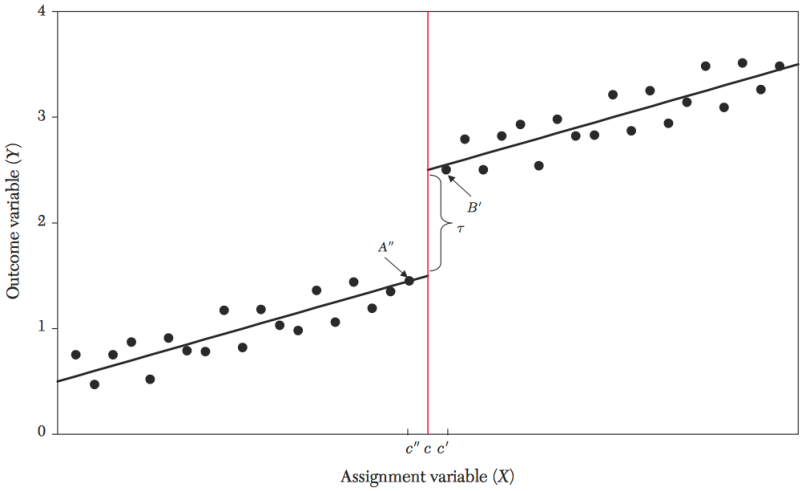
$$Bank\,loans/sales = \alpha + \beta_1 Election\,dummy + \beta_2 PPP\,investment\,year + \epsilon \qquad (4.4)$$

where the receipt of the election event effect is denoted by the dummy variable *Election dummy*. *Election dummy* takes the value of 1 if the *PPP investment year* is equal to or more than 2008(or 2009) for Chinese (or Indian) private sector firms respectively.

I adapt the RDD graph of Lee and Lemieux (2009) in Figure 4.2 to explain the basic RDD setting. Accordingly, B' is the estimated value of Y (Bank loans/sales) for the firm observation having PPP investment in the year c (c=2008 for the Chinese firms and c=2009 for the Indian firms); hence, this firm received the treatment (the election event effect). A" is the estimated value of Y (Bank loans/sales) for the same firm in the opposing state of not having the treatment. Therefore, B'-A" is the causal effects of the election event on private sector firms' access to bank loans.

Figure 4.2: Simple Linear Research Discontinuity Setup

This figure is adapted from Lee and Lemieux (2009) to explain the basic RDD setting



In my RDD, the treatment determining variable *PPP investment year* is discrete with the PPP year being recorded only in years. According to Lee and Card (2008), if the treatment determining covariate is continuous, no functional form is needed to estimate the effect of the event. Hence, I simply compared the outcome "just above" and "just below" the cutoff point

with the assumption that the treatment and the control group are identical. However, with the discrete assignment variable, I may not have computed the average within the "as small as possible" neighborhoods of the threshold; hence, this may have over-estimated the treatment effect at the discontinuity threshold. To solve this problem, Lee and Card (2008) propose an inference procedure to conduct an RDD with a discrete running variable.

1. Lee and Card (2008) normalize he assignment variable X (which is $PPP\,investment\,year$ in my setting) is normalized to make sure that the cutoff point equals to zero; hence, the intercept of the regression is the estimate of $\mathrm{E}(Y_0|X=0)$. Then they choose the parametric functional form to estimate the treatment effects by using the goodness-of-fit statistic to decide whether a polynomial form is appropriate.[2]

2. They compute both heteroskedasticity and cluster-consistent standard errors (clustering on the different discrete value of X) and decide whether the counterfactual functional forms can be specified. If yes, then they have two identical specification errors in $\mathrm{E}(Y_1|X=x_k)$ and $\mathrm{E}(Y_0|X=x_k)$. As a result, the cluster-consistent standard error is used for inference. Lee and Card (2008) explain this circumstance by approximating two counterfactual functions

$$E(Y_1|X=x_j) = \alpha_0 + X_j\gamma 0 + \beta_0 + a_{1j}$$

$$E(Y_0|X=x_j) = \alpha_0 + X_j\gamma 0 + a_{0j}$$

where a_{1j}, a_{0j} are the random specification errors. Part A of Figure 4.3 indicates the case when two errors are identical. Both the estimate of $E(Y_1|X=x_k)$ and the extrapolation of $E(Y_0|X=x_k)$ underestimate the true effects, but the errors a_{1j}, a_{0j} in these two estimates have the same sign and magnitude. Therefore, the treatment effect is at the discontinuity $E(Y_1-Y_0|X=x_k)=\beta$ (Lee and Card, 2008). Part B of Figure 4.3 indicates the case when two errors are independent. The estimate of $E(Y_1|X=x_k)$ underestimates the true effects while the extrapolation of $E(Y_0|X=x_k)$ overestimates them. Therefore, the estimate of the treatment

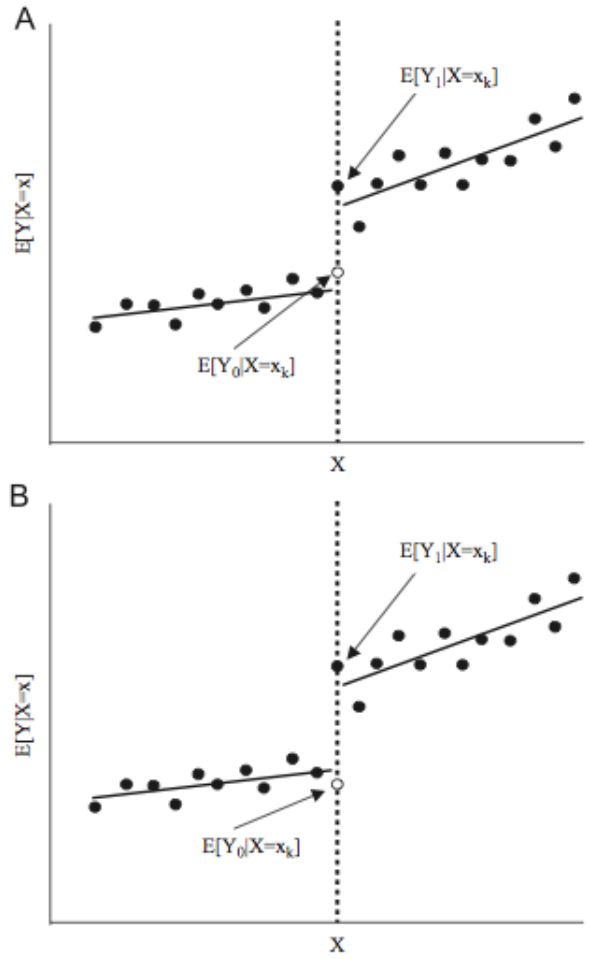
[2]The goodness-of-fit statistic $G = \frac{(ESS_R - ESS_{UR})/(J-K)}{(ESS_{UR})/(N-J)}$

where ESS_R is the restricted error sum of squares from estimating Model 4.4 with the polynomial form in the assignment variable X, ESS_{UR} is the unrestricted error sum of squares achieved by regressing the outcome variable Y ($Bank\,loans/sales$ in my setting) on a full set of J dummy variables systematically generated from the variable $PPP\,investment\,year$ to capture J different discrete value recorded by years. G follows F(J-K,N-J) with K denotes the number of parameters in Model 4.4 and N measures total observations(Lee and Card, 2008).

effect at the discontinuity may be biased and the standard error will need to be inflated (Lee and Card, 2008).

Figure 4.3: Counterfactual Specification: Identical Errors and Independent Errors

This figure is adapted from Lee and Card (2008) to explain two cases: identical errors and independent errors. Part A presents the identical errors when the random specification error, generated from the estimate of $E(Y_1|X = x_k)$ (by the data from the right of this threshold), equals the specification error that is generated from the extrapolation of $E(Y_0|X = x_k)$ (by data from the left). Part B indicates the latter case where these two errors are independent and unequal.



3. The method to inflate the standard error is to collapse data into cells with each cell corresponding to one PPP investment year. The cell size-weighted regression is then run, and the mean square error from this regression and the cell variance are used to compute $\widehat{\sigma^2}$ [3] .

[3]The formula is $\widehat{\sigma^2}=\frac{1}{N}\sum_{j=1}^{J} n_j(\overline{Y_j} - W_j\widehat{\theta})^2 - \frac{1}{N}\sum_{j=1}^{J}\frac{1}{n_j-1}\sum_{i=1}^{n_j}(Y_{ij} - \overline{Y_j})^2$, in which the first term is the weighted variance of the mean residual from the cell size-weighted regression and the second term is the average cell variance (Lee and Card, 2008)

Add this value to the sampling variance to get the robustness results.[4]

4.4 Data

4.4.1 Data Sources

The data was sourced from several multiple sources. Information on PPP projects was sourced from the World Bank's Private Participation in Infrastructure (PPI) Database. Information related to the financial data of partnering private firms was obtained from Datastream. For the years between 1988 and 2013, the final sample included 169 and 215 firm-year observations for China and India, respectively. Political connection data is obtained from the board of directors information reported in the annual reports of partnering private sector firms. For the Indian firms, in addition to annual reports, I used India's bicameral parliament online public data of both from the Upper House (Rajya Sabha) and from the Lower House (Lok Sabha). Data on insider ownership and bank loans were mainly collected from private sector firms' annual reports. These annual reports were available on the firms' official websites or on Morningstar Database. Data on bank loans, including both short-term and long-term bank loans, were obtained from the liabilities section on the balance sheets and notes to financial statements. Insider ownership was the percentage of shares held by the Chief Executive Officer (CEO), the chair, the executive directors, the non-executive directors and associated family members (Pawlina and Renneboog, 2005). For the Chinese firms, I was able to obtain insider ownership data in the *Directors' interest* section of the annual reports. For the Indian firms, insider ownership data was obtained from the corporate governance reports and the shareholding patterns sourced from the annual reports or the websites of the National Stock Exchange of India and the Bombay Stock Exchange, the two largest stock exchanges in India. I also used Thomson Reuters Eikon Database for cross-checking the accuracy of the insider ownership data. In order to reduce the potential identification problem, I created a control group of the competing

[4]The new adjusted interval is $(\widehat{\beta} - 1.96\sqrt{\widehat{V(\widehat{\beta})} + 2\widehat{\sigma^2}}); \widehat{\beta} + 1.96\sqrt{\widehat{V(\widehat{\beta})} + 2\widehat{\sigma^2}})$ which contains $\mathrm{E}(Y_1 - Y_0|X = x_k)$ with $\alpha = 5\%$ (Lee and Card, 2008)

non-PPP firms. Applying the propensity-score matching, I obtained one-to-one matched firms (for the firms investing in PPPs), matched by firm size and industry (based on the sector level of the FTSE/Dow Jones Industrial Classification Benchmark [ICB] in Datastream). I used the nearest-neighbour matching method to capture the bias in the estimated treatment effects when matching PPP firms and non-PPP firms by size and industry.

4.4.2 Descriptive Analysis

Table 4.1 reports descriptive statistics at firm-level data. I ran a mean difference test to explore the varying characteristics between PPP private sector firms and their competing non-PPP counterparts (the control group) in PPP investment years. The total PPP firms' sample included 169 and 215 firm-year observations of the Chinese and the Indian PPP private sector firms, respectively. Due to the unavailability of bank loan data, the final sample dropped to 149 and 203 firm-year observations in China and India, respectively.

Panel A compares PPP private sector firms and their non-PPP counterparts. As can be seen in Panel A of Tables 4.1, both the Chinese and the Indian PPP firms have higher bank loans/sales than their matched non-PPP firms. The relative difference in bank loans is more than twice the size of their corresponding sales. An average PPP firm's access to bank loans, which is higher than that of a similar firm in the same sector, supports the idea that PPP firms, with government assets as collateral and government loan guarantees, have better access to external finances. While the Chinese PPP firms have a greater ability to meet their interest payments than their non-PPP firms, the result is the exact opposite in India. This indicates that the nature of firm that engages in PPP ventures varies between the countries.

Panels B, C and D of Tables 4.1 classify private sector firms into politically connected and nonpolitically connected firms. For the Chinese firms, on average, politically connected firms have higher bank loans/sales in all three groups, which is consistent with Hypothesis 5 claiming that political connections enhance access to external financing. This result holds even for the Indian firms.

Table 4.1: Descriptive Statistics for the Analysis on Bank Loans

This table provides the mean of firm-level variables, the difference of means between PPP and non-PPP firms, and between politically connected and nonpolitically connected firms, along with the *t*-test. The mean value is reported in the years during which firms have had PPP projects. *Bank loans/sales* is measured by total long term and short term bank loans divided by sales. *Interest coverage* denotes earnings before interest and taxes divided by interest expenses on debts. *Size* is measured by the natural logarithm of total assets. *Leverage* is calculated by the total debt divided by the total assets. *Age* is measured from the year of a firm's incorporation. *Tobin's q* (with one year lag) is measured by the market to book value of total assets in order to capture investment opportunities. *Insider ownership* is the percentage of shares held by the CEO, the chair, the directors and associated family members. ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

Panel A: The total sample	China				India			
	PPP (n=149)	Non-PPP (n=116)	Difference	t-test	PPP (n=203)	Non-PPP (n=146)	Difference	t-test
Bank loans/sales	3.319	0.718	2.601***	6.5	2.208	0.917	1.291**	1.97
Interest coverage	9.691	3.713	5.978	1.64	4.490	26.165	-21.675***	-3.35
Size	7.056	6.908	0.148	1.29	7.692	7.546	0.146**	1.99
Age	12.812	9.147	3.665***	3.87	7.917	9.459	-1.542***	-2.78
Leverage	0.266	0.286	-0.020	-0.8	0.409	0.311	0.098***	5.05
Tobin's q	2.214	1.381	0.833***	3.39	2.523	2.087	0.436	0.84
Insider ownership	32.241	19.635	12.606***	4.04	12.988	7.068	5.921***	3.19
Panel B: The total sample	Politically connected firms (n=158)	Nonpolitically connected firms (n=107)	Difference	t-test	Politically connected firms (n=76)	Nonpolitically connected firms (n=273)	Difference	t-test
Bank loans/sales	3.135	0.771	2.364***	5.76	3.857	1.048	2.809***	3.64
Interest coverage	6.079	8.532	-2.453	-0.66	17.664	12.394	5.270	0.67
Size	7.103	6.825	0.278**	2.43	7.997	7.528	0.469***	5.57
Age	11.513	10.757	0.756	0.76	8.299	8.631	-0.332	-0.5
Leverage	0.299	0.240	0.059**	2.39	0.315	0.383	-0.068***	-2.92
Tobin's q	1.880	1.805	0.075	0.29	1.872	2.473	-0.601	-0.96
Insider ownership	24.889	30.014	-5.125	-1.58	6.563	11.575	-5.012**	-2.29
Panel C: PPP	Politically connected firms (n=94)	Nonpolitically connected firms (n=55)	Difference	t-test	Politically connected firms (n=45)	Nonpolitically connected firms (n=158)	Difference	t-test
Bank loans/sales	4.609	1.115	3.494***	5.24	5.815	1.122	4.693***	4.07
Interest coverage	7.668	13.213	-5.545	-1.29	3.565	4.769	-1.204	-0.85
Size	7.053	7.061	-0.008	-0.04	7.914	7.626	0.288**	2.53
Age	12.479	13.382	-0.903	-0.59	8.617	7.709	0.908	1.13
Leverage	0.294	0.219	0.075***	2.73	0.389	0.415	-0.026	-0.86
Tobin's q	2.236	2.177	0.059	0.15	2.054	2.663	-0.608	-0.61
Insider ownership	32.999	30.945	2.054	0.53	10.577	13.605	-3.028	-0.96
Panel D: Non-PPP	Politically connected firms (n=64)	Nonpolitically connected firms (n=52)	Difference	t-test	Politically connected firms (n=31)	Nonpolitically connected firms (n=115)	Difference	t-test
Bank loans/sales	0.971	0.407	0.564***	4.85	0.790	0.949	-0.159	-0.2
Interest coverage	3.746	3.672	0.074	0.01	39.753	22.650	17.103	0.91
Size	7.177	6.576	0.601***	4.03	8.126	7.396	0.730***	6.08
Age	10.094	7.981	2.113**	2.1	7.800	9.888	-2.088*	-1.87
Leverage	0.305	0.262	0.043	0.99	0.197	0.341	-0.144***	-4.04
Tobin's q	1.357	1.411	-0.054	-0.19	1.566	2.213	-0.647	-1.56
Insider ownership	12.593	28.925	-16.332***	-3.23	0.275	8.840	-8.565	-3.21***
Panel E: Politically connected PPP & non-PPP firms	Politically connected PPP firms (n=94)	Politically connected non-PPP firms (n=64)	Difference	t-test	Politically connected PPP firms (n=45)	Politically connected non-PPP firms (n=31)	Difference	t-test
Bank loans/sales	4.609	0.971	3.638***	6.02	5.815	0.790	5.025*	1.93
Interest coverage	7.668	3.746	3.922	0.92	3.565	39.753	-36.188*	-1.81
Size	7.053	7.177	-0.124	-0.86	7.914	8.126	-0.212	-1.33
Age	12.479	10.094	2.385*	1.97	8.617	7.800	0.817	0.74
Leverage	0.294	0.305	-0.011	-0.41	0.389	0.197	0.192***	4.44
Tobin's q	2.236	1.357	0.879***	3.16	2.054	1.566	0.488	1.5
Insider ownership	32.999	12.593	20.406***	5.67	10.577	0.275	10.303***	3.14

Panel E of Tables 4.1 compare, within politically connected firms, the differences between PPP and non-PPP firms. This allowed me to gain initial insights on my Hypothesis 6. In both China and India, politically connected PPP firms have higher bank loans/sales than politically connected non-PPP firms. This result lends initial support to my Hypothesis 6 that within the politically connected firms, the social lending view associated with PPP firms enables these firms to gain higher access to bank loans. However, in India, there is a lower interest coverage in politically connected PPP firms than those in non-PPP firms, while the result for the Chinese firms is not significant. This may signal the potential evidence of the political corruption view in India as the ability of paying interest does not go along with the high access to bank loans in the politically connected PPP firms.

4.5 Empirical Results and Discussion

4.5.1 Political Connections and Bank Loans

My first test aimed to understand the relationship between political connections and bank loans. The cross-sectional regression results are reported in Table 4.2. After controlling for firm-level productivity (proxied by Tobin's q), firm size, firm age, ownership structure and industry fixed effects, I find that political connections have a positive and significant effect on firm-level bank loans, given the positive and significant coefficient of the variable *Political connection* (as in Column 1 for Chinese firms and Column 5 for Indian firms). While politically connected Chinese firms' bank lending is 2.584 times higher than that of nonpolitically connected Chinese firms, this figure for the Indian firms is lower at 0.429. This lends support to my Hypothesis 5. In relation to this, I controlled for political connections to explore the effects of PPP investments. The results, as indicated in Column 2 for the Chinese firms and Column 6 for Indian firms, support my Hypothesis 4 suggesting that PPP investments increase partnering private firms' access to bank loans. In China, the bank lending of PPP firms is 3.050 times higher than their non-PPP counterparts, whereas in Indian, this figure is only about 0.543. When I separated

private sector firms into PPP and non-PPP groups (as in Columns 3 and 4 for the Chinese firms, and Columns 7 and 8 for the Indian firms), the politically connected firms still exhibit the feature of higher bank lending, though the effect is more pronounced for PPP firms. Thus, it supports my Hypothesis 6 that PPPs enhance the positive effects of political connection on private sector firms in these two economies. Interestingly, the higher bank loans for politically connected PPP firms were more pronounced in the Chinese economy. This is evident by the positive and significant coefficient of the variable *Political connection* belong to PPP groups. Politically connected PPP firms' bank lending is 2.674 (1.502) times higher than nonpolitically connected PPP firms in China (India), respectively. This implies that political connections matter more for PPP private sector firms in China.

4.5.2 Effects of PPPs and Political Connections on Private Sector Firms' Bank Financing: the Heckman Two-Stage Model

Table 4.3 reports the effects of PPPs and political connections on private sector firms' bank financing. Panel A presents the results of the first stage of the Heckman model when I conducted the probit estimate of the variable PPP. For the Chinese firms, as indicated in Column 1 of Panel A, private sector firms with lower *Leverage*, higher *Age* and higher $Tobins'q$ prefer PPP projects. This is consistent with the descriptive statistics and the investment–cash flow sensitivity analysis documenting that, in China, older, better-valued firms with less debt burden, relative to their matched firms in the same sector, prefer PPP projects. Especially, private sector firms with political connections are more likely to opt for PPPs compared with nonpolitically connected firms. This is evident from the positive and significant results of the coefficient of the variable *Political connection*. This is consistent with the view proposed by Chen et al. (2011) that politically connected firms may receive better investment opportunities from the government which in turn enables the firms to enhance their value.

For the Indian firms, as indicated in Column 2 of Panel A, younger firms higher debt burden with opt for PPPs. This is consistent with my findings in the investment–cash flow sensitivity

Table 4.2: Role of Political Connections on Bank Lending

This table present the effects of political connections on access to bank loans. *Political Connection* (Pol) is a dummy variable that takes 1 for firms whose chairperson and executive directors who were formerly or currently officers in the government, the parliament, or the military (Chen et al., 2011). *Bank loans/sales* is measured by total long term and short term bank loans divided by sales. *Size* is measured by the natural logarithm of total assets. *Age* is measured from the year of a firm's incorporation. *Tobin's q* (with one year lag) is measured by the market to book value of total assets in order to capture investment opportunities. *Insider ownership* is the percentage of shares held by the CEO, the chairperson, the directors and associated family members. ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

	China				India			
	The total sample	The total sample	PPP firms	Non-PPP firms	The total sample	The total sample	PPP firms	Non-PPP firms
	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tobin's q	-0.019	-0.147	-0.137	-0.056	-0.013	-0.020	0.032	-0.028
	(-0.172)	(-1.382)	(-0.833)	(-1.311)	(-0.546)	(-0.826)	(0.373)	(-0.711)
Size	0.095	-0.047	0.224	0.052	0.734***	0.607***	1.138***	0.472***
	(0.267)	(-0.146)	(0.352)	(0.548)	(4.109)	(3.323)	(3.967)	(2.794)
Age	0.023	-0.022	-0.077	0.016	-0.111***	-0.1003***	-0.193***	-0.0644***
	(0.634)	(-0.675)	(-1.271)	(1.062)	(-4.936)	(-4.405)	(-4.947)	(-3.455)
Insider ownership	0.002	-0.016*	-0.026	0.001	0.005	0.001	0.002	-0.004
	(0.174)	(-1.823)	(-1.501)	(0.223)	(0.743)	(0.120)	(0.183)	(-0.613)
Political connection	2.584***	2.310***	2.674***	0.542***	0.429*	0.460*	1.502***	-0.712***
	(5.868)	(5.785)	(3.578)	(3.407)	(1.662)	(1.802)	(3.928)	(-2.694)
PPP		3.050***				0.534***		
		(7.418)				(2.747)		
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.532	0.974	2.402	-0.317	-4.086**	-3.616**	-6.889**	-2.611*
	(0.447)	(0.314)	(0.462)	(-0.369)	(-2.665)	(-2.367)	(-2.975)	(-1.770)
R-squared	20.153	35.148	32.720	42.777	18.648	20.522	26.624	26.855
N	258	258	149	109	343	343	201	142

Table 4.3: Heckman Two-Stage Model and Slope Differences to Estimate the Effects of PPPs and Political Connections on Bank Financing

This table presents the effects of PPPs and political connections on firm's capability to access bank loans. Panel A reports the first stage probit model to estimate what determines private sector firms to participate in PPP projects. Panel B reports the second-stage model to estimate the effects of PPP investments on private sector firms' capability to access bank loans after controlling for the endogeneity and the selection bias of PPP firms. Panel C reports the Slope Difference Test by computing simple slopes of $Bank\,loans/sales$ on PPP when $Political\,connection$ and $Tobin's\,q$ were held constant at different combinations of high and low values. This was designed to explore whether changes in bank loans relate to overinvestment problems. $Bank\,loans/sales$ was measured by the total long term and short term bank loans divided by the sales. $Size$ was measured by the natural logarithm of total assets. Age was measured from the year of a firm's incorporation. $Tobin's\,q$ (with one year lag) was measured by the market to book value of total assets in order to capture investment opportunities. $Insider\,ownership$ is the percentage of shares held by the CEO, the chair, the directors and associated family members. ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

Panel A. Heckman two-stage model: Stage 1-The probit estimate of PPPs	China	India
PPPs	Coef/t	Coef/t
	(1)	(2)
Leverage	-1.154**	1.924***
	(-2.24)	(4.15)
Size	0.025	0.346**
	(0.19)	(2.33)
Age	0.061***	-0.050***
	(4.25)	(-2.66)
Tobin's q	0.079*	0.050
	(1.93)	(1.37)
Political connections	0.304*	0.086
	(1.77)	(0.40)
Industry effects	Yes	Yes
Constant	-1.732	-2.814**
	(-1.66)	(-2.47)
N	288	348
Pseudo R-squared	9.51	9.76

Panel B. Heckman two-stage model: Stage 2-The effects of PPPs on Bank loans						
Total bank loans/sales	Total sample	High q	Low q	Total sample	High q	Low q
	(1)	(2)	(3)	(4)	(5)	(6)
Tobin's q	-0.062	-0.040	0.913	-0.040	-0.020	-3.138**
	(-0.616)	(-0.480)	(0.981)	(-0.265)	(-0.075)	(-2.244)
Size	-0.046	-0.036	0.730	2.087**	3.048**	1.729

		(-0.150)	(-0.111)	(1.387)				(2.221)	(2.159)	(1.265)
Age		0.071	0.081	0.045				-0.385***	-0.399**	-0.470**
		(1.334)	(1.373)	(0.484)				(-3.166)	(-2.261)	(-2.557)
Insider ownership		-0.020**	-0.024**	-0.001				-0.020	-0.016	-0.018
		(-2.302)	(-2.215)	(-0.101)				(-0.890)	(-0.490)	(-0.523)
Mills' ratio		2.596**	3.775**	3.609**				2.752	4.332	3.173
		(2.160)	(2.429)	(2.105)				(1.344)	(1.440)	(1.004)
PPP=1		1.999***	0.902	3.745***				-0.813	-0.771	-1.599
		(2.983)	(1.098)	(3.427)				(-0.986)	(-0.648)	(-1.283)
Political connection=1		1.637**	0.250	2.915***				-3.191**	-1.966	-4.774**
		(2.417)	(0.298)	(2.744)				(-2.139)	(-0.822)	(-2.293)
PPP* Political connection		1.807**	2.643**	0.949				7.911***	8.646***	8.228***
		(2.051)	(2.398)	(0.670)				(4.530)	(3.143)	(3.283)
Industry effects		Yes	Yes	Yes				Yes	Yes	Yes
Constant		-4.792	-2.855	-14.633**				-14.679*	-21.149*	-9.026
		(-1.248)	(-1.014)	(-2.507)				(-1.819)	(-1.671)	(-0.799)
R-squared		37.50	52.90	45.17				0.151	0.203	0.173
N		258	124	134				333	167	166
Panel C: Slope Difference to explore overinvestment problems										
Y=Total loan/sales (X=PPP)	Coef	Std.Err	t-test	p-value	Adjusted-p	Coef	Std.Err	t-test	p-value	Adjusted-p
(pol & high q) - (pol & low q)	-1.004	2.031	-0.49	0.622	3.732	-5.118	7.314	-0.7	0.485	2.91
(pol & high q) - (non-pol & high q)	1.799	0.642	2.8	0.005	0.03**	4.946	4.724	1.05	0.296	1.776
(pol & low q) - (non-pol & low q)	1.669	1.403	1.19	0.236	1.416	9.978	3.581	2.79	0.006	0.036**
(non-pol & high q) - (non-pol & low q)	-1.134	1.414	-0.8	0.423	2.538	-0.086	1.825	-0.05	0.962	5.772
(pol & high q) - (non-pol & low q)	0.665	1.680	0.4	0.693	4.158	4.860	4.769	1.02	0.309	1.854
(pol & low q) - (non-pol & high q)	2.803	1.343	2.09	0.038	0.228	10.064	3.621	2.78	0.006	0.036**

analysis that show private sector firms opting for PPPs to circumvent underinvestment problems. However, unlike the case of the Chinese firms, there is no significance in the effects of *Political connection* on the probit estimate of PPP.

Panel B of Table 4.3 indicates the second stage of the Heckman two-stage model, which was to test the effects of PPPs and political connection on private sector firms' access to bank loans. Columns 1,2 and 3 are for the Chinese firms. Columns 4,5 and 6 are for the Indian firms. For the Chinese firms, as indicated in Column 1 of Panel B, PPP firms have better access to bank financing compared with their non-PPP counterparts. This is evident from the positive and significant result of the coefficient of the variable PPP. PPP and politically connected firms, especially, have higher bank loans. This is evident from the positive and significant coefficient of the interaction term between PPP and *Political connection*. For the Indian firms, the same results are documented when there is a positive and significant coefficient of the interaction term between PPP and *Political connection*, as indicated in Column 4 of Panel B. This is consistent with my Hypothesis 5, which claims that political connections provide better access to bank financing of PPP-partnering private sector firms than that of nonpolitically connected firms.

4.5.3 Testing for Potential Overinvestment Problems: Slope Difference Test

Firstly, to disentangle overinvestment problems, the main regression was conducted for two subsamples: the high-q group of firms and the low-q group of firms, as indicated in Panel B of Table 4.3. Columns 2 and 3 are for the Chinese firms with high Tobin's q and low Tobin's q, respectively. Columns 5 and 6 are for the Chinese firms with high Tobin's q and low Tobin's q, respectively. For the robustness tests, as indicated in Panel C of Table 4.3, I computed the slope difference to test the effects of PPP on firms' bank financing when the moderator, *Political connection* and $Tobin's\, q$ were held constant at different combinations of high and low values. The aim of firm classification into the high-q group and the low-q group was to

link firms' financing with overinvestment problems. Accordingly, firms with low investment opportunities (low q) may suffer more from overinvestment problems (Jensen, 1986; Pawlina and Renneboog, 2005; Vogt, 1994).

In relation to the Chinese firms, as indicated in Columns 2 and 3 of Panel B of Table 4.3, when private sector firms were classified into the high-q group and the low-q group, the coefficient of the interaction term between PPP and *Political connection* is only significant at the high-q group. More importantly, for the slope difference test, as indicated in Panel C of Table 4.3, only the second pairs, (Political connection and high q) -(Nonpolitical connection and high q), experience the positive and significant results. This means that the better access of PPP politically connected firms to bank financing only happens in firms with high investment opportunities in China. This implies that in China, political ties may bring better access bank financing to PPP-partnering private sector firms, helping them fulfil their plentiful investment opportunities.

For the Indian firms, as indicated in Columns 5 and 6 of Panel B of Table 4.3, PPP politically connected firms have higher bank financing for both the high-q and low-q groups of firms. However, for robustness tests indicated in Panel C of Table 4.3, only the third pair, (Political connection and low q) -(nonpolitical connection and low q), experiences the positive and significant results. This implies that the PPP Indian private sector firms with political ties may have better access to bank financing despite the fact that they have few investment opportunities. Therefore, owing to their political connections, these kinds of firms have more chances to overuse their abundant bank financing. This supports the overinvestment hypothesis. This result is consistent with the descriptive analysis of when the PPP Indian firms have higher bank loans but document lower interest coverage compared with their non-PPP counterparts. As also indicated in the descriptive analysis, these PPP firms also have higher insider ownership, which allows managers to have more power to manipulate the firms' financing.

4.5.4 Effects of Election Events – Regression Discontinuity Design

Table 4.4, following Lee and Card (2008), reports the result of the goodness-of-fit statistic on whether the polynomial form was appropriate for my RDD. Lee and Card (2008) conclude that the polynomial function is too restrictive if the statistic exceeds the critical value. However, all of my results for different groups of firms witness that the G-value is less than the critical F-value; hence the polynomial form was appropriate for my analysis. Gelman and Imbens (2014) study the effects of a high-order of polynomials in the RDD. Following these authors, I used a local linear or quadratic polynomials in the RDD rather than the higher order of polynomials, since the higher order can lead the causal effects to become misleading. My study used the discrete assignment treatment ($PPP\,investment\,years$ as recorded by years), so local linear regression, as a non-parametric estimation was not to be used. Therefore, my study used the quadratic polynomials to estimate the treatment effects of the election event on the firms' bank financing.

Tables 4.5 reports the main regression results that estimated the effects of the election events on the Chinese and Indian firms by implementing the RDD.[5]. Panels A and C report the results, for the Chinese and Indian firms respectively, in which standard errors were estimated by Huber-White sandwich estimators to capture heteroscedasticity. Panels B and C reports the estimators, for the Chinese and Indian firms respectively, with the cluster-consistent standard errors. The observations were clustered into years to capture the correlation of private sector firms' bank financing within years.

For the Chinese firms, as indicated in Panels A and B of Table 4.5, there are no significant results in the coefficient of the variable $Election\,dummy$ on the variable $Bank\,loans/sales$ after controlling for the PPP investment years and their quadratic polynomial. Therefore, there is no statistical evidence of differences in firms' bank loan access before and after the election events in China. By contrast, in India, as indicated in Panels C and D of Table 4.5, for the data in the total sample (Column 1), the coefficient of the variable $Election\,dummy$ is

[5]The results of these tables are visualized in Figures 4.4 and 4.5

Table 4.4: The Goodness-of-Fit Statistics to Choose the Parametric Functional Form for Regression Discontinuity Design

This table presents the results of the goodness-of-fit statistic, proposed by Lee and Card (2008), to decide whether a polynomial form was appropriate for the research design discontinuity or not in the Chinese and Indian firms. Panel A indicates the goodness-of-fit test for the 2nd degree of polynomials. Panel B indicates the 3rd degree of polynomials. The goodness-of-fit statistic $G = \frac{(ESS_R - ESS_{UR})/(J-K)}{(ESS_{UR})/(N-J)}$ where ESS_R is the restricted error sum of squares from estimating Model 4.4 with the polynomial form in the assignment variable X, and ESS_{UR} is the unrestricted error sum of squares attained from regressing the outcome variable Y ($Bank\,loans/sales$ in my setting) on a full set of the J dummy variables systematically generated from the variable $PPP\,investment\,year$. This is designed to capture the J different discrete values recorded by years. G follows F(J-K,N-J) with K denoting the number of parameters in Model 4.4, and N measures the total observations (Lee and Card, 2008).

China	The total sample	PPP & politically connected firms	PPP & nonpolitically connected firms	non-PPP & politically connected firms	non-PPP & nonpolitically connected firms
Panel A: Degree of polynomial==2					
ESSr	2074.607	1399.674	79.107	21.146	3.398
ESSur	2007.98	1289.828	58.709	20.018	2.980
J	10	10	10	10	10
K	3	3	3	3	3
N	187	70	32	45	40
(J-K,N-J)	(7,177)	(7,60)	(7,22)	(7,35)	(7,30)
G	0.839	0.730	1.092	0.282	0.600
Critical F-value	2.062	2.167	2.464	2.285	2.334
Panel B: Degree of polynomial==3					
ESSr	2070.143	1389.868	76.617	20.995	3.397
ESSur	2007.98	1289.828	58.709	20.018	2.980
J	10	10	10	10	10
K	4	4	4	4	4
N	187	70	32	45	40
(J-K,N-J)	(6,177)	(6,60)	(6,22)	(6,35)	(6,30)
G	0.913	0.776	1.118	0.285	0.699
Critical F-value	2.150	2.254	2.549	2.372	2.421
India	The total sample	PPP & politically connected firms	PPP & nonpolitically connected firms	non-PPP & politically connected firms	non-PPP & nonpolitically connected firms
Panel A: Degree of polynomial==2					
ESSr	1012.114	274.112	433.381	16.653	103.715
ESSur	1006.335	251.969	422.535	11.018	100.363
J	10	10	10	10	10
K	3	3	3	3	3
N	322	41	147	28	106
(J-K,N-J)	(7,312)	(7,31)	(7,137)	(7,18)	(7,96)
G	0.256	0.389	0.502	1.315	0.458
Critical F-value	2.039	2.323	2.077	2.577	2.106
Panel B: Degree of polynomial==3					
ESSr	1011.609	274.041	430.051	15.230	103.324
ESSur	1006.335	251.969	422.535	11.018	100.363
J	10	10	10	10	10
K	4	4	4	4	4
N	322	41	147	28	106
(J-K,N-J)	(6,312)	(6,31)	(6,137)	(6,18)	(6,96)
G	0.273	0.453	0.406	1.147	0.472
Critical F-value	2.128	2.409	2.165	2.661	2.195

Table 4.5: Regression Discontinuity Design for Testing Private Sector Firms' Bank Financing

This table reports the main regression used to test the effect of the election event on the firms' access to bank loans. Panels A and C report the regression results, for the Chinese and Indian firms respectively, with the standard error being estimated using the Huber-White sandwich estimators to capture heteroscedasticity. Panels B and D report the regression results, for the Chinese and Indian firms respectively, with the standard error being estimated by the use of the cluster option. The dependent variable *Bank loans/sales* was measured by total long term and short term bank loans divided by sales. The receipt of the election event effect was denoted by the dummy variable *Election dummy*. *Election dummy* took the value of 1 if the *PPP investment year* was equal to or more than 2008 (or 2009) for the Chinese (or the Indian) private sector firms. Yr was calculated by normalizing *PPP investment year* by the value 2008 to ensure the threshold is at 0. $Yr * Yr$ captured the effects of quadratic polynomials. The observations were clustered into years. ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

Panel A: Chinese firms – Regression with heteroskedasticity standard errors	The total sample	PPP & politically connected firms	PPP & nonpolitically connected firms	non-PPP & politically connected firms	non-PPP & nonpolitically connected firms
	(1)	(2)	(3)	(4)	(5)
Election dummy	0.117	-0.916	2.380	-0.021	0.426
	(0.167)	(-0.616)	(1.094)	(-0.056)	(1.070)
Yr	-0.125	-0.099	-0.583	-0.044	-0.070*
	(-0.869)	(-0.319)	(-1.561)	(-0.632)	(-2.010)
Yr*Yr	0.029	0.083	-0.008	-0.016	-0.010
	(0.725)	(0.944)	(-0.110)	(-0.940)	(-1.424)
Constant	1.677**	3.768**	-0.030	1.009**	0.163
	(2.869)	(2.807)	(-0.038)	(3.269)	(1.496)
R-squared	0.017	0.058	0.198	0.033	0.161
N	187	70	32	45	40
Panel B: Chinese firms – Regression with cluster-consistent standard errors	The total sample	PPP & politically connected firms	PPP & nonpolitically connected firms	non-PPP & politically connected firms	non-PPP & nonpolitically connected firms
	(1)	(2)	(3)	(4)	(5)
Election dummy	0.117	-0.916	2.380	-0.021	0.426
	(0.310)	(-0.951)	(1.681)	(-0.088)	(1.349)
Yr	-0.125	-0.099	-0.583**	-0.044	-0.070**
	(-1.440)	(-0.485)	(-2.526)	(-1.158)	(-2.436)
Yr*Yr	0.029	0.083	-0.008	-0.016*	-0.010*
	(1.229)	(1.720)	(-0.154)	(-1.833)	(-2.044)
Constant	1.677**	3.768**	-0.030	1.009***	0.163
	(4.647)	(4.616)	(-0.055)	(4.916)	(1.588)
R-squared	0.017	0.058	0.198	0.033	0.161

N	187	70	32	45	40
Panel C: Indian firms – Regression with heteroskedasticity standard errors	The total sample	PPP & politically connected firms	PPP & nonpolitically connected firms	non-PPP & politically connected firms	non-PPP & nonpolitically connected firms
	(1)	(2)	(3)	(4)	(5)
Election dummy	0.725*	3.014*	0.488	-0.861	0.302
	(1.758)	(1.737)	(0.886)	(-0.961)	(0.795)
Yr	-0.034	-0.001	-0.039	0.146	-0.009
	(-0.434)	(-0.002)	(-0.382)	(1.096)	(-0.123)
Yr*Yr	-0.028**	-0.034	-0.023	-0.055**	-0.009
	(-2.173)	(-0.663)	(-1.206)	(-2.251)	(-0.604)
Constant	0.832***	0.804	1.008***	1.726**	0.432**
	(4.571)	(1.200)	(4.154)	(2.353)	(2.851)
R-squared	0.039	0.252	0.018	0.231	0.020
N	322	41	147	28	106
Panel D: Indian firms – Regression with cluster-consistent standard errors	The total sample	PPP & politically connected firms	PPP & nonpolitically connected firms	non-PPP & politically connected firms	non-PPP & nonpolitically connected firms
	(1)	(2)	(3)	(4)	(5)
Election dummy	0.725***	3.014**	0.488	-0.861	0.302
	(5.144)	(2.762)	(1.716)	(-0.994)	(0.932)
Yr	-0.034	-0.001	-0.039	0.146	-0.009
	(-1.159)	(-0.003)	(-0.709)	(1.250)	(-0.143)
Yr*Yr	-0.028**	-0.034	-0.023	-0.055*	-0.009
	(-4.399)	(-0.733)	(-1.691)	(-2.148)	(-0.824)
Constant	0.832***	0.804*	1.008***	1.726*	0.432**
	(7.217)	(2.253)	(5.274)	(2.175)	(3.571)
R-squared	0.039	0.252	0.018	0.231	0.020
N	322	41	147	28	106

Figure 4.4: Chinese Firms: Graphs for Regression Discontinuity Design

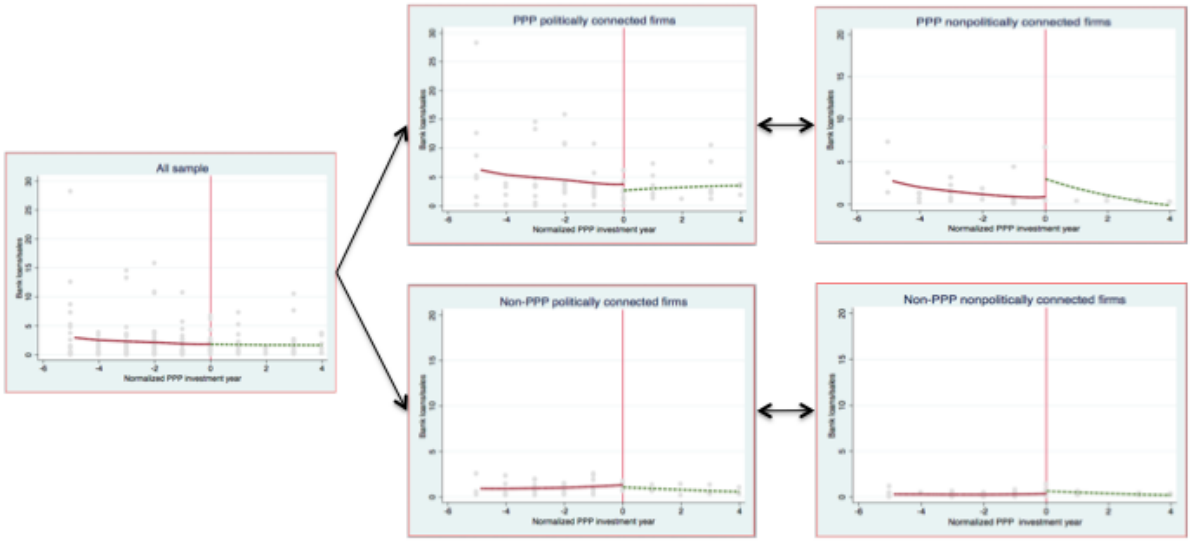
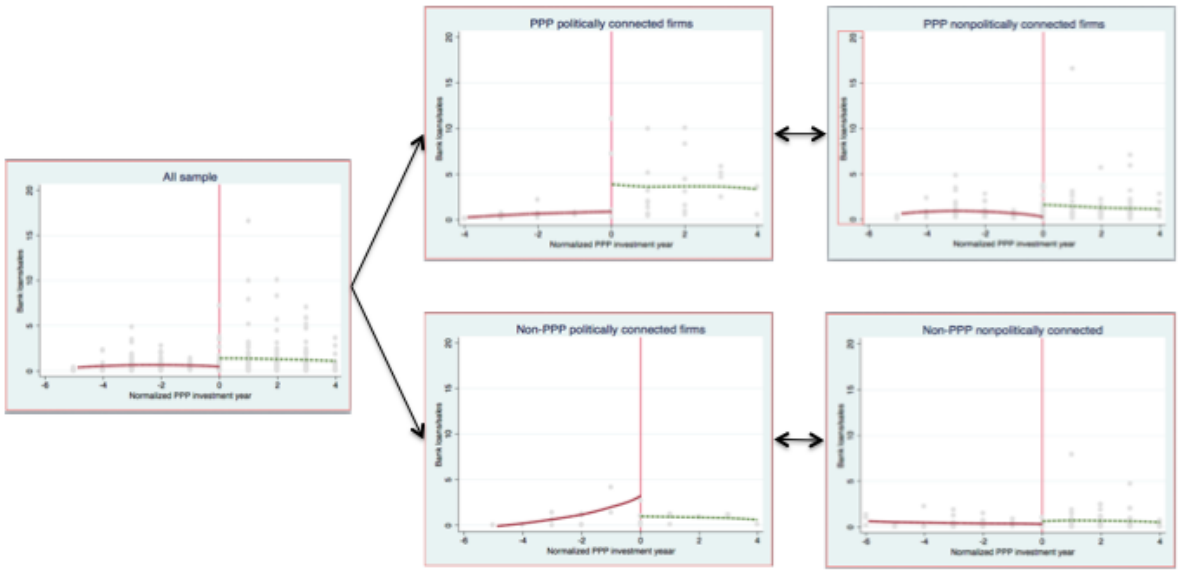


Figure 4.5: Indian Firms: Graphs for Regression Discontinuity Design



positive and significant, indicating that after the election event, access to bank loans is 72.5% higher for private sector firms in the post election period, relative to those in the pre-election year. The coefficient of the quadratic term $Yr * Yr$ is negative and significant, implying that firms' bank financing in the years around the election event is 2.8% higher than those far away from this event. Moreover, when I consider different groups that made up my total sample, with these groups being categorized by PPP and political connections (Columns 2 to 5), it becomes clear that PPP and politically connected firms witness the positive and

significant coefficient of the variable *Election dummy* on the firms' bank financing (Column 2). On average, after the election result comes out, PPP firms with political connections have 3.014 times higher bank lending than those before the election event. These other three groups experience insignificant results (Columns 3 to 5). This is consistent with my hypothesis that PPP-partnering private firms with political connections have opportunities to achieve more bank financing in the election event when their supported government maintain their power. This again confirms the privilege of PPP politically connected firms over other private sector firms in India.

Moreover, there is a plausible explanation for the different effects of the election event in China and in India. Although in China, there may have been a change in leaders, the Communist Party of China still maintains its power and dominate its government. Hence, the preference with its political ties may not change much during election events. However, India seems to be more democratic, with multiple parties and alliances competing for the election. As a result, the failure of the incumbent government may sweep out the previous preference of this government's politically connected firms. By contrast, the incumbency advantage of the current government may enhance the preferential banking financing for politically connected firms during the election event.

4.5.5 Robustness Tests

My main findings suggest that the SLH is supported in China whereas the PCH is supported in India. I further investigate the validity of these findings through a series of robustness tests.

First, I tested how higher bank lending, which results from engaging in PPP projects and political connections, as indicated in the previous analysis, influenced firm level credit risk. I regressed the probability of default (as a measurement of credit risk) on firms' bank lending ($Bank\,loans/sales$), political-connected status ($Political\,connection$), PPP engagement (PPP) and their interactions. The results are reported in Table 4.6. As reported in Panel A of Table 4.6, in the case of Chinese PPP firms, there is no significant relationship between bank

lending and the probability of default. However, in the case of the Indian PPP firms, as shown in Panel B of the table, for the total sample in Column 1, higher bank lending is more sensitive to default probability. This is evident from the positive and significant coefficient of the three-way interaction $PPP^{*}Political\,Connection^{*}Bank\,loans/sales$. More importantly, when I divided the sample firms into high-q and low-q group, the significant result of this 3-way interaction is only seen in the low-q group firms. This lends further support to the view that the Indian PPP firms with political connections allocate higher bank lending to low-growth firms that have a higher probability of default. This lends support to the PCH in India.

Second, I used the election event as the exogenous shock to re examine the effect of political connection on the firms' credit risk. I initially conducted the RDD to investigate whether the election event (the treatment effect) would lead to a significant change in the firms' credit risk. The results are reported in Table 4.7. Panels A and C report the regression results, for the Chinese and Indian firms respectively, with the standard error being estimated using the Huber-White sandwich estimators to capture heteroscedasticity. Panels B and D report the regression results, for the Chinese and Indian firms respectively, with the standard error being estimated by the use of the cluster option. For the total sample, the Chinese firms experience insignificant results. In the case of the Indian firms, the probability of default (as a proxy of credit risk) increase significantly under the impact of the election event. When I divided the total sample of the Indian firms into four groups at different combinations of PPP engagement (PPP or non-PPP firms) and political ties (politically connected or not), significant results are only witnessed in politically connected PPP firms, as indicated in Columns C and D.

Then, to confirm the dark side of the election event, I linked the bank lending with the credit risk. I used the RDD with the election event as the treatment effect to explore whether there was any relationship between the increase in the bank lending and credit risk. The results are reported in Table 4.8. As indicated in Panels C and D, politically connected PPP firms' bank lending in the Indian market has a positive effect on the probability of default of these firms in the post election event period. This is evident from the positive and significant interaction term between $Election\,dummy$ and $Bank\,loans/sales$ in the subgroup of Indian firms which

Table 4.6: The Effects of PPPs and Political Connections on the Sensitivity of Bank Financing on Credit Risk

This table presents the effects of PPPs and political connections on the sensitivity of bank financing on credit risk. Panel A and B report the results of the Chinese firms and Indian firms respectively. $The probability of default$ was estimated by the combined credit risk model in the Thomson Eikon database, $Bank loans/sales$ was measured by total long term and short term bank loans divided by sales. PPP was a dummy variable, which took value 1 for firms invested in PPP projects, or else zero for firms which were matched by industry and firm size. $Political Connection$ (Pol) was a dummy variable that took 1 for firms whose chair and executive directors who were formerly or currently officers in the government, the parliament or the military (Chen et al., 2011). ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

Panel A: Chinese firms			
The probability of default	The total sample	High-q group	Low-q group
	(1)	(2)	(3)
Bank loans/ sales	0.092	-0.605	0.214
	(0.818)	(-1.023)	(1.137)
PPP	-0.053	-0.428	0.077
	(-0.659)	(-1.116)	(0.608)
PPP*Bank loans/sales	-0.074	0.541	-0.205
	(-0.643)	(0.860)	(-1.078)
Political connection	-0.053	-0.543	0.045
	(-0.610)	(-1.431)	(0.371)
Political connection* Bank loans/sales	-0.0135	0.801	-0.199
	(-0.109)	(1.340)	(-0.985)
PPP*Political connection	0.165	0.737*	0.007
	(1.482)	(1.830)	(0.045)
PPP*Political connection*Bank loans/sales	-0.004	-0.782	0.188
	(-0.030)	(-1.232)	(0.930)
Industry effects	Yes	Yes	Yes
Constant	0.190	0.715*	0.026
	(1.469)	(1.855)	(0.250)
R-squared	13.955	38.075	23.363
N	124	54	54
Panel B: Indian firms			
The probability of default	The total sample	High-q group	Low-q group
	(1)	(2)	(3)
Bank loans/ sales	0.242***	0.027	0.699***
	(7.333)	(1.525)	(10.599)
PPP	0.174**	0.048	0.493***
	(3.282)	(1.264)	(5.662)
PPP*Bank loans/sales	-0.235***	0.021	-0.715***
	(-6.384)	(0.781)	(-10.416)
Political connection	-0.028	-0.017	0.159
	(-0.248)	(-0.199)	(0.560)
Political connection* Bank loans/sales	-0.259**	-0.002	-0.819**
	(-3.057)	(-0.022)	(-2.441)
PPP*Political connection	-0.178	-0.129	-0.452
	(-1.332)	(-1.358)	(-1.407)
PPP*Political connection*Bank loans/sales	0.373***	0.097	0.931**
	(4.258)	(0.922)	(2.743)
Industry effects	Yes	Yes	Yes
Constant	-0.031	0.130***	-0.247
	(-0.135)	(4.890)	(-0.986)
R-squared	32.487	72.448	58.535
N	297	132	127

Table 4.7: Regression Discontinuity Design for Testing Private Sector Firms' Credit Risk under the Effect of the Election Event.

This table reports the regression that was used to test the effect of the election event on the firms' credit risk. Panels A and C report the regression results, for the Chinese and Indian firms respectively, with the standard error being estimated using the Huber-White sandwich estimators to capture heteroscedasticity. Panels B and D report the regression results, for the Chinese and Indian firms respectively, with the standard error being estimated by the use of the cluster option. The dependent variable *The probability of default* was estimated by the combined credit risk model in the Thomson Eikon database. The receipt of the election event effect was denoted by the dummy variable *Election dummy*. For the Chinese firms, *Election dummy* took the value of 1 if the *PPP investment year* was equal to or more than 2008. For the Indian firms, *Election dummy* took the value of 1 if the *PPP investment year* was equal to or more than 2009. Yr was calculated by normalizing *PPP investment year* by the value 2008 (or 2009) for the Chinese (or the Indian) firms to ensure the threshold is at zero. $Yr * Yr$ was to capture the effects of quadratic polynomials. The observations were clustered into years. ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

Panel A: Chinese firms – Regression with heteroskedasticity standard errors	The total sample	PPP and politically connected firms	PPP and nonpolitically connected firms	Non-PPP and politically connected firms	Non-PPP and nonpolitically connected firms
The probability of default	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t
Election dummy	0.018	-0.026	-0.126	0.022	0.081
	(0.256)	(-0.156)	(-1.358)	(0.184)	(0.586)
Yr	0.011	0.025	0.033	0.009	0.010
	(0.531)	(0.524)	(1.066)	(0.261)	(0.282)
Yr*Yr	-0.007	-0.014	-0.012	-0.006	-0.014**
	(-1.163)	(-1.180)	(-1.438)	(-0.688)	(-2.089)
Constant	0.171**	0.239	0.207**	0.165	0.146*
	(3.003)	(1.661)	(2.663)	(1.619)	(1.829)
R-squared	2.726	6.188	23.163	5.225	20.308
N	142	48	18	33	30
Panel B: Chinese firms – Regression with cluster-consistent standard errors	The total sample	PPP and politically connected firms	PPP and nonpolitically connected firms	Non-PPP and politically connected firms	Non-PPP and nonpolitically connected firms
The probability of default	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t
Election dummy	0.018	-0.026	-0.127	0.022	0.081
	(0.332)	(-0.197)	(-1.334)	(0.184)	(0.937)
Yr	0.011	0.025	0.033	0.009	0.010
	(0.851)	(0.802)	(1.148)	(0.320)	(0.379)
Yr*Yr	-0.007	-0.014*	-0.012	-0.006	-0.014*
	(-1.486)	(-2.138)	(-1.553)	(-0.833)	(-1.810)
Constant	0.171**	0.239**	0.207**	0.165	0.146*
	(3.848)	(2.397)	(2.561)	(1.803)	(2.023)
R-squared	2.726	6.188	2.316	5.225	20.308
N	142	48	18	33	30

Panel C: Indian firms – Regression with heteroskedasticity standard errors	The total sample	PPP and politically connected firms	PPP and nonpolitically connected firms	Non-PPP and politically connected firms	Non-PPP and nonpolitically connected firms
The probability of default	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t
Election dummy	0.110*	0.228*	0.119	0.005	0.071
	(1.909)	(1.750)	(1.405)	(0.087)	(0.595)
Yr	0.003	0.011	0.001	-0.002	0.004
	(0.176)	(0.331)	(0.059)	(-0.155)	(0.096)
Yr*Yr	0.010**	0.009	0.007*	-0.005*	0.016*
	(2.445)	(1.089)	(1.666)	(-1.862)	(1.688)
Constant	0.149***	0.102	0.186***	0.118**	0.133*
	(4.118)	(1.352)	(3.672)	(2.926)	(1.778)
R-squared	3.656	22.762	5.864	10.874	2.241
N	301	39	135	25	102
Panel D: Indian firms – Regression with cluster-consistent standard errors	The total sample	PPP and politically connected firms	PPP and nonpolitically connected firms	Non-PPP and politically connected firms	Non-PPP and nonpolitically connected firms
The probability of default	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t
Election dummy	0.110	0.228**	0.119	0.005	0.071
	(1.579)	(4.781)	(1.306)	(0.088)	(0.577)
Yr	0.003	0.011	0.001	-0.002	0.004
	(0.134)	(0.859)	(0.058)	(-0.175)	(0.078)
Yr*Yr	0.010**	0.009	0.007	-0.005	0.016**
	(3.023)	(1.311)	(1.599)	(-1.853)	(2.798)
Constant	0.149***	0.102**	0.186**	0.119**	0.133
	(5.265)	(2.963)	(4.750)	(3.799)	(1.695)
R-squared	3.656	22.762	5.864	10.874	2.241
N	301	39	135	25	102

Table 4.8: Regression Discontinuity Design for Testing the Sensitivity of Bank Financing on Credit Risk under the Effect of the Election Event.

This table indicates the sensitivity of private sector firms' bank lending on credit risk (measured by the probability of defaults). The dependent variable *The probability of default* was estimated by the combined credit risk model in the Thomson Eikon database. The receipt of the election event effect was denoted by the dummy variable *Election dummy*. For the Chinese firms, *Election dummy* took the value of 1 if the *PPP investment year* was equal to or more than 2008. For the Indian firms, *Election dummy* took the value of 1 if the *PPP investment year* was equal to or more than 2009. Yr was calculated by normalizing *PPP investment year* by the value 2008 (or 2009) for the Chinese (or the Indian) firms to ensure the threshold is at zero. $Yr * Yr$ was to capture the effects of quadratic polynomials. *Bank loans/sales* was measured by total long term and short term bank loans divided by sales. Panels A and C report the regression results, for the Chinese and Indian firms respectively, with the standard error being estimated using the Huber-White sandwich estimators to capture heteroscedasticity. Panels B and D report the regression results, for the Chinese and Indian firms respectively, with the standard error being estimated by the use of the cluster option. The observations were clustered into years. ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

Panel A: Chinese firms – Regression with heteroskedasticity standard errors	The total sample	PPP and politically connected firms	PPP and nonpolitically connected firms	Non-PPP and politically connected firms	Non-PPP and nonpolitically connected firms
The probability of default	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t
Election dummy	0.070	0.008	-0.147	0.134	0.036
	(1.327)	(0.067)	(-1.519)	(1.645)	(0.217)
Bank loans/ sales	-0.001	-0.011	0.037**	0.098	0.072
	(-0.168)	(-0.956)	(2.925)	(1.279)	(0.828)
Election dummy* Bank loans/sales	0.014	0.028	-0.022	-0.082	0.020
	(1.501)	(1.681)	(-1.557)	(-0.991)	(0.135)
Yr	-0.024**	-0.028*	0.046	-0.004	0.010
	(-2.377)	(-1.897)	(1.371)	(-0.159)	(0.264)
Yr*Yr	0.001	0.001	-0.013	-0.002	-0.010
	(0.558)	(0.403)	(-1.467)	(-0.361)	(-1.326)
Constant	0.104**	0.163	0.188**	0.042	0.116
	(3.043)	(1.607)	(2.453)	(0.913)	(1.311)
R-squared	12.678	17.575	41.799	26.852	18.183
N	124	50	18	30	26
Panel B: Chinese firms – Regression with cluster-consistent standard errors	The total sample	PPP and politically connected firms	PPP and nonpolitically connected firms	Non-PPP and politically connected firms	Non-PPP and nonpolitically connected firms
The probability of default	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t
Election dummy	0.070	0.008	-0.147	0.134	0.036
	(1.363)	(0.066)	(-1.551)	(1.544)	(0.330)
Bank loans/ sales	-0.001	-0.011	0.037**	0.098	0.072
	(-0.169)	(-1.119)	(2.869)	(1.346)	(0.915)
Election dummy* Bank loans/sales	0.014	0.028	-0.022	-0.082	0.020
	(1.359)	(1.661)	(-1.662)	(-1.298)	(0.153)
Yr	-0.024**	-0.028**	0.046	-0.004	0.010
	(-4.186)	(-3.071)	(1.454)	(-0.185)	(0.474)

Yr*Yr	0.001	0.001	-0.013	-0.002	-0.010
	(1.573)	(1.235)	(-1.546)	(-0.449)	(-1.412)
Constant	0.104**	0.163*	0.188*	0.042	0.116*
	(3.662)	(1.880)	(2.393)	(1.160)	(2.189)
R-squared	12.678	17.575	41.799	26.852	18.183
N	124	50	18	30	26

Panel C: Indian firms – Regression with heteroskedasticity standard errors	The total sample	PPP and politically connected firms	PPP and nonpolitically connected firms	Non-PPP and politically connected firms	Non-PPP and nonpolitically connected firms
The probability of default	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t
Election dummy	0.069	0.238*	0.132	0.019	-0.028
	(0.861)	(1.704)	(1.390)	(0.181)	(-0.144)
Bank loans/ sales	0.034*	-0.025	0.036*	-0.015	0.152
	(1.845)	(-0.524)	(1.818)	(-1.447)	(1.088)
Election dummy* Bank loans/sales	0.047	0.142**	-0.029	-0.040	0.089
	(1.316)	(2.799)	(-1.177)	(-0.865)	(0.360)
Yr	-0.002	-0.067**	0.003	0.002	0.005
	(-0.109)	(-2.325)	(0.158)	(0.128)	(0.131)
Yr*Yr	0.009**	-0.003	0.007	-0.008**	0.018*
	(2.206)	(-0.508)	(1.648)	(-2.313)	(1.906)
Constant	0.116**	0.0121	0.162**	0.157**	0.057
	(2.707)	(0.127)	(2.843)	(2.808)	(0.593)
R-squared	17.411	82.200	6.185	26.587	24.178
N	297	39	133	25	100
Panel D: Indian firms – Regression with cluster-consistent standard errors	The total sample	PPP and politically connected firms	PPP and nonpolitically connected firms	Non-PPP and politically connected firms	Non-PPP and nonpolitically connected firms
The probability of default	Coef./t	Coef./t	Coef./t	Coef./t	Coef./t
Election dummy	0.069	0.238**	0.132	0.019	-0.028
	(0.649)	(2.538)	(1.292)	(0.156)	(-0.111)
Bank loans/ sales	0.034**	-0.025	0.036**	-0.015	0.152
	(3.870)	(-0.765)	(4.153)	(-1.304)	(0.865)
Election dummy* Bank loans/sales	0.047	0.142**	-0.029	-0.040	0.089
	(0.996)	(3.394)	(-1.537)	(-0.787)	(0.227)
Yr	-0.002	-0.067**	0.003	0.002	0.005
	(-0.112)	(-4.281)	(0.150)	(0.120)	(0.127)
Yr*Yr	0.009**	-0.003	0.007	-0.008*	0.018**
	(2.694)	(-0.472)	(1.470)	(-2.125)	(3.320)
Constant	0.116***	0.012	0.162**	0.157**	0.057
	(4.123)	(0.189)	(5.026)	(2.669)	(0.664)
R-squared	17.411	82.199	6.185	26.587	24.178
N	297	39	133	25	100

engage in PPP projects and political connections. The other subgroups witness insignificant results. This further supports the negative effect of bank lending in the Indian market.

Finally, the sign and significance of the treatment effects for the regression with heteroskedasticity standard errors (as indicated in Panels A and C of Tables 4.5) are mostly the same as those with cluster-consistent errors (as indicated in Panels B and D of Tables 4.5). According to Lee and Card (2008), with the assumption of the two identical standard errors from the two estimators of the data from the right (the treatment) and the left (the control) of the threshold (the election event), the results from the cluster-consistent errors were then be used for inference. The case of two identical standard errors happened in my study if the source of the estimated standard errors was independent of the election event. There is every chance that private sector firms' bank financing is also influenced by seasonality. Haggard et al. (2008) study the political economy of private sector development and explore the Soviet-style seasonality of investment in which the investments are low in the first quarter, reaching mini peaks in June and September, and dramatically increasing in the last quarter. Likewise in India, Bhole (2004) indicates the seasonal variations in bank credit with the increased bank financing in the busy season (October to March) and the decreased bank financing in the slack season (April to December). Consequently, the seasonality of bank financing, which is independent of the election event may lead to identical standard errors of two estimators before and after the election event. This idea is consistent with the view of Card and Shore-Sheppard (2004) that the Medicare coverage may be influenced by a quarter of births more than usual due to health differences in season of birth.

In relation to robustness tests, it is also assumed that there are few chances where these two standard errors are independent due to some unobservable effects before and after the election event. This results in biased estimators of the treatment effects. Accordingly, Lee and Card (2008) propose the procedure to inflate the standard errors. The idea of this method applied to my study is that the firm observation data was collapsed into the year-cells to calculate the mean square error of the cell size-weighted regression and average cell variance. The difference between these two terms could be added to the sampling variance to re-estimate the signifi-

Table 4.9: Chinese Firms: The Robustness Tests for Regression Discontinuity Design

This table reports the results of the adjusted variance, standard errors, and the t-test of the main treatment effects (the effects of *Election dummy* on *Bank loans/sales*). The firm observation data was collapsed into the year-cells to calculate the mean square error of the cell size-weighted regression and average cell variance. The difference between these two terms were be able to added to the sampling variance to re-estimate the significant of the treatment effects.

Year	Mean Bank loans sales	Standard errors	Frequency	Variance	Residual from cell-sized weight regression	Weighted variance of the mean residual from the regression	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Panel A: The total sample							
2003	3.738	6.551	21	42.920	3.024	1.027	
2004	1.103	1.123	17	1.261	2.639	0.633	
2005	2.283	3.586	27	12.862	2.312	0.772	
2006	2.674	3.891	26	15.139	2.043	0.580	
2007	1.670	2.265	28	5.129	1.831	0.502	
2008	1.838	1.818	21	3.306	1.793	0.361	
2009	1.833	2.118	14	4.487	1.697	0.216	
2010	0.788	0.518	5	0.268	1.658	0.074	
2011	1.824	2.725	19	7.428	1.677	0.286	
2012	1.612	1.534	9	2.352	1.754	0.148	
		Sum	187	95.152		4.599	Term (1)=sum of (7)
						0.509	Term (2)=sum of (5)/sum of (4)
						4.090	Added variance= Term(1)-Term(2)
						8.321	Adjusted variance= Original variance + 2*Added variance
						2.885	Adjusted standard errors= Sqrt(Adjusted variance)
						0.040	Adjusted t-test for treatment effects = Original Coefficient/Adjusted SE
Panel B: PPP and politically connected firms							
2003	7.623	9.338	8	87.180	6.348	4.606	
2004	1.794	1.733	5	3.002	5.499	2.160	
2005	4.974	5.281	9	27.892	4.816	2.982	
2006	5.416	4.797	11	23.011	4.300	2.906	
2007	3.355	3.114	9	9.699	3.951	2.007	
2008	2.490	1.819	9	3.308	2.852	1.046	
2009	3.550	2.299	6	5.287	2.836	0.690	
2010	1.151	0	1	0	2.987	0.127	
2011	3.750	3.411	8	11.636	3.3051	1.248	
2012	3.103	0.888	4	0.789	3.790	0.826	
		Sum	70	171.805		18.593	Term (1)=sum of (7)
						2.454	Term (2)=sum of (5)/sum of (4)
						16.139	Added variance= Term(1)-Term(2)
						33.205	Adjusted variance= Original variance + 2*Added variance
						5.762	Adjusted standard errors= Sqrt(Adjusted variance)
						-0.159	Adjusted t-test for treatment effects = Original Coefficient/Adjusted SE
Panel C: PPP and nonpolitically connected firms							
2003	4.091	3.000	3	9.001	2.689	0.678	
2004	0.918	0.490	5	0.240	2.176	0.740	
2005	1.557	1.007	6	1.015	1.648	0.509	
2006	1.159	0.658	3	0.433	1.104	0.114	
2007	0.956	1.688	6	2.848	0.545	0.056	

2008	3.544	4.404	2	19.396	2.350	0.345	
2009	0.351	0	1	0	1.760	0.097	
2010	0.641	0.379	2	0.143	1.153	0.083	
2011	0.431	0.108	3	0.012	0.531	0.026	
2012	0.238	0	1	0	-0.106	0.001	
		Sum	32	33.089		2.649	Term (1)=sum of (7)
						1.034	Term (2)=sum of (5)/sum of (4)
						1.615	Added variance= Term(1)-Term(2)
						4.832	Adjusted variance= Original variance + 2*Added variance
						2.198	Adjusted standard errors= Sqrt(Adjusted variance)
						1.083	Adjusted t-test for treatment effects
							= Original Coefficient/Adjusted SE
Panel D: non-PPP and politically connected firms							
2003	1.089	1.284	3	1.650	0.840	0.047	
2004	0.792	0.852	6	0.726	0.936	0.117	
2005	1.020	0.743	6	0.552	1.001	0.134	
2006	0.818	0.536	7	0.287	1.036	0.167	
2007	1.258	0.984	7	0.968	1.038	0.168	
2008	1.097	0.464	5	0.215	0.988	0.108	
2009	0.869	0.391	3	0.153	0.928	0.057	
2010	0.753	0.867	2	0.751	0.836	0.031	
2011	0.614	0.461	4	0.212	0.714	0.045	
2012	0.659	0.490	2	0.240	0.559	0.014	
		Sum	45	5.755		0.888	Term (1)=sum of (7)
						0.128	Term (2)=sum of (5)/sum of (4)
						0.760	Added variance= Term(1)-Term(2)
						1.581	Adjusted variance= Original variance + 2*Added variance
						1.257	Adjusted standard errors= Sqrt(Adjusted variance)
						-0.017	Adjusted t-test for treatment effects
							= Original Coefficient/Adjusted SE
Panel E: non-PPP and nonpolitically connected firms							
2003	0.283	0.431	7	0.186	0.274	0.0132	
2004	0.440	0	1	0	0.290	0.002	
2005	0.236	0.280	6	0.078	0.287	0.012	
2006	0.147	0.173	5	0.030	0.265	0.009	
2007	0.338	0.284	6	0.080	0.224	0.008	
2008	0.723	0.443	5	0.196	0.589	0.043	
2009	0.351	0.204	4	0.042	0.509	0.026	
2011	0.228	0.115	4	0.013	0.293	0.009	
2012	0.268	0.004	2	0.000	0.156	0.001	
		Sum	40	0.626		0.123	Term (1)=sum of (7)
						0.016	Term (2)=sum of (5)/sum of (4)
						0.107	Added variance= Term(1)-Term(2)
						0.248	Adjusted variance= Original variance + 2*Added variance
						0.498	Adjusted standard errors= Sqrt(Adjusted variance)
						0.855	Adjusted t-test for treatment effects
							= Original Coefficient/Adjusted SE

Table 4.10: Indian Firms: The Robustness Tests for Regression Discontinuity Design

This tables reports the results of the adjusted variance, standard errors, and the t-test of the main treatment effects (the effects of *Election dummy* on *Bank loans/sales*). The firm observation data was collapsed into the year-cells to calculate the mean square error of the cell size-weighted regression and average cell variance. The difference between these two terms were able to be added to the sampling variance to re-estimate the significant of the treatment effects.

Year	Mean Bank loans sales	Standard errors	Frequency	Variance	Residual from cell-sized weight regression	Weighted variance of the mean residual from the regression	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Panel A: The total sample							
2004	0.112	0.129	9	0.017	0.306	0.003	
2005	0.574	0.882	11	0.779	0.522	0.009	
2006	0.803	1.008	41	1.016	0.683	0.059	
2007	0.649	0.660	36	0.436	0.789	0.070	
2008	0.901	1.007	20	1.015	0.838	0.044	
2009	1.580	2.372	30	5.627	1.557	0.226	
2010	1.582	2.813	52	7.913	1.495	0.361	
2011	1.173	1.848	58	3.414	1.377	0.341	
2012	1.352	1.709	51	2.921	1.203	0.229	
2013	0.897	1.105	14	1.221	0.973	0.041	
		Sum	322	24.357		1.383	Term (1)=sum of (7)
						0.076	Term (2)=sum of (5)/sum of (4)
						1.307	Added variance= Term(1)-Term(2)
						2.634	Adjusted variance=Original variance + 2*Added variance
						1.623	Adjusted standard errors= Sqrt(Adjusted variance)
						0.447	Adjusted t-test for treatment effects = Original Coefficient/Adjusted SE
Panel B: PPP and politically connected firms							
2005	0.130	0.052	2	0.003	0.260	0.003	
2006	0.494	0.207	5	0.043	0.499	0.030	
2007	0.808	0.776	5	0.602	0.669	0.055	
2008	0.634	0.119	3	0.014	0.771	0.043	
2009	4.881	5.141	4	26.426	1.819	0.323	
2010	2.779	3.067	9	9.408	1.784	0.698	
2011	4.122	3.734	7	13.946	1.680	0.482	
2012	4.529	1.449	4	2.100	1.508719	0.222	
2013	2.080	2.200	2	4.839	1.269	0.079	
			41	57.381		1.935	Term (1)=sum of (7)
						1.400	Term (2)=sum of (5)/sum of (4)
						0.536	Added variance= Term(1)-Term(2)
						2.262	Adjusted variance=Original variance + 2*Added variance
						1.504	Adjusted standard errors= Sqrt(Adjusted variance)
						2.004**	Adjusted t-test for treatment effects = Original Coefficient/Adjusted SE
Panel C: PPP and nonpolitically connected firms							
2004	0.172	0.138	5	0.019	0.63	0.014	
2005	0.924	0.984	4	0.968	0.799	0.017	
2006	1.174	1.268	20	1.608	0.920	0.115	
2007	0.825	0.777	15	0.604	0.994	0.101	
2008	0.941	0.894	9	0.800	1.024	0.064	
2009	1.490	1.298	14	1.685	1.496	0.213	

2010	1.732	3.443	22	11.853	1.434	0.308	
2011	0.882	1.083	26	1.172	1.327	0.311	
2012	1.322	1.666	26	2.777	1.174	0.244	
2013	1.184	0.961	6	0.923	0.976	0.039	
			147	22.408		1.426	Term (1)=sum of (7)
						0.152	Term (2)=sum of (5)/sum of (4)
						1.274	Added variance= Term(1)-Term(2)
						2.629	Adjusted variance=Original variance + 2*Added variance
						1.621	Adjusted standard errors= Sqrt(Adjusted variance)
						1.859*	Adjusted t-test for treatment effects
							= Original Coefficient/Adjusted SE
Panel D: non-PPP and politically connected firms							
2004	0	0	2	0	-0.386	0.002	
2005	0.001	0	1	0	0.257	0.000	
2006	0.661	0.682	3	0.465	0.791	0.013	
2007	0.571	0.640	4	0.410	1.213	0.040	
2008	2.745	1.935	2	3.743	1.525	0.032	
2009	0.982	1.036	5	1.073	0.864	0.025	
2010	0.802	0.512	4	0.262	0.955	0.025	
2011	0.913	0.011	3	0.000	0.934	0.018	
2012	1.014	0.138	3	0.019	0.803	0.013	
2013	0.017	0	1	0	0.562	0.002	
			28	5.972		0.170	Term (1)=sum of (7)
						0.213	Term (2)=sum of (5)/sum of (4)
						-0.043	Added variance= Term(1)-Term(2)
						0.665	Adjusted variance=Original variance + 2*Added variance
						0.815	Adjusted standard errors= Sqrt(Adjusted variance)
						-1.056	Adjusted t-test for treatment effects
							= Original Coefficient/Adjusted SE
Panel E: non-PPP and nonpolitically connected firms							
2004	0.075	0.101	2	0.010	0.259	0.001	
2005	0.589	1.106	4	1.222	0.328	0.004	
2006	0.385	0.535	13	0.286	0.380	0.018	
2007	0.389	0.397	12	0.158	0.415	0.020	
2008	0.362	0.263	6	0.069	0.432	0.011	
2009	0.299	0.350	7	0.123	0.733	0.036	
2010	0.938	1.866	17	3.482	0.715	0.082	
2011	0.614	0.739	22	0.547	0.680	0.096	
2012	0.747	1.162	18	1.350	0.626	0.067	
2013	0.255	0.269	5	0.072	0.555	0.015	
			106	7.319		0.348	Term (1)=sum of (7)
						0.069	Term (2)=sum of (5)/sum of (4)
						0.279	Added variance= Term(1)-Term(2)
						0.662	Adjusted variance=Original variance + 2*Added variance
						0.814	Adjusted standard errors= Sqrt(Adjusted variance)
						0.371	Adjusted t-test for treatment effects
							= Original Coefficient/Adjusted SE

cant of the treatment effects. Tables 4.9 and 4.10 report the results of the adjusted variance, standard errors, and t-test of the main treatment effects (the effects of *Election dummy* on *Bank loans/sales*). For the Chinese firms, as indicated in Table 4.9, all the results of adjusted t-test experience the insignificant effects of the election event. However, for the Indian firms, the results of the adjusted t-tests still witness the positive and significant treatment effects in PPP firms, especially for those with political connections, as seen in Panel B and C of Table 4.10. Therefore, the robustness tests for the Indian firms still confirm my finding that PPP-partnering private firms with political connections can have opportunities to achieve more bank financing in the election event when their supported government maintains its power.

4.6 Conclusion

My study tests whether political connections increase private sector firms' access to bank loans in economies that face capital constraints due to lower institutional development. In addition to that, my study tests whether such preferential access associated with political connections improves social welfare by encouraging firms that have high-growth opportunities but which are facing underinvestment problems. In other words, my study tests the Social Lending Hypothesis (SLH), which claims that bank loans that are influenced by political connections enhance the efficient allocation of capital resources by encouraging banks to invest in high-risk social ventures.

Existing literature does not lend any support to the SLH. On the contrary, most of the evidence suggests that political connections lead to welfare loss as politicians engage in corruptive practices by allocating excess bank funds to less deserving projects for their own private benefits. However, one caveat of the existing studies is that most the studies are based on general corporate bank loans samples that may not be directly aligned with the social interests of the government. Hence, these studies are testing political corruption in general, rather than directly testing the SLH.

My study contributes to the literature by using a sample of Public Private Partnership

(PPPs) projects that has a clear social alignment, as the government engages with the private sector to efficiently manage government resources as part of a national-building exercise. Hence, I argue that the SLH can be better tested by using PPP engaged private sector firms as the treatment group and comparing these with matched non-PPP competing private sector firms as the control group. In this context, I hypothesize that the relatively high bank loan that is made available to the politically connected PPP treatment group rather than to the matched non-PPP politically connected control group, can throw better light on the SLH. In addition to that, I also test whether higher loans result in possible overinvestment and thus reflect the negative effects of political connections that are cited in the current literature.

I use PPP private sector firms, along with a control group of non-PPP private sector firms in China and India for testing the SLH. China and India, being the first and second largest emerging economies, provide an ideal setting for my analysis. I find that politically connected PPP private sectors firms receive, on average, higher bank loans than their politically connected and matched non-PPP private sector firms. However, the firms' benefits of higher bank loans through political connections are seen mainly in China. In the case of the Indian market, political connections lead to the overinvestment of private sector firms that have higher access to bank loans. Thus, the SLH is partially supported in my study.

Chapter 5

Public–Private Partnerships and Institutional Quality: Cross-Country Analyses

5.1 Introduction

Countries around the world are facing a serious and enormous infrastructure gap that is hindering socio-economic global development.[1] Given the increasing public deficit and the constraints on commercial debt as a consequence of recent financial crises, Public–Private Partnerships (PPPs) have become increasingly important, given their key role in alleviating the deficiencies in various types of infrastructure.

Due to differences in the origin of PPPs and in growth rates, economic conditions, financial development and liberalization, however, countries around the world are at different stages of PPP development. While almost all developing economies are in the early stage of PPP development and are focusing on establishing an official PPP legal framework, some developed economies (i.e. the United Kingdom [UK] and Australia) are already at the advanced stage of PPP market maturity with sophisticated models and diverse private funds. Interestingly, high-level economic, financial and institutional development do not always ensure the attraction of higher fund flows from the private sector.[2] Recently, according to KPMG (2015), increasing numbers of PPP investments have taken place in emerging markets that are going through huge

[1] It has been estimated that about US$ 57 trillion is needed for infrastructure investment from 2013 to 2030 to keep up with the projected global GDP growth (Dobbs et al., 2013). This amount is 60% more than all the value of investment in infrastructure over the past 18 years.

[2] The private sector firms refer to those firms participating in PPP projects as partners relative to the public sector led by governments.

economic and infrastructure growth rates, despite their associated risk of expropriation (e.g. Latin America and Asia). In contrast, in some previously leading developed markets such as the UK and other European economies, PPP deals have plunged. Therefore, the importance of institutional quality in the success of PPP projects remains an unanswered question. My study attempts to fill this void by examining the relationship between institutional quality and PPP benefits to partnering private sector firms. In addition, by taking advantage of my research setting, I aim to provide fresh insights into the relationship between the legal environment and the firms' capability of accessing external financing.

In addressing the ways that institutional quality has influenced firms' corporate finance, previous literature has emphasized the traditional "law–finance–growth" nexus of Porta et al. (1997, 1996) in which high institutional quality leads to high financing capabilities. The most supported view in the empirical literature is that the development of the financial system and the strong protection of private property rights alleviate capital constraints and enhances external financing (e.g. Beck et al., 2003; Berkowitz et al., 2015; Claessens and Laeven, 2003; Demirgüç-Kunt and Maksimovic, 1998; Wurgler, 2000). However, the study of Pistor et al. (2000) is one of the few initial attempts to investigate this nexus in transition economies, and it shows a distinct feature in which political connections may play a role in obtaining preferential external financing. Since then, there has been increasing support for what has been known as the "political tie" hypothesis. The rationale for this hypothesis is that firms seek for political connections to get government-back support and then overcome their difficulties in accessing bank lending in the context of asymmetric information, poor protection of private properties, expropriation and discrimination. Therefore, given the mixed evidence, it is difficult to gauge whether the different levels of benefits received by firms in PPPs across economies are explained by the law–finance–growth nexus or the political tie hypothesis (Chen et al., 2014; Claessens et al., 2008; Cull et al., 2015; Faccio et al., 2006; Faccio, 2010; Khwaja and Mian, 2005).

The main aims of my study are to investigate the nature and benefits of PPP private sector firms, to ascertain whether PPPs help private sector firms alleviate capital constraints across economies, and to identify whether there is any relationship between institutional quality and

PPP benefits to partnering private sector firms. While previous PPP analyses, which focus on PPP deal flows and use case studies on PPP project-level performance, explore the efficacy of PPPs for the public sector (Hodge and Greve, 2009), my study provides new insights from the private sector's perspective on the benefits of PPPs for partnering firms. To my best knowledge, this is the first empirical cross-country study on how PPPs influence partnering private sector firms in the corporate finance dimension.

My study provides significant implications for both public and private sectors in understanding the key performing factors in successful PPPs. Rather than focusing on the public sector in a single country as commonly examined by past researchers, my study contributes to the PPP literature by focusing on PPP private sector firms in the inter-country analysis. Furthermore, by providing a unique setting and adopting robust empirical models, my study extends the corporate finance literature on the benefits of these unique contractual agreements for private sector firms in order to gauge the debate between the law–finance–growth nexus vs. the political tie hypothesis. Hence, I attempt to explain the firms' financing capabilities and how these may affect the success of PPP projects. Moreover, my study provides new guidance on the direction and viability of PPP private sector firms in relation to their level of PPP market maturity and institutional quality.

My study on PPPs provides an ideal setting for disentangling the law–finance–growth nexus and the political tie hypothesis. The previous literature adopts a general corporate investment argument, which may not align with political preference, to test the effects of a legal framework on the financing of firms. My argument, developed through a PPP lens, provides a better platform in which political connections have the potential to be more active. There is a clear motivation for the private sector to attempt to secure political ties in order to be granted PPP projects from the government, and then be rewarded with more costless government assets and government guarantees compared with its competing counterparts. Political connections may help partnering private sector firms run PPP projects smoothly in the context of large, high-risk infrastructure projects, since partnering firms can get preferential treatment for land acquisition and can easily access bank lending. Moreover, my analysis on PPP firms has been

conducted across nine countries at varying degrees of institutional quality, from a higher level of institution aiming to improve stability, accountability and equality between the public and private sector to a lower level of an institution based on political connections or government-backed support for firms' development. Therefore, this allows me to examine whether the law–finance–growth nexus or the political tie hypothesis is more plausible in explaining private sector firms' financial benefits.

I used a sample of 625 PPP partnering private firms that covers the years from 1980 to 2015 and straddles nine economies at varying degrees of economic and PPP development. These economies also compose a majority of the global PPP market. For example, in 2015, the economies' total PPP deal and investment value accounted for about 75.43% and 67.03% correspondingly (IJGlobal Database, 2015). I find that the nature of firms that undertake PPP investments varies. Private sector firms in economies with low institutional quality opt for PPPs to alleviate capital constraints commonly attributed to underinvestment; in contrast, those in economies with high institutional quality opt for PPPs to solve the problem of overinvestment caused by abundant cash flow. In the long run, the benefits of lower capital constraints through PPP investment are more pronounced in the economies with high institutional quality. Hence, when explaining why private sector firms undertake PPP investments, the law–finance–growth hypothesis appears to be more plausible than the political tie hypothesis.

The remainder of my chapter is organized into four sections. Public–Private Partnership development stages are presented in Section 5.2. The literature review and hypotheses development are discussed in Section 5.3. Section 5.4 provides the descriptions of the data and the empirical methodology. The empirical findings are presented in Section 5.5. Section 5.6 concludes my study.

5.2 Public–Private Partnership Development Stages

PPPs started in the early 17th century through French concession and developed a strong presence in the UK and the US as well as throughout Europe in the 18th and 19th centuries (Grimsey

and Lewis, 2007). In developing countries, PPPs emerged later, from the 1990s onwards, and were concentrated in the BRIC (Brazil, Russia, India and China) emerging economies which account for nearly 50 % of total PPP investment in developing countries (World Bank Group, 2012*a*).

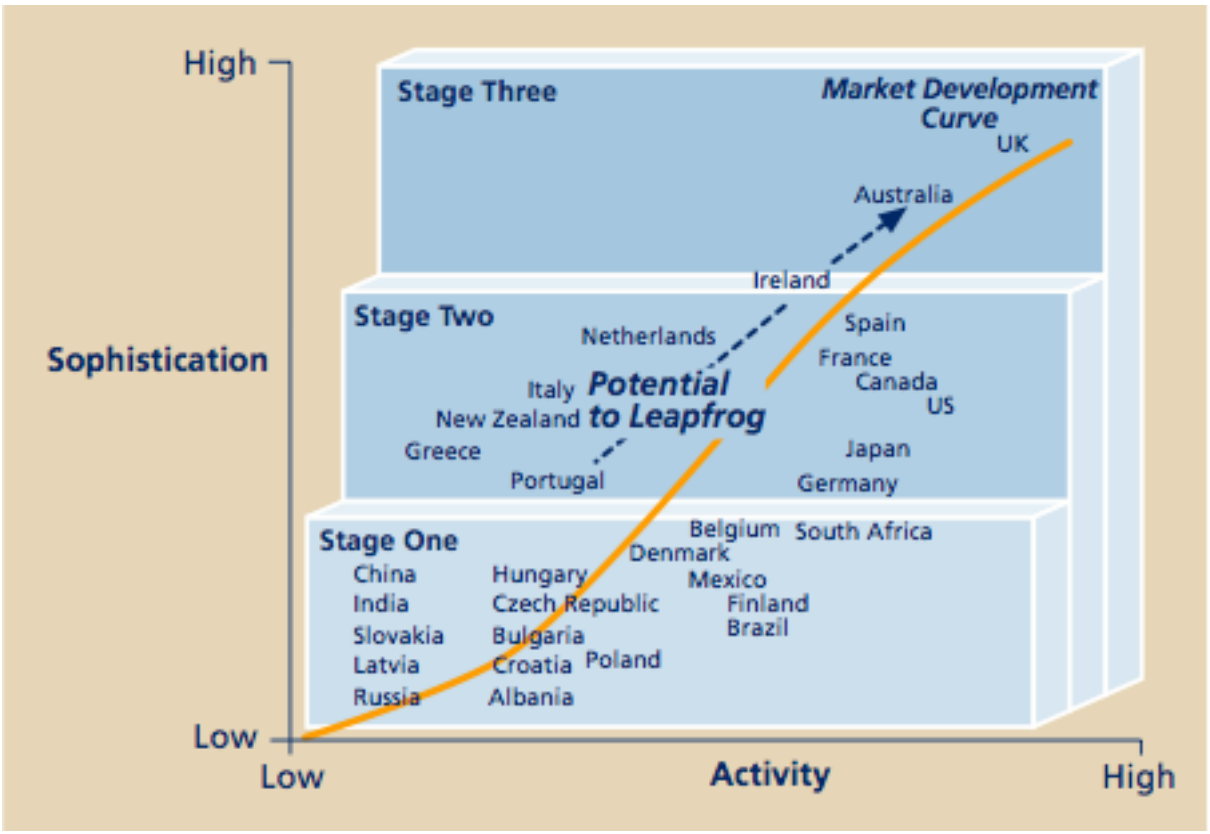
Due to the different origin and growth of PPPs in different economies, countries around the globe are at different stages of PPP sophistication and activity. Eggers and Startup (2006) classify PPP market maturity as having three levels: high, medium and low, based on the completeness of policy framework, the sophistication of PPP models, the development of the PPP marketplace and capital market to finance PPPs, and the expandability of sectors and government support for PPPs.

As shown in Figure 5.1, adapted from Eggers and Startup (2006), many countries are still at the early stage of PPP market maturity, including the BRIC economies, South Africa, Mexico and some European countries like Belgium, Hungary and Denmark. These countries are in the phase of establishing an adequate policy framework, building a PPP marketplace and facilitating proper transactions. Meanwhile, economies such as the US, Canada, Japan and Germany have approached the higher stage (Stage Two) of PPP market maturity with new hybrid models, an expanded PPP marketplace and new funding sources in the financial markets. The UK and Australia have achieved the most advanced stage of PPP market maturity with innovative, sophisticated and flexible PPP models and more diversified private funds and financial assets to develop (Eggers and Startup, 2006).

Recently, however, the global PPP deal flow has not corresponded exactly with the PPP market development curve. The mature market has witnessed a surge in PPP deals in Canada and Australia, along with the US, the country projected to be the next PPP player. The main factors driving this trend are strong potential growth, high investment, political stability, and commitment from these nations. By contrast, the UK, the preceding dominator of PPPs, has experienced a decline in PPP deal flow due to its previous peak of investment, anti-private finance options and negative press release. As indicated in Figure 5.2 adapted from KPMG (2015), the average annual number of PPP deals between 2010 and 2014 was approximately

Figure 5.1: PPP Market Maturity across Different Economies

This figure illustrates PPP market maturity across different economies depending on the completeness of the policy framework, the sophistication of PPP models, the development of PPP marketplace and capital market to finance PPPs, and the expandability of sectors and government support for PPPs. It is sourced from Eggers and Startup, 2016, (p.6)



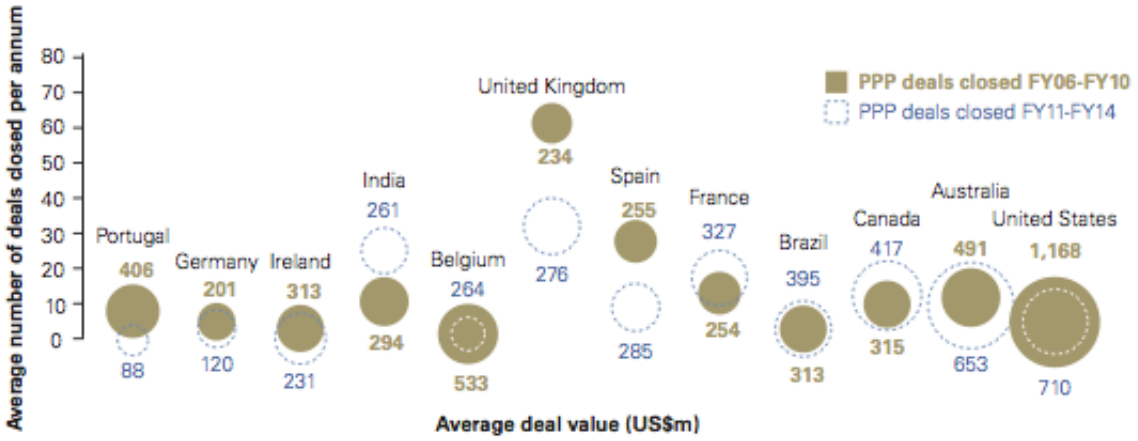
half that of the preceding five years. The same plunge of PPP deals can be seen in other countries in Europe such as Portugal, Spain and Ireland. By contrast, emerging economies are taking advantages of this decline to attract seasoned investors from the mature market and are experiencing a surge in PPP deals, with China, India and Brazil at the top of PPP investment destination (see KPMG (2015)).

5.3 Literature Review and Hypotheses Development

There is a considerable body of literature studying the relationship between the law, the legal environment and finance. Porta et al. (1996, 1997) investigate the legal determinant of external financing across 49 countries. They find that countries with poor investor protection, both in

Figure 5.2: Change in PPP Deals across Countries from 2006-2010 to 2011-2014

This figure, adapted from KPMG (2015), illustrates the changes of PPP deals in terms of average number of deals per annum and average deal value



Source: IJ Online data (accessed 15 May 2015) and KPMG analysis

terms of legal rules and the quality of enforcement, have more ownership concentration and smaller capital markets (both equity and debt markets). This results in fewer chances for firms to access external financing. By classifying countries according to the origin of their laws, it appears that countries with French civil law have the weakest investor protection and less developed capital markets, compared with the common law countries which have better institutions and less corrupt governments (Porta et al., 1996, 1997). Demirgüç-Kunt and Maksimovic (1998) assess the ability of firms to grow beyond their internal resources in 30 developed and developing countries and highlight that the effectiveness of legal institutions and financial systems is important in securing external financing for firm growth. Wurgler (2000) investigates the relationship between the development of financial markets and capital allocation across 65 countries and states that countries with more informative stock markets, less state ownership and stronger protection of minority investors enhance the efficiency of capital allocation. Similarly, Claessens and Laeven (2003) argue that a less developed financial sector and weaker property rights reduce a firm's access to external financing and hinder asset allocation effectiveness. Hence, firms in countries with poor protection of properties tend to allocate more capital to fixed assets rather than intangible assets since weak property rights limit the ability to secure returns of intangible assets from other competitors. Barasa et al. (2017)

and Tebaldi and Elmslie (2013) argue that stronger institutional quality, in terms of regulatory quality, rule of law and control of corruption, enhances a firm's possibility of extracting value from its resources (i.e. internal Research and Development expenditure, human capital and managerial experience) for innovation.

Beck et al. (2003) explore the importance of the legal origin and legal environment on firms' corporate finance by examining two channels: the "political" and the "adaptability" channels. On one hand, the political channel focuses on the relationship between state rights and private property rights and argues that the higher degree to which private investors are protected, the better implications for financial development (see also Wurgler, 2000). On the other hand, the adaptability channel emphasizes how legal traditions adapt with changing conditions and fil the gap between economic needs and the legal system's capabilities. The results indicate that while the political channel focuses on the State's power, the adaptability channel enhances financial development by relating the process of law making and law adjustment to evolving conditions (Beck et al., 2003; Wurgler, 2000). While the studies above indicate how institutional quality can determine the capability of achieving external financing, Pistor et al. (2000) investigate this relationship in transition economies. A distinct feature is observed in the transition economies: that is, the ability to access external financing is determined not only by the strength of private property rights but also by the strength of residual state ownership and political intervention. Allen et al. (2005) study the law–finance–growth nexus in China and find that poor protection of minority investors leads to a weak external financial market and slow firm growth for state-owned enterprises and listed firms. In contrast, Chinese private firms, who may use other financing channels that are based on reputation and political relationships, thus challenge the traditional law–finance–growth nexus of Porta et al. (1997, 1996). More importantly, a growing body of literature indicates that political connections positively influence firms' access to financing especially in developing countries, and argues that in economies with poor protection of private property rights and high corruption, political connections act as an alternative channel to achieve preferential external financing (e.g. Chen et al., 2014; Claessens et al., 2008; Cull et al., 2015; Faccio et al., 2006; Faccio, 2010; Khwaja and Mian, 2005; Li et al., 2008).

In summary, previous studies faced difficulty in teasing out whether the benefits of private sector firms across economies, in terms of reducing capital constraints, could be attributed to one of the following: the traditional law–finance–growth nexus of Porta et al. (1997, 1996) in which high institutional quality leads to high financing capability or the political tie effect where politically connected firms receive preferential financing within a low institutional quality framework. My study on PPPs provides me with an ideal setting to resolve this problem.

The previous literature on the relationship between institutional quality and PPPs focuses on discovering what factors associated with institutional quality drive the choice of PPP projects and ensure their success; therefore, their findings are based on country-level analyses. For example Hovakimian (2009) studies the determinants of Public–Private Partnerships in developing countries between 1990 and 2003 based on the World Bank' Private Participation in Infrastructure (PPI) database. Hovakimian (2009) argue that higher institutional quality, such as stable, less-corrupt economies and effective rules of law results in more PPP projects. In other research, Chan et al. (2010); Hwang et al. (2013) and Zhang (2005) identify the critical success factors for PPPs that are associated with institutional quality, such as political stability, government support and a reasonable legal framework. My study concentrates on firm-level analyses, from other perspectives, aims to explore how institutional quality can bring benefits to partnering private sector firms. My hypothesis follows the traditional law–finance–growth theory by (Porta et al., 1996, 1997, eg) in the expectation of achieving a positive relationship between legal environment and capability of accessing external financing.

Research question: Does the relationship between institutional quality and PPP project benefits to partnering private sector firms?

Hypothesis 8 *The benefits of lower capital constraints of partnering private sector firms through PPP investments are more significant in mature economies with better institutional quality.*

Hypothesis 9 *The benefits of increasing partnering private sector firms' value through PPP investments are more significant in mature economies with better institutional quality.*

5.4 Data and Methodology

5.4.1 Data

My cross-country sample contains PPP-partnering private sector firms in nine economies. It comprises five developed countries (namely the UK, Australia, Canada, the US and Japan) and the four BRIC emerging and developing countries (namely Brazil, Russia, India and China). Representing more than 67% of the value of global PPP deals, these countries are top leading markets for PPPs and representative of the main trends in the recent global infrastructure market (KPMG, 2015).

The nine economies chosen range across all three levels of PPP market maturities, and thus ensures the variation of institutional quality in my sample. For instance, while the high PPP maturity countries comprise the UK and Australia, and the countries with medium maturity consist of the US, Canada and Japan, it is important to note that all emerging markets fall into the low PPP maturity category, consisting of Brazil, China, India and Russia.

I created a comprehensive database by integrating several data sources. For the BRIC emerging economies, information on PPP projects and a list of partnering private sector firms were sourced from the World Bank's Private Participation in Infrastructure (PPI) Project database. For the developed countries, such data were sourced from Infrastructure Australia, Her Majesty's (HM) Treasury in the UK, the National Council for PPPs and Federal Highway Administration in the US, the Canadian Council for PPPs and Japan's Private Participation in Infrastructure (PPI)/Public–Private Partnership (PPP) Association.[3] Information related to the financial data of partnering private firms was obtained from Datastream. Institution quality-related indicators were sourced from the Worldwide Governance Indicators created by Kaufmann et al. (2011), and country-controlled variables were sourced from the World Bank database.[4]

[3]See Appendix D for more details.
[4]See Appendix A for more details.

To reduce a potential identification problem, a control group of competing non-PPP firms was created for each PPP private sector firm in each country, by applying the propensity-score matching technique. I obtained one-to-one matched firms according to firm size and industry (based on the FTSE/Dow Jones Industrial Classification Benchmark). I used the nearest-neighbour matching method to capture the bias in the estimated treatment effects when matching PPP firms and non-PPP firms. Due to the limited availability of matched non-PPP firms in the same industry, especially those in the early 1980s and 1990s, my study used the matching with replacement method.

My analysis focused on both the short-term (the year of PPP announcements) and the long-term (the five-year post-PPP investment period). In addition to providing me with an understanding of the nature of firms that engage in PPPs in the short-term, the analysis also enabled me to investigate the effects of PPP investment on the firms' investment–cash flow sensitivity relationship in the long run.

My initial sample included 1,162 listed non-financial firms (625 PPP partnering private sector firms and 537 matched non-PPP firms) over the period 1980–2015. After excluding the firms that did not have sufficient financial information, my final sample consisted of 1,137 firms from nine countries over the sample period, including 614 treatment firm-years and 523 control firm-years in the PPP investment year. For a long-term post-PPP analysis, owing to the exclusion of overlapping PPP investments during five-year periods and the limited availability of data in the upcoming years, my study was left with 1,513 firm-year observations, including 763 treatment firm-years and 750 control firm-years.

Figure D1[5] reports the proportion of PPP-partnering private sector firms for each country and each industry in my sample. As shown in Figure D1, India is the country with the most PPP private sector firms in the sample (34%), followed by China (27%). In terms of industry classification, the construction and material industry exhibits the highest number of the observations, following by the electricity and the gas and water industries.

[5]See in Appendix D

5.4.2 Methodology

Investment–Cash Flow Sensitivity

Following Fazzari et al. (1988) and Hovakimian (2009), I ran the following regression to estimate the differences in investment–cash flow sensitivity between the PPP and non-PPP firms:

$$\begin{aligned} Investment_{it} &= \alpha + \beta_1 Cash\,flow_{it} + \beta_2 PPP + \beta_3 Cash\,flow_{it} \times PPP \\ &+ f(Firm - level\,control\,variables) + f(Country - level\,control\,variables) \\ &+ \delta_i + \delta_t + i.Industry + i.Country + \epsilon_{it} \end{aligned} \tag{5.1}$$

In Equation (5.1), *Investment* was measured by the changes in gross fixed assets divided by the previous year's fixed assets. *Cash flow* was the income before extraordinary items, depreciation, and amortization, scaled by the previous year's fixed assets.

The *PPP* dummy took value 1 for private sector firms investing in PPPs (a treatment group) and zero for competing non-PPP private sector firms (a control group):

$$PPP = \begin{cases} 1 & \text{if firms participate in PPPs (the treatment group)} \\ 0 & \text{if firms do NOT participate in PPPs (the control group)} \end{cases} \tag{5.2}$$

An interaction between *Cash flow* and *PPP* dummy was used to capture the differences in investment–cash flow sensitivity between the two groups.

Following Hovakimian (2009), I used a list of firm-level control variables, *Size*, *Age*, *Leverage*, and *Tobin's q*,[6] that were expected to affect investment–cash flow sensitivity.

Country-level control variables included *Log GDP* and *Credit to private sector*. I included *Log GDP* to control the biases arising from the differences in market size across countries and *Credit to private sector* to control the capital availability to the private sector in the economy. Masulis et al. (2011) argue that the different level of available capital in different economies

[6]The explanation of these variables is provided in Section 3.3.3. Methodology of Chapter 3.

can influence how firms overcome their financial constraints.[7] To deal with unobservable fixed effects, δ_i, δ_t were used to capture firm fixed-effects and year fixed-effects respectively, while $i.Industry$, $i.Country$ were the generated industry dummies and country dummies used to control industry and country effects.[8]

Disentangling the Cause for Investment–Cash Flow Sensitivity: Underinvestment or Overinvestment

One potential interpretation problem associated with investment–cash flow sensitivity is that it can be attributed to either underinvestment or overinvestment. I addressed this issue by clearly distinguishing between the underinvestment and overinvestment issues. Firms with high investment opportunities (high Tobin's q) may suffer more information asymmetries and have less pledged assets, resulting in high dependence on internal cash flow (Myers and Majluf, 1984; Pawlina and Renneboog, 2005). Meanwhile, according to Jensen and Meckling (1976), managers tend to overinvest free cash flow to pursue their pecuniary and non-pecuniary benefits of larger firm size. Firms with low growth opportunities (low Tobin's q) have more overinvestment problems due to the shortage of projects with positive net present value (NPV), leading to high investment–cash flow sensitivity.

I used Tobin's q to capture investment opportunities. I then followed Dawson and Richter (2006) to interpret the three-way interaction $PPP * Tobin's\, q * Cash\, flow$. I first ran the regression:

[7]Instead of using $Credit\, to\, private\, sector$ as a measurement of capital availability, I also followed Masulis et al. (2011) to use alternative indicators of capital availability, such as $Credit\, to\, domestic\, market\, capitalization$ and $Domestic\, savings\, to\, GDP$ of World Bank Group (2016a), $Political\, Stability$ of Kaufmann et al. (2011) or $Financial\, freedom$ of Heritage Foundation (2016). The sign and the significance of the main results remain the same.

[8]Appendix A provides detailed definitions of all the variables.

$$Investment_{it} = \alpha + \beta_1 Cash\,flow_{it} + \beta_2 PPP + \beta_3 Tobin's\,q + \beta_4 Cash\,flow_{it} \times PPP$$
$$+ \beta_5 Cash\,flow_{it} \times Tobin's\,q + \beta_6 PPP \times Tobin's\,q + \beta_7 PPP \times Tobin's\,q \times Cash\,flow_{it}$$
$$+ f(Firm - level\,control\,variables) + f(Country - level\,control\,variables)$$
$$+ \delta_i + \delta_t + i.Industry + i.Country + \epsilon_{it} \tag{5.3}$$

Subsequently, to distinguish between the overinvestment and underinvestment problem, I first computed slopes of *Investment* on *Cash flow*, where the moderator variables *PPP* and *Tobin's q* were held constant at different combinations of high and low values. Then I compared these slopes and tested whether their differences were significant from zero in predicting the *Investment* variable. I conducted the Bonferroni correction to reduce the probability of type I errors by calculating the adjusted-p value. The adjusted-p value was measured by dividing the critical p-value by the number of simultaneous tests (Dawson and Richter, 2006; Miller, 1966).

This procedure generated a total of six pairs of slopes:

Pair 1: (PPP and high Tobin's q) - (PPP and low Tobin's q)

Pair 2: (PPP and high Tobin's q) - (Non-PPP and high Tobin's q)

Pair 3: (PPP and low Tobin's q) - (Non-PPP and low Tobin's q)

Pair 4: (Non-PPP and high Tobin's q) - (Non-PPP and low Tobin's q)

Pair 5: (PPP and high Tobin's q) - (Non-PPP and low Tobin's q)

Pair 6: (PPP and low Tobin's q) - (Non-PPP and high Tobin's q)

In order to correctly interpret the results on whether the differences in investment–cash flow sensitivity in PPP firms were caused by underinvestment or overinvestment, I focused on the first three pairs (i.e. Pair 1 to 3). These pairs allowed me to assess differences in investment–cash flow sensitivity of PPP firms with varying degree of investment opportunities (as in Pair 1),

and to compare PPP firms with their non-PPP counterparts in the same degree of investment opportunities (as in Pairs 2 and 3). [9]

Role of Institutional Quality on Investment–Cash Flow Sensitivity of Private Sector Firms Across Different Economies

To explain why there are differences in the nature and benefits of PPP private sector firms across different economies, I first followed the traditional law–finance–growth theory originated by Porta et al. (1996) and Porta et al. (1997) to examine the positive role of institutional quality on the reduction of private sector firms' capital constraints. Six institutional quality variables of Kaufmann et al. (2011), namely *Accountability*, *Political stability*, *Government effectiveness*, *Regulatory quality*, *Rule of law*, *Control of corruption*, and the variable *Freedom from Corruption* of Heritage Foundation (2016) were used.[10] The model specification is

$$\begin{aligned} Investment_{it} &= \alpha + \beta_1 Cash\,flow_{it} + \beta_2 PPP + \beta_3 Institutional\,quality + \beta_4 Cash\,flow_{it} \times PPP \\ &+ \beta_5 Cash\,flow_{it} \times Institutional\,quality + \beta_6 PPP \times Institutional\,quality \\ &+ \beta_7 PPP \times Institutional\,quality \times Cash\,flow_{it} + f(Firm - level\,control\,variables) \\ &+ f(Country - level\,control\,variables) + \delta_i + \delta_t + i.Industry + i.Country + \epsilon_{it} \end{aligned} \tag{5.4}$$

Again, I computed slopes of the variable *Investment* on the variable *Cash flow* and generated

[9] The interpretation of these pairs is provided in Section 3.3.3. Methodology of Chapter 3. A visual interpretation is illustrated in Figure 3.2 and 3.3 of Chapter 3.

[10] These institutional-quality variables enabled me to explore whether the benefits of private sector firms in highly corrupt economies can offset the disadvantages of low institutional quality. Faccio (2006) indicates that the incidence of political connections is associated with regulatory environment and corruption. There is every chance that in the economies with low institutional quality, especially in terms of poor protection of private properties, and in terms of corruption, expropriation and discrimination, private sector firms seek political connections. This enables the firms to take advantage of government-backed support for achieving external financing (Bai et al., 2006; Li et al., 2008; Firth et al., 2009). Within my setting, PPPs can provide private sector firms with a greater platform to access preferential financing, since the PPP contract mechanism allows the government to allocate government pledgeable assets, government subsidies or even state-owned banking financing (La Porta et al., 2002; Engel et al., 2010).

six pairs of slope difference.

Pair 1: (PPP firms in high institutional quality) - (PPP firms in low institutional quality)

Pair 2: (PPP firms in high institutional quality) - (Non-PPP firms in high institutional quality)

Pair 3: (PPP firms in low institutional quality) - (Non-PPP firms in low institutional quality)

Pair 4: (Non-PPP firms in high institutional quality) - (Non-PPP firms in low institutional quality)

Pair 5: (PPP firms in high institutional quality) - (Non-PPP firms in low institutional quality)

Pair 6: (PPP firms in low institutional quality) - (Non-PPP firms in high institutional quality)

If there were significant results on the slope differences when I kept the variable *Institutional quality* constant, as indicated in Pair 2 and Pair 3, this suggested that the differences of capital constraints between PPP private sector firms and their non-PPP counterparts were attributed to the impacts of institutional quality.

5.4.3 Descriptive Analysis

Table 5.1 reports the results of descriptive statistics to compare PPP private sector firms and their non-PPP competing counterparts. The analyses were conducted in the PPP years and five-year post-PPP period. The main aim was to explore how the treatment and control groups varied and to ascertain whether this variation explained the cross-economy and cross-market maturity differences.[11]

In the PPP investment years, for the total sample, as shown in Panel A of Table 5.1, larger,

[11]Note that all the developing markets fall into the low maturity category, while high and medium maturity groups consist of only developed economies.

older, better-valued firms with high sale growth, relative to their matched firms, opts for PPPs. However, in consideration of the development of economies and PPP market maturity, as highlighted in Panels B, C, D and E, the nature of PPP private sector firms varied across different economies. The results of Panel C reveal that firms in the high maturity PPP market follow the general trend in which larger and older firms choose to invest in PPP projects. These firms experience higher investment and cash flow compared with their non-PPP counterparts. In comparison, such patterns are not observed in the medium maturity PPP market. As shown in Panel D, there is a slight difference between PPP and non-PPP firms in terms of $Capex/sales$, indicating that firms in the medium maturity market with less investment intensity opt for PPPs. In the low maturity market consisting of only developing economies, the noticeable feature is that firms with high investment opportunities opt for PPPs (see Panel E).

I now turn to the post-PPP analyses. In the developed economies with the high maturity PPP market, compared with non-PPP firms, PPP private sector firms maintain better financial positions in the long run, in terms of higher $Investment$, $Cash\,flow$, $Size$, and Age. It is interesting to note that they are even rewarded with higher leverage after participating in PPP projects. On the contrary, PPP firms in the medium maturity market do not witness much pronounced change.

However, in the long run, for PPP firms in the developing economies (i.e. the low maturity market), a newly added feature is their lower leverage compared with that of their non-PPP counterparts. Given that $Leverage$ is calculated by total debt divided by total assets, the lower leverage of PPP firms may be attributed to changes in debt or equity. I investigate this interesting finding further and the results indicate that in the post-PPP period, both debt and equity are increasing in volume, but the growth rate of equity increases more than those of debt, resulting in lower leverage for PPP private sector firms. The plausible rationale is that the higher growth of equity may be attributed to the increase in government ownership in private sector firms as a consequence of PPPs. Therefore, the result implies that PPP investments help private sector firms increase the volume of debts in the low maturity market.

To disentangle the cross-sectional variation of PPP benefits, Table 5.2 compares the char-

Table 5.1: Descriptive Analysis – PPP & Non-PPP Firms in the PPP Year and the Five-Year Post-PPP Period – Cross-Country Sample

This table provides the mean firm-level characteristics of the sample firms, the difference of means between PPP firms and non-PPP firms along with t-test. Note that all the developing economies fall into the low maturity category, while high and medium maturity groups consist of only developed economies. The mean value is reported for the years during which firms have PPP projects and during the firms' five-year post-PPP period. *Investment* was measured by the changes in gross fixed assets, divided by the previous year's fixed assets. *Cash flow* denoted income before extraordinary items, depreciation, and amortization, divided by the previous year's fixed assets. *Size* (firm size) was measured by the natural logarithm of total assets. *Leverage* is calculated by total debt divided by total assets. *Age* was measured from the year of the firm's incorporation. *Tobin's q* was measured by the market-to-book value of total assets. *Capex/sales* was calculated by capital expenditure divided by sales in order to measure investment intensity. *Sale growth* was measured as the average growth over three years in net sales to capture growth opportunities. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

	in the PPP year			in the five-year post-PPP		
Variable	PPP	Non-PPP	Difference	PPP	Non-PPP	Difference
Panel A: The total sample						
Investment	0.840	0.752	0.088	0.472	0.520	-0.048
Cash flow	0.751	0.580	0.171	0.636	0.552	0.084
Size	6.245	6.104	0.141***	6.439	6.213	0.226***
Age	12.103	11.243	0.860*	16.349	15.004	1.345***
Tobin's q	1.706	1.394	0.312*	1.168	1.271	-0.103***
Capex/sales	0.681	0.308	0.373	0.151	0.364	-0.213
Sale growth	46.680	28.971	17.709**	24.928	15.601	9.327**
Leverage	0.423	0.410	0.013	0.412	0.418	-0.006
N	614	523		763	750	
Panel B: Developed Economies						
Investment	0.567	0.231	0.336	0.531	0.548	-0.017
Cash flow	0.802	0.476	0.326*	0.701	0.526	0.175
Size	6.474	6.284	0.190**	6.496	6.264	0.232***
Age	20.140	17.464	2.676***	20.134	18.528	1.606***
Tobin's q	1.268	1.359	-0.091	1.215	1.288	-0.073**
Capex/sales	0.064	0.134	-0.070*	0.082	0.120	-0.039
Sale growth	9.600	5.364	4.236	10.889	8.551	2.338
Leverage	0.413	0.429	-0.016	0.428	0.409	0.019
N	157	153		478	481	
Panel C: High Maturity						
Investment	0.401	0.222	0.179*	0.503	0.193	0.310**
Cash flow	1.614	0.612	1.002**	1.298	0.273	1.025***
Size	6.450	5.915	0.535***	6.391	5.711	0.680***
Age	18.465	12.209	6.256***	16.049	12.583	3.466***
Tobin's q	1.419	1.514	-0.095	1.332	1.319	0.013
Capex/sales	0.072	0.192	-0.120	0.146	0.182	-0.037
Sale growth	11.059	10.140	0.919	11.126	7.242	3.884
Leverage	0.399	0.354	0.045	0.433	0.341	0.092**
N	43	43		122	120	
Panel D: Medium Maturity						
Investment	0.630	0.235	0.395	0.541	0.663	-0.122
Cash flow	0.496	0.424	0.073	0.501	0.609	-0.108
Size	6.484	6.421	0.063	7.787	7.679	0.109
Age	20.772	19.518	1.254	21.534	20.504	1.030
Tobin's q	1.210	1.306	-0.096	1.174	1.278	-0.104
Capex/sales	0.062	0.112	-0.050*	0.061	0.100	-0.039*
Sale growth	9.184	7.299	1.885	10.988	7.878	3.109
Leverage	0.419	0.457	-0.038	42.622	43.139	-0.517
N	114	110		356	361	
Panel E: Low Maturity						
Investment	0.941	0.529	0.412	0.372	0.469	-0.097
Cash flow	0.732	0.625	0.107	0.524	0.599	-0.075
Size	6.167	6.031	0.136**	6.341	6.118	0.223**
Age	9.341	8.670	0.671	10.000	8.703	1.297***
Tobin's q	1.865	1.410	0.455**	1.087	1.237	-0.150*
Capex/sales	0.899	0.383	0.516	0.268	0.830	-0.562
Sale growth	60.115	39.330	20.785**	48.741	26.341	22.400*
Leverage	0.426	0.402	0.024	0.385	0.435	-0.051**
N	457	370		285	269	

Table 5.2: Descriptive Analysis – PPP-Partnering Private Sector Firms in Cross-Country Sample

This table provides the mean firm-level characteristics of the sample PPP firms in their corresponding institutional quality, and the difference of means in different economies (developed– emerging) and in different market maturity (high-medium-low). Note that all the developing economies fall into the low maturity category, while high and medium maturity groups consist of only developed economies. The mean value was reported for the years that PPP firms engage in PPP investments (Panel A) and in the five-year post-PPP period. *Investment* was measured by the changes in gross fixed assets, divided by the previous year's fixed assets. *Cash flow* denoted income before extraordinary items, depreciation and amortization, divided by the previous year's fixed assets. *Size* (firm size) was measured by the natural logarithm of total assets. *Leverage* was calculated by total debt divided by total assets. *Age* was measured from the year of the firm's incorporation. *Tobin's q* was measured by the market-to-book value of total assets. *Capex/sales* was calculated by capital expenditure divided by sales to measure investment intensity. *Sale growth* was measured as the average growth over three years in net sales to capture growth opportunities. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Variable	Developed economies (1)	High maturity (2)	Medium maturity (3)	Low maturity (4)	Difference (1)-(4)	(2)-(3)	(3)-(4)	(2)-(4)
Panel A:PPP year								
Firm Characteristics								
Investment	0.567	0.401	0.630	0.941	-0.374	-0.229	-0.311	-0.540
Cash flow	0.802	1.614	0.496	0.732	0.070	1.118***	-0.236	0.882
Size	6.474	6.450	6.484	6.167	0.307	-0.034	0.317***	0.283**
Age	20.14	18.465	20.772	9.341	10.799***	-2.307	11.431***	9.124***
Tobin's q	1.268	1.419	1.210	1.864	-0.596*	0.209***	-0.654*	-0.445
Capex/sales	0.065	0.072	0.062	0.899	-0.834	0.010	-0.837	-0.827
Sales growth	9.599	10.705	9.184	60.115	-50.516***	1.521	-50.931***	-49.409*
Leverage	0.413	0.399	0.419	0.426	-0.013	-0.020	-0.007	-0.027
Institutional Quality								
Political Stability	0.830	0.701	0.876	-0.766	1.596***	-0.175***	1.642***	1.467***
Regulatory Quality	1.426	1.755	1.546	-0.230	1.656***	0.209***	1.776***	1.985***
Control of Corruption	1.699	1.939	1.610	-0.440	2.139***	0.329***	2.050***	2.379***
Freedom from Corruption	1.417	1.753	1.290	-0.883	2.300***	0.463***	2.173***	2.636***
Government Effectiveness	1.603	1.708	1.321	-0.043	1.646***	0.387***	1.364***	1.751***
Rule of Law	1.516	1.690	1.451	-0.233	1.749***	0.239***	1.684***	1.923***
N	*157*	43	114	457				
Panel B: The five-year post-PPP period								
Firm Characteristics								
Investment	0.531	0.503	0.541	0.372	0.159	-0.038	0.169	0.131
Cash flow	0.700	1.298	0.501	0.524	0.176	0.797***	-0.023	0.774***
Size	6.496	6.391	6.531	6.341	0.155**	-0.140*	0.190***	0.050
Age	20.134	16.049	21.534	10.000	10.134***	-5.485***	11.534***	6.049***
Tobin's q	1.215	1.332	1.174	1.087	0.128**	0.158***	0.087**	0.245
Capex/sales	0.082	0.146	0.061	0.268	-0.186***	0.085***	-0.207***	-0.122**
Sales growth	9.705	11.126	10.814	48.740	-39.035***	0.312	-37.926***	-37.614**
Leverage	0.428	0.433	0.426	0.385	0.043**	0.007	0.041**	0.048*
Institutional Quality								
Political Stability	0.845	0.807	0.858	-0.576	1.421***	-0.051**	1.434***	1.383***
Regulatory Quality	1.377	1.704	1.536	-0.113	1.490***	0.168***	1.649***	1.817***
Control of Corruption	1.662	1.970	1.557	-0.435	2.097***	0.413***	1.992***	2.405***
Freedom from Corruption	1.403	1.797	1.272	-0.933	2.336***	0.525***	2.205***	2.730***
Government Effectiveness	1.592	1.704	1.265	-0.151	1.743***	0.439***	1.416***	1.855***
Rule of Law	1.481	1.700	1.407	-0.390	1.871***	0.293***	1.797***	2.090***
N	478	122	356	285				

acteristics and corresponding institutional quality of PPP private sector firms across different levels of economies (developed and emerging economies) and different PPP market maturity (high, medium and low maturity). In the PPP investment years, as can be seen in Panel A of Table 5.2, PPP firms in the developed markets (both in high and medium maturities) are older, with lower sales growth than those in the developing market. Moving into the five-year post-PPP period, as indicated in Panel B of Table 5.2, it is interesting that PPP private sector firms in the higher mature PPP market can obtain higher leverage but lower investment intensity compared with those in the low maturity PPP market.

In terms of institutional quality in relation to different economies and market maturities, the results support my conjecture that developed economies have higher institutional quality than emerging economies. Also, such countries in the higher PPP maturity market enjoy higher institutional quality.

Overall, the results highlight the nature of private sector firms opting for PPPs and how they align with the maturity of PPP markets. In high maturity markets and highly developed economies, firms in a better financial position than those of non-PPP firms are awarded PPP projects; in low maturity markets, private sector firms with better growth opportunities tend to be awarded PPP projects. In the long run, a more mature market provides PPP firms with greater opportunities to increase their leverage.

5.5 Empirical Results and Discussion

5.5.1 Public–Private Partnerships and Investment–Cash Flow Sensitivity

Table 5.3 analyses investment–cash flow sensitivity between PPP and non-PPP firms in the PPP investment year and the five-year post-PPP period.

As shown in Column 1 of Table 5.3, overall, private sector firms experience higher

investment–cash flow sensitivity relative to their non-PPP counterparts in the PPP investment year. The coefficient of the interaction variable, PPP x $Cash\ flow$, is positive and significant. In light of the results reported in Columns 2 to 5, however, it is obvious that such an effect is more apparent in less mature markets. For instance, the investment–cash flow sensitivity for PPP private sector firms in the medium maturity level is approximately 152.65 % (0.977/0.640) higher than that for non-PPP counterparts, as shown in Column 4 of Table 5.3, and this is economically significant. More importantly, the result of the low maturity economies witnesses higher differences between PPP and non-PPP firms. In Column 5, although non-PPP firms show negative investment–cash flow sensitivity (i.e. the negative coefficient of the variable $Cash\ flow$), the interaction term between PPP and $Cash\ flow$ is still positive and significant. Overall, the results suggest that private sector firms with more capital constraints opt for PPPs, and higher capital constraints of PPP firms are more pronounced in PPP firms in less mature states.

Columns 6 to 10 report the results of the investment–cash flow sensitivity in the five-year post-PPP period. In contrast to those reported in the PPP year, the coefficients of the variable $Cash\ flow$ are positively significant in all the models, indicating the positive sensitivity between investment and cash flow among non-PPP private sector firms. Given the negative coefficient of the interaction terms between PPP and $Cash\ flow$ in almost all models (except in Column 8), the results confirm my predication that in the long run, PPP private sector firms experience low capital constraints compared with their non-PPP counterparts. In terms of the magnitude of the coefficients, the sensitivity of PPP private sector firms in the developed economies is about 93.71% (-0.912/0.973) lower than that of their competing non-PPP firms (Column 7). In contrast, the investment–cash flow sensitivity of PPP firms in the low (medium) maturity group is about 36.1% (73.41%) lower than that of their non-PPP counterparts (Columns 9 and 10). The implication is that the benefits of lower capital constraints of private sector firms through PPP investments are higher in the higher maturity state, which confirms the finding of Table 5.2 that in the long run, PPP-partnering private sector firms in the higher maturity state witness a higher leverage compared with those in emerging economies. The ability to

Table 5.3: Cross-Country Analysis – Investment–Cash Flow Sensitivity: PPP & Non-PPP firms in the PPP Year and the Five-Year Post-PPP Period

This table compares investment–cash flow sensitivity between PPP firms and non-PPP firms. Note that all the developing economies fall into the low maturity category, while high and medium maturity groups consist of only developed economies. *Investment* was measured by the changes in gross fixed assets, divided by the previous year's fixed assets. *Cash flow* denoted income before extraordinary items, depreciation and amortization, divided by the previous year's fixed assets. *Size* was measured by the natural logarithm of total assets. *Leverage* was calculated by total debt divided by total assets. *Age* was measured from the year of the firm's incorporation. PPP is a dummy variable, which took value 1 for firms invested in PPP projects or else zero for firms which were matched by industry and firm size. *Tobin's q* (with one year lag) was the market-to-book value of total assets to capture investment opportunities. *Log GDP*, *Credit to Private Sector* and *Country dummies* were aimed to control for country-level effects. *Industry dummies* were aimed to control industry effects. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

	in the PPP year					in the five-year post-PPP period				
Investment	The total sample (1)	Developed economies (2)	High maturity (3)	Medium maturity (4)	Low maturity (5)	The total sample (6)	Developed economies (7)	High maturity (8)	Medium maturity (9)	Low maturity (10)
Cash flow	-0.124	0.561***	0.204**	0.640***	-0.228*	0.687***	0.973***	0.084**	1.339***	0.277***
	(-1.192)	(3.099)	(2.461)	(2.944)	(-1.859)	(15.079)	(14.172)	(2.085)	(15.317)	(9.931)
PPP	0.237	0.358	0.211*	0.118	0.145	0.479*	0.678**	0.155	0.672*	0.028
	(0.904)	(1.593)	(1.711)	(0.455)	(0.407)	(1.899)	(2.262)	(1.046)	(1.838)	(0.261)
PPP * Cash flow	0.323***	0.130	-0.058	0.977***	0.525***	-0.601***	-0.912***	0.007	-0.983***	-0.100*
	(2.989)	(0.661)	(-0.679)	(3.844)	(3.969)	(-8.277)	(-8.618)	(0.150)	(-5.791)	(-1.814)
Leverage	2.124***	4.589***	-0.120	3.808***	-0.109	0.166**	0.126**	2.978***	0.099	-0.430*
	(3.439)	(10.384)	(-0.333)	(7.683)	(-0.114)	(2.810)	(2.150)	(11.878)	(1.533)	(-1.665)
Age	0.022	-0.010	-0.010	-0.010	0.025	-0.239*	-0.517**	-0.167	-0.645**	-0.064
	(0.959)	(-0.640)	(-1.352)	(-0.567)	(0.698)	(-1.681)	(-2.081)	(-1.519)	(-2.009)	(-1.117)
Size	-0.652***	-0.426**	-0.088	-0.403	-0.649**	-0.023	-0.014	0.010	-0.006	-0.032**
	(-2.869)	(-2.014)	(-0.860)	(-1.614)	(-2.087)	(-1.216)	(-0.625)	(0.917)	(-0.221)	(-2.810)
Tobin's q	-0.048	0.012	0.013	-0.042	-0.055	-0.031	0.020	-0.073**	0.117	0.007
	(-1.192)	(0.206)	(0.854)	(-0.391)	(-1.129)	(-0.780)	(0.267)	(-2.466)	(0.950)	(0.314)
Log GDP	0.312	0.026	0.027	-0.346	0.599	0.257	0.643	0.147	-0.240	0.677**
	(0.433)	(0.023)	(0.060)	(-0.237)	(0.551)	(0.418)	(0.533)	(0.242)	(-0.128)	(1.989)
Credit to Private Sector	0.006	0.005	0.001	-0.006	-0.006	0.001	0.003	-0.004	0.003	-0.009
	(0.545)	(0.843)	(0.365)	(-0.759)	(-0.231)	(0.265)	(0.473)	(-0.838)	(0.408)	(-1.296)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.597	1.076	0.458	6.847	2.903	-1.675	-5.357	0.000	6.583	0.000
	(0.411)	(0.082)	(0.091)	(0.405)	(0.224)	(-0.232)	(-0.384)	(0.000)	(0.284)	(0.000)
R-squared	8.060	47.956	53.319	63.021	10.149	19.160	30.470	48.840	40.290	29.300
N	1,137	310	88	224	827	1,513	959	242	717	554

access debt through PPP helps partnering firms to be less reliant on their internal cash flow, which in turn improves their investment efficiency.

5.5.2 Underinvestment or Overinvestment

To disentangle the above differences of investment–cash flow sensitivity, Table 5.4 explores whether the higher investment–cash flow sensitivity of PPP private sector firms can be attributed to underinvestment or overinvestment. While Columns 1 and 2 report the results in the PPP investment year. Columns 3 and 4 report the results in the five-year post-PPP period. Again, I focus on Pairs 1 to 3 in each maturity state.

At the time engaging in PPP investment, for the total sample, Panel A of Table 5.4 shows that the difference between PPP and non-PPP firms is significant at Pair 3 *(PPP & low Tobin's q)-(Non-PPP & low Tobin's q)*. This indicates that PPP private sector firms with low investment opportunities experience a higher cash burden than non-PPP firms with low investment opportunities. This provides support for the overinvestment hypothesis of Jensen and Meckling (1976), stating that the higher investment–cash flow sensitivity of PPP private sector firms may be caused by overinvestment. In other words, for the total sample, private sector firms with overinvestment problems opt for PPPs.

In consideration of the various maturity states, Panels C to E reveal two interesting patterns. First, in the low maturity state, in the PPP year, both underinvestment and overinvestment problems drive private sector firms in emerging markets to opt for PPPs (see Pairs 2 and 3 in Panel E). However, considering the magnitude of the slope differences, the subgroup of high-q firms in Pair 2 exhibits a difference that is about three times higher than that of low-q firms in Pair 3. In the medium maturity state, I see positively significant results at the low-q group (see Pair 3 in Panel D), which implies overinvestment problems. Second, when I focus on Pair 1, in developed economies (i.e. high and medium maturities), PPP firms with high investment opportunities can be seen to experience a lower cash burden in comparison to those with low investment opportunities, indicating that overinvestment issues are more pronounced. On the

contrary, the inverse result is observed in PPP firms in emerging economies, indicating that underinvestment issues are more pronounced.

Overall, it appears that overinvestment problems drive private sector firms to opt for PPPs in developed economies, whereas opting for PPPs in emerging economies are more likely driven by underinvestment problems. This confirms the observations in Tables 5.1 and 5.2 that in developed economies, firms with abundant cash flow opt for PPPs to solve their problems of overinvestment. However, in emerging economies firms with more untapped investment opportunities opt for PPPs to alleviate capital constraints caused by underinvestment.

In the five-year post-PPP investment, as shown in Columns 3 and 4 of Table 5.4, PPP private sector firms with low growth opportunities (low $Tobin's\, q$) in all PPP market maturity experience a lower investment–cash flow sensitivity compared with their non-PPP counterparts, given the negative and significant slope difference between *PPP & low Tobin's q* and *non-PPP & low Tobin's q*. These results support the overinvestment hypothesis of Jensen and Meckling (1976), suggesting that PPP firms across economies can lower their overinvestment problems in the long run after participating in PPP projects.

It is worth mentioning that only PPP firms in developed economies with a medium maturity PPP market can achieve a significantly lower investment–cash flow sensitivity in the high-q group, as evident in the negative and significant slope difference in Pair 2 of Panel D. Compared with those in the low maturity market in the five-year post-PPP period, this result suggests that PPP firms in the developed economies with the medium maturity PPP market show an ability to lower both underinvestment and overinvestment problems in the long run, which is consistent with the results of Table 5.3 indicating that PPPs in the medium maturity PPP market can lower more capital constraints compared with those in emerging economies.

Table 5.4: Cross-Country Analysis – Reason for Differences in Investment–Cash Flow Sensitivity - PPP Firms & Non-PPP Firms in the PPP Year

This table uses a Slope Difference Test to show whether the differences between PPP firms and non-PPP firms in investment–cash flow sensitivity are caused by underinvestment or overinvestment. Note that all the developing economies fall into the low maturity category, while high and medium maturity groups consist of only developed economies. PPP was a dummy variable which took value 1 for firms invested in PPP projects or else zero for firms which were matched by industry and firm size. $Tobin's\,q$ (with one year lag) was aimed to capture investment opportunities. $Adjusted\,P$ was a Bonferroni adjusted p-value which accounted for the fact that there are six post-hoc tests. This was a conservative adjustment by multiplying each of the p-values by the number of tests. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

	in the PPP year		in the five-year post-PPP	
Panel A: The total sample	Coef.	Adjusted P	Coef.	Adjusted P
	(1)	(2)	(3)	(4)
(PPP & high Tobin's q)-(PPP & low Tobin's q)	-0.002	5.892	0.265*	0.078
(PPP & high Tobin's q)-(Non-PPP & high Tobin's q)	-0.027	5.052	-0.708***	0.000
(PPP & low Tobin's q)-(Non-PPP & low Tobin's q)	0.817***	0.000	-0.383***	0.000
(Non-PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	0.842***	0.000	0.590***	0.000
(PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	0.815***	0.000	-0.119	1.422
(PPP & low Tobin's q)-(Non-PPP & high Tobin's q)	-0.026	5.202	-0.973***	0.000
Panel B: Developed economies	Coef.	Adjusted P	Coef.	Adjusted P
(PPP & high Tobin's q)-(PPP & low Tobin's q)	-1.276***	0.000	0.304	0.126
(PPP & high Tobin's q)-(Non-PPP & high Tobin's q)	-0.525	0.168	-2.280***	0.000
(PPP & low Tobin's q)-(Non-PPP & low Tobin's q)	1.274***	0.000	-0.555***	0.000
(Non-PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	0.523	0.624	2.029***	0.000
(PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	-0.002	5.958	-0.251	0.156
(PPP & low Tobin's q)-(Non-PPP & high Tobin's q)	0.751**	0.018	-2.584***	0.000
Panel C: High maturity	Coef.	Adjusted P	Coef.	Adjusted P
(PPP & high Tobin's q)-(PPP & low Tobin's q)	-0.274***	0.000	0.958***	0.000
(PPP & high Tobin's q)-(Non-PPP & high Tobin's q)	-0.174	0.258	0.112	0.624
(PPP & low Tobin's q)-(Non-PPP & low Tobin's q)	0.341	0.162	-0.879***	0.000
(Non-PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	0.240	0.768	-0.033	4.002
(PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	0.067	3.864	0.080	0.540
(PPP & low Tobin's q)-(Non-PPP & high Tobin's q)	0.101	1.734	-0.846***	0.000
Panel D: Medium maturity	Coef.	Adjusted P	Coef.	Adjusted P
(PPP & high Tobin's q)-(PPP & low Tobin's q)	-1.121**	0.024	0.801**	0.024
(PPP & high Tobin's q)-(Non-PPP & high Tobin's q)	-0.207	3.810	-2.168***	0.000
(PPP & low Tobin's q)-(Non-PPP & low Tobin's q)	1.589***	0.000	-0.403**	0.024
(Non-PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	0.674	0.618	2.566***	0.000
(PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	0.467	1.734	0.398	1.008
(PPP & low Tobin's q)-(Non-PPP & high Tobin's q)	0.914**	0.048	-2.969***	0.000
Panel E: Low maturity	Coef.	Adjusted P	Coef.	Adjusted P
(PPP & high Tobin's q)-(PPP & low Tobin's q)	2.140***	0.000	0.303*	0.006
(PPP & high Tobin's q)-(Non-PPP & high Tobin's q)	2.051***	0.000	0.126	0.534
(PPP & low Tobin's q)-(Non-PPP & low Tobin's q)	0.781***	0.000	-2.278***	0.000
(Non-PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	0.869***	0.000	-2.101***	0.000
(PPP & high Tobin's q)-(Non-PPP & low Tobin's q)	2.921***	0.000	-1.975***	0.000
(PPP & low Tobin's q)-(Non-PPP & high Tobin's q)	-0.089	2.772	-0.177**	0.012

5.5.3 Role of Institutional Quality

Table 5.5 presents the results that I tested of the direct effects of institutional quality indicators on private sector firms' investment–cash flow sensitivity.[12]

At the time of engaging in PPP projects, as shown in Columns 1 to 3, PPP private sector firms document a higher investment–cash flow sensitivity compared with their non-PPP firms after controlling the effects of institutional quality, given the negatively significant interaction term between PPP and $Cash\,flow$. In contrast, the significantly negative coefficients of PPP *$Cash\,flow$*$Institutional\,quality$ imply that PPP private sector firms in economies with higher institutional quality experience lower investment–cash flow sensitivity.

In the five-year post-PPP period, PPP private sector firms benefit from lower investment–cash flow sensitivity, as indicated by the negatively significant coefficients of the interaction term between PPP and $Cash\,flow$. Moreover, PPP private sector firms in economies with higher institutional quality experience more benefits from lower investment–cash flow sensitivity compared with those in economies with lower institutional quality (i.e. the negatively significant coefficients of the three-way interaction PPP * $Cash\,flow$ *$Institutional\,quality$).

To explain these results, I follow Dawson and Richter (2006) to interpret three-way interaction PPP*$Cash\,flow$*$Institutional\,quality(IQ)$ by regressing the dependent variable $Investment$ on $Cash\,flow$ when the moderate variables PPP and $Institutional\,quality$ hold constant at a high or low level. The results are reported in Table 5.6.

In the PPP investment year, as shown in Columns 1 and 2 of Table 5.6, there are positively significant slope differences in Pair 3 in all the measures of institutional quality. On the contrary, in the high institutional-quality state (Pair 2), the slope difference between PPP and non-PPP firms is either negatively significant or not significantly different from zero. Therefore, this confirms that in low institutional-quality economies, private sector firms with higher capital constraints opt for PPPs.

[12] I report results of three indicators *Political stability*, *Regulatory quality* and *Control of corruption*. The results of other indicators for institutional quality remain qualitatively the same.

Table 5.5: Cross-Country Analysis – The Effects of Institutional Quality in the PPP Year and in the Five-Year Post-PPP Period - Main Regression

This table reports the results of how institutional quality influence private sector firms' investment–cash flow sensitivity. *Investment* was measured by the changes in gross fixed assets, divided by the previous year's fixed assets. *Cash flow* denoted income before extraordinary items, depreciation, and amortization, divided by the previous year's fixed assets. *Size* was measured by the natural logarithm of total assets. *Leverage* was calculated by total debt divided by total assets. *Age* was measured from the year of the firms' incorporation. *Tobin's q* (with one year lag) was the market-to-book value of total assets to capture investment opportunities. *Political stability*, *Regulatory quality*, and *Control of corruption* were aimed to capture institutional quality. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

	in the PPP year			in the five-year post -PPP period		
Investment	(1)	(2)	(3)	(4)	(5)	(6)
PPP	0.658**	0.260	0.200	0.239	0.179	0.167
	(2.465)	(0.923)	(0.732)	(1.129)	(0.574)	(0.583)
Cash flow	0.010	-0.150	-0.030	0.396***	0.474***	0.509***
	(0.094)	(-1.428)	(-0.276)	(7.066)	(6.471)	(7.743)
Political stability	-0.555			-1.098***		
	(-0.669)			(-3.279)		
Regulatory quality		0.928			-0.061	
		(0.846)			(-0.134)	
Control of corruption			-0.098			-0.616
			(-0.985)			(-1.224)
Cash flow * PPP	0.432***	0.326***	0.357***	-0.275***	-0.280**	-0.343***
	(3.401)	(2.940)	(2.981)	(-3.167)	(-2.418)	(-3.410)
Cash flow * Political stability	0.550***			0.617***		
	(2.599)			(8.199)		
Cash flow * Regulatory quality		0.559**			0.247***	
		(2.325)			(3.694)	
Cash flow * Control of corruption			0.487***			0.196***
			(2.701)			(3.613)
PPP * Political stability	0.973***			0.405*		
	(3.043)			(1.708)		
PPP * Regulatory quality		0.368			0.296	
		(1.029)			(1.111)	
PPP * Control of corruption			0.048			0.298
			(0.173)			(1.490)
PPP * Cash flow * Political stability	-1.550***			-0.647***		
	(-6.791)			(-6.360)		
PPP * Cash flow * Regulatory quality		-0.690***			-0.348***	
		(-2.643)			(-3.523)	
PPP * Cash flow * Control of corruption			-0.240			-0.263***
			(-1.234)			(-3.684)
Leverage	2.878***	2.280***	2.069***	0.104**	0.120**	0.127**
	(4.821)	(3.623)	(3.305)	(2.272)	(2.337)	(2.431)
Size	-0.600***	-0.652***	-0.647***	-0.245**	-0.238*	-0.245*
	(-2.753)	(-2.819)	(-2.811)	(-2.001)	(-1.795)	(-1.826)
Age	0.038*	0.027	0.019	-0.020	-0.020	-0.020
	(1.730)	(1.154)	(0.829)	(-1.293)	(-1.134)	(-1.099)
Tobin's q	-0.048	-0.051	-0.054	-0.008	-0.026	-0.027
	(-1.238)	(-1.243)	(-1.332)	(-0.204)	(-0.646)	(-0.663)
Log GDP	0.308	0.519	0.771	0.178	0.242	0.293
	(0.411)	(0.655)	(0.972)	(0.314)	(0.406)	(0.489)
Credit to private sector	0.004	0.006	0.002	0.001	0.002	0.001
	(0.402)	(0.554)	(0.137)	(0.279)	(0.348)	(0.071)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.215	-0.836	-2.045	0.141	-1.663	-1.019
	(0.454)	(-0.089)	(-0.195)	(0.021)	(-0.240)	(-0.145)
R-squared	19.661	8.994	9.844	30.080	23.480	23.200
N	984	984	984	1401	1401	1401

Table 5.6: Cross-Country Analysis – The Effects of Institutional Quality in the PPP Year and the Five-year Post-PPP Period - Slope Difference Test

This table uses Slope Difference to show whether the differences between PPP firms and non-PPP firms in investment–cash flow sensitivity are influenced by Institutional Quality. PPP was a dummy variable which took value 1 for firms invested in PPP projects or else zero for firms which are matched by industry and firm size. IQ variables were the variables that indicated institutional quality, including *Political stability*, *Government effectiveness*, and *Regulatory quality*. Adjusted P was a Bonferroni adjusted p-value which accounted for the fact that there are six post-hoc tests. This was a conservative adjustment achieved by multiplying each of the p-values by the number of tests. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Political stability	in the PPP year		in the five-year post-PPP	
	Coef. (1)	Adjusted P (2)	Coef. (3)	Adjusted P (4)
(PPP & high IQ)-(PPP & low IQ)	-1.659***	0.000	-0.046	4.038
(PPP & high IQ)-(Non-PPP & high IQ)	-1.229***	0.000	-0.986***	0.000
(PPP & low IQ)-(Non-PPP & low IQ)	1.343***	0.000	0.033	4.686
(Non-PPP & high IQ)-(Non-PPP & low IQ)	0.913*	0.054	0.974***	0.000
(PPP & high IQ)-(Non-PPP & low IQ)	-0.316	1.140	-0.012	5.466
(PPP & low IQ)-(Non-PPP & high IQ)	0.430	0.174	-0.940***	0.000
Panel B: Regulatory Quality	Coef.	Adjusted P	Coef.	Adjusted P
(PPP & high IQ)-(PPP & low IQ)	-0.206	1.314	-0.159	0.960
(PPP & high IQ)-(Non-PPP & high IQ)	-0.384	1.110	-0.838***	0.000
(PPP & low IQ)-(Non-PPP & low IQ)	0.704***	0.000	-0.290*	0.066
(Non-PPP & high IQ)-(Non-PPP & low IQ)	0.883	0.120	0.389***	0.000
(PPP & high IQ)-(Non-PPP & low IQ)	0.498	0.144	-0.449***	0.000
(PPP & low IQ)-(Non-PPP & high IQ)	-0.179	3.018	-0.679***	0.000
Panel C: Control of Corruption	Coef.	Adjusted P	Coef.	Adjusted P
(PPP & high IQ)-(PPP & low IQ)	0.496***	0.006	-0.146	0.930
(PPP & high IQ)-(Non-PPP & high IQ)	0.075	4.794	-0.860***	0.000
(PPP & low IQ)-(Non-PPP & low IQ)	0.558***	0.006	-0.286*	0.060
(Non-PPP & high IQ)-(Non-PPP & low IQ)	0.979**	0.042	0.428***	0.000
(PPP & high IQ)-(Non-PPP & low IQ)	1.054***	0.000	-0.432***	0.000
(PPP & low IQ)-(Non-PPP & high IQ)	-0.421	0.720	-0.714***	0.000

After the five-year participation in PPPs, as indicated in Columns 3 and 4 of Table 5.6, for firms in economies with high institutional quality, PPP private sector firms experience a significantly lower investment–cash flow sensitivity compared with their non-PPP counterparts (see Pair 2). A similar pattern is also observed for economies with low institutional quality (See Pair 3), though the level of significance is much weaker.

The above results reveal two important implications. First, the benefits of lower capital constraints through PPP investment are more pronounced in the context of high institutional quality. Second, in the low level of institutional quality, while the PPP private sector firms also experience a deduction in capital constraint which is consistent with the political tie hypothesis, the effect is lower than it is for PPP firms from a high institutional quality context. This provides strong support for the law–finance–growth hypothesis. In other words, the law–finance–growth hypothesis is more plausible for explaining the benefits of lower capital constraints of private sector firms through PPP investments. In this mechanism, the strong protection of private sector properties in the high institutional quality environment can offset the disadvantage of a high barrier to exploiting preferential financing from political connections and corruption.

5.5.4 Robustness Tests

To assess whether the law–finance–growth nexus can outperform the political tie benefits, I conducted tests on whether institutional quality can enhance the benefits of PPPs in terms of firm value, as a robustness check.

Following Maury (2006) and Masulis et al. (2011), a Difference-in-Difference technique was utilized by regressing measures of firm value ($Tobin's\, q$ or Return on Assets ROA) on the variable PPP (a dummy variable is equal to 1 for PPP firms, otherwise is 0), the variable $PostPPP$ (is equal to 1 if the period is in the five-year post-PPP investment year and is 0 otherwise), their interaction terms ($PPP * PostPPP$) and control variables (i.e. $Size$, $Leverage$, $Capex/sales$,

$Sale\,growth$, Age, $Market\,risk$).[13] The baseline regression was:

$$Firm\,value\,variables\,(Tobin's\,q\,or\,ROA) = \alpha + \beta_1 PPP + \beta_2 PostPPP + \beta_3 PostPPP * PPP$$
$$+ f(Firm - level\,control\,variables) + f(Country - level\,control\,variables)$$
$$+ i.Industry + i.Country \tag{5.5}$$

The main variable of interest was the interaction term between PPP and $PostPPP$, β_3. It captured change in firm value for PPP-partnering private sector firms relative to that of the firms' non-PPP counterparts subsequent to the PPP investment period.

I first ran the baseline regression separately for the group of countries with corresponding high, medium and low PPP market maturity. I then used the Chow test to test the significance of differences of the coefficient (β_3) on the interaction term between PPP and $PostPPP$.

Table 5.7 reports the results with a dependent variable $Tobin's\,q$ as the measurement of firm value.[14] Among the economies with various development states, only in the developed economies with the medium maturity PPP market, PPP private sector firms experience significant higher firm value compared with their non-PPP counterparts subsequent to PPP investments. To compare the subsamples using the Chow test, the results show that the coefficients on the interaction terms are significantly different only for those in between the medium and low PPP maturity market ($Prob > F = 0.036$). This robustness result confirms the dominance of the law–finance–growth nexus over the political tie hypothesis in explaining the effects of the institutional quality on corporate finance. However, it should be noted that private sector firms in the medium maturity PPP market appear to be able to achieve better gains from PPP investments in terms of solving capital constraints and enhancing firm value, even when compared with those in the high maturity PPP market. This reflects and explains the general trend in global PPP deal flow: that is, deal flow shifts from the traditional high maturity market to

[13] See Appendix A for variable definition

[14] I also used Return on Assets (ROA) as a dependent variable. The conclusion is qualitative the same.

Table 5.7: Cross-Country Analysis – Firm Value: PPP & Non-PPP Firms in the Five-year Pre and Post-PPP Period

This table uses a Difference-in-Difference technique to compare the change in firm value of PPP-partnering private sector firms with that in their non-PPP counterparts between five-year post and pre-PPP investments.The dependent variable $Tobin's\ q$ was measured by the market-to-book value of total assets. *Size* was measured by the natural logarithm of total assets. *Leverage* was calculated by total debt divided by total assets. *Capex/sales* was calculated by capital expenditure divided by sales to measure investment intensity. *Sale growth* was measured as the average growth over three years in net sales to capture growth opportunities. *Age* was measured from the year of the firm's incorporation. *Market risk* was calculated by estimating the market model (one factor) on the monthly returns of firms in the previous five years. *PPP* was a dummy variable which took value 1 for firms invested in PPP projects or else zero for firms which are matched by industry and firm size. *Post PPP* was a dummy variable which took value 1 for firms in the five-year post-PPP period or else zero for those in the five-year pre-PPP period. *Log GDP*, *Credit to private sector* and *Country dummies* were aimed to control for country-level effects. *Industry dummies* were aimed to control industry effects. ***,**,* indicate significance at the 1%, 5% and 10% levels, respectively.

Tobin's q	The total sample	Developed economies	Developed economies		Emerging-Low maturity
			High maturity	Medium maturity	
	(1)	(2)	(3)	(4)	(5)
PPP	0.070	0.045	0.545	-0.052	-0.130
	(0.437)	(0.296)	(1.008)	(-0.371)	(-0.357)
Post PPP	-0.151	-0.174*	-0.573*	-0.122	0.000
	(-1.560)	(-1.846)	(-1.713)	(-1.551)	(0.001)
PPP x Post PPP	0.032	-0.032	0.478	0.111**	0.234
	(0.269)	(-0.272)	(1.203)	(2.127)	(0.770)
Size	-0.644***	-0.011	-0.793**	0.244**	-0.871***
	(-8.924)	(-0.096)	(-2.135)	(2.250)	(-8.488)
Capex/sales	0.474***	1.805***	2.116***	0.167	0.159*
	(6.671)	(13.563)	(9.205)	(0.591)	(1.676)
Sale growth	-0.178***	0.280*	0.331	0.167	-0.130**
	(-4.521)	(1.900)	(0.504)	(1.400)	(-2.363)
Leverage	0.455***	0.327***	-0.142	0.353***	0.241
	(3.321)	(2.658)	(-0.230)	(3.633)	(0.420)
Age	0.710***	0.524*	0.649	0.202	0.838*
	(2.974)	(1.958)	(0.728)	(0.834)	(1.897)
Market risk	-0.095	-0.031	0.202	-0.075	-0.115
	(-1.212)	(-0.376)	(0.850)	(-0.995)	(-0.682)
Log GDP	0.611**	0.299	-0.794	0.680*	0.364
	(2.007)	(0.704)	(-0.556)	(1.707)	(0.721)
Credit to Private Sector	0.003	0.003	0.019*	0.002	-0.010
	(1.312)	(1.498)	(1.706)	(1.301)	(-1.446)
Country dummies	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes
Constant	-2.743	-2.420	12.826	-8.440*	-2.338
	(-0.775)	(-0.499)	(0.818)	(-1.686)	(-0.653)
Test of Difference in β_3 (Chow test)					
(2)-(5)		0.361			
(3)-(4)			0.486		
(4)-(5)				0.036**	
(3)-(5)					0.817
R-squared	10.320	20.810	25.070	19.750	25.420
N	2,327	1,643	377	1,266	684

the medium maturity market, in which partnering private sector firms can operate with better growth potential, and more importantly, they can gain higher political commitments. These results are also in line with the idea of Eggers and Startup (2006) who claim that, in additional to strong public engagement, those firms in the medium maturity market can have golden opportunities to learn from their trailblazers' success and failure to establish more tailored PPP models that are able to cope with uncertainty in institutional environments as well as in their contract incompleteness.

5.6 Conclusion

PPPs have become increasingly common and crucial for addressing the growing infrastructure gap in the world. PPPs come with the benefit of readily pledged government assets that can help the private sector invest in large infrastructure projects without increasing their investment–cash flow sensitivity.

In this chapter, I tested whether this inherent benefit reduced the underinvestment problem, which was evident from the reduction in the investment–cash flow sensitivity of private sector firms. To test this conjecture, I used the sample of 625 PPP partnering private firms that covered the years from 1980 to 2015 and straddled nine economies with varying degrees of economic and PPP development. I also attempted to understand whether changes in investment–cash flow sensitivity were driven by underinvestment or overinvestment. This is important as any reduction in the investment–cash flow sensitivity does not guarantee reduction in the underinvestment problem. If the reduction is experienced mainly by a subgroup of firms with low growth opportunities, then it reflects a potential overinvestment problem.

In addition to that, my study aims to understand the influence of institutional quality on PPP benefits to partnering private sector firms. The existing literature remains inclusive about whether the law–finance–growth nexus or the political tie hypothesis is more dominant in explaining firms' financial benefits under the effects of institutional quality. One limitation of existing studies is that they use general corporate investment which may not be directly

aligned with political interference in some cases.

My study contributes to the literature by using the sample of Public–Private Partnerships in which political intervention has more opportunities to be activated. This is because securing political connections helps the private sector successfully award large government infrastructure projects and receive numerous government guarantees to operate smoothly high-risk assets. As a consequence of this, my study finds that the nature of firms that undertake PPP investments varies. While private sector firms in economies with low institutional quality opt for PPPs to alleviate capital constraints commonly attributed to underinvestment, those in economies with high institutional quality opt for PPPs to solve the problem of overinvestment caused by abundant cash flow. In the long run, the benefits of lower capital constraints through PPP investment are more significant in economies with high institutional quality. I conducted the robustness tests by using firm value as the measurement of private sector firms' benefits from PPPs. The results again confirm that the law–finance–growth hypothesis seems to be more pronounced than the political tie hypothesis for supporting the argument that the private sector firms gain financial benefits through PPP investments.

In summary, my research highlights that PPP investments made by private sector firms are generally perceived as value enhancing investments by investors. However, the real benefits associated with reduced reliance on internal cash flows, and consequently, the reduced underinvestment problem of private sector firms and increased firm value are not that straightforward. Such benefits are affected by the extent to which institutional quality exists in an economy. My research provides new guidance on the direction and viability of PPP-partnering private sector firms in varying degrees of market maturity and institutional quality.

Chapter 6

Conclusion

6.1 Overview of the Thesis

Countries around the world have experienced tremendous economic growth thanks to their massive urban and industrial development and their active role in global supply chains that bring back numerous benefits to partnering economies. However, the dark side is that this enormous growth comes with a huge infrastructure gap that challenges each government's possibility to hunt down sufficient financial resources in order to fulfil the demand of its economic advancement. Given the limited resources coming from public finance and the failure of privatization programs, Public–Private Partnerships have emerged as an optimal synergy to bridge the infrastructure gap. PPPs come with specialized roles of partnering private firms by developing and operating infrastructure projects and, more importantly, providing private finance and other embedded institutional finance to compensate for the deficiency of public resources. In exchange for these supportive roles, PPPs, unlike their non-PPP counterparts, provide partnering private sector firms with more costless government assets and other government guarantees. This ensures that the partnering private sector can run their high-risk infrastructure projects smoothly. Nevertheless, these firms have been facing serious transaction costs to obtain the right to award highly competitive projects, especially in highly corrupt economies. They also have been faced with low actual revenue, cost and time overruns due to high information asymmetries at the initial stage of the projects and in the follow-up to unexpected results that hinder the firms' efficiency.

China and India command the lion's share of PPP projects, composing approximately 20% of total investment value in developing countries but also in the top countries with a high number of canceled projects. Therefore, PPPs have not been attractive enough for private

sector firms, and only 15% and 40% of infrastructure funding has come from the private sector in China and India respectively (Wilkins et al., 2014; High Level Committee on Financing Infrastructure, 2012). In order to attract PPP participation from private sector firms, it is crucial to investigate the firms' motives and the subsequent benefits that PPPs can provide. PPPs are sustainable only if the private sector finds sufficient incentives to offset their capital constraints in high risk ventures like PPPs.

My study examines PPPs from the private sector's perspective and to understand whether PPPs– which have seen a nine-fold increase in emerging markets in the last ten years– assist in fulfilling the intended purpose of eliminating financial constraints faced by private sector firms. My study also uncovers whether a high reliance on government brings benefits to PPP partnering private sector firms by explaining PPPs' investment efficiency in relation to under-investment and overinvestment. More importantly, my study further tests the Social Lending Hypothesis (SLH) to examine whether such government preferential treatment for high bank lending to the private sector also improves the social welfare by encouraging banks to efficiently allocate capital to those with high growth opportunities. In a broader view, such a contrasting influence of government support suggests the mediating role of political settings in enhancing/hindering PPP benefits. PPPs provides a strong platform of social venture in which seeking for political connections in the context of weak institutions is more crucial for awarding and running projects smoothly in a high risk environment. Subsequently, my study attempts to explain how institutional quality influences PPP benefits. My study is able to reconsider which of the law–finance–growth or political tie hypotheses is more pronounced as a way of explaining the motivations that encourage private sector firms to engage with PPPs and the firms' requirement to ensure their commitments and future success.

My thesis consists of an introduction with the research motivation, the research objectives and the contributions (Chapter 1); a comprehensive literature review of theories and extant literature on the effects of PPPs and their related factors (Chapter 2); an empirical study on how PPPs influence partnering private sector firms' investment efficiency and market valuation to accomplish the first research objectives (Chapter 3); a close analysis of PPP private sector

firms' access to bank loans to examine how political connections play their roles in mediating PPP gains and losses for partnering private firms and social welfare (Chapter 4); a detailed examination of how institutional quality influences PPPs' benefits (Chapter 5); and a summary of the empirical findings of my study and the key contributions, implications, limitations and the possibilities my study offers for future research (Chapter 6).

6.2 Research Findings

First, my study examines whether PPPs benefit partnering private sector firms in terms of increasing firm market valuation and reducing capital constraints in the two largest emerging economies, namely China and India.

In consideration of firm market valuation, my study, by using the event study with the sample of 138 and 124 PPP announcements (1988–2013) in China and India respectively, reveals that in both of these economies investors react positively to PPP announcements issued by partnering private sector firms. This leads to an enhancement of the firms' market valuation, with the positive cumulative abnormal returns from the (-10,+10) event window being 1.87% and 2.11% in China and India, respectively. My robustness tests, conducted by using the Barber and Lyon matched-firm approach, further confirm that the PPP announcements add value to partnering private sector firms relative to their matched non-PPP counterparts in the same industry. Overall, investors may consider PPP announcements issued by partnering private firms as good news, leading to increased firm value.

When studying investment–cash flow sensitivity, my study, by using 169 and 215 firm-year observations in China and India respectively, explores the variance in the nature of firms that undertakes PPP projects varies. Compared to non-PPP counterparts, in China, older and highly valued firms with higher cash inflow engage in PPPs while in India, younger and cash-constrained firms with higher debt burdens opt for PPPs. This indicates that unlike in China, PPP investments in India are mainly driven by an underinvestment problem. In the long run, PPP involvement reduces investment–cash flow sensitivity in both countries' private

sector firms; however, the reduced capital constraint is more pronounced in China. Hence, these findings show that PPPs help partnering firms be less reliant on their internal cash flow to finance their investments. I further confirm these findings by exploring how private sector firms' participation in PPPs leads to an increase in accessing external financing in terms of bank loans.

Second, my study attempts to uncover the underlying determinants of PPP benefits for partnering private sector firms. As PPP projects involve the public sector, my results show that a high reliance on the government, in the form of government investments, political connections and contractual agreements, is beneficial for the Chinese private firms as this grants them a deduction in their overinvestment problems. In contrast, a high dependency on the government is detrimental to the Indian firms as it imposes more overinvestment problems on these firms than it does on their non-political counterparts. The contrasting results of government reliance suggest the distinct feature of the political system that may influence firms' benefits through PPPs. I investigate this conjecture by showing that the Chinese PPP firms have lower investment–cash flow sensitivity when regulatory quality improves. Given that regulatory quality is measured by the ability of the government to promote the private sector (Kaufmann et al., 2011), this result lends support to my findings on the positive effects of high reliance on government in China. In the case of India, accountability and government effectiveness matter in reducing capital constraints of PPP partnering private firms. Given that accountability is measured as having freedom of expression and the ability to nominate one's own government (Kaufmann et al., 2011), the results are consistent with the idea that the political setup in India – democracy – is mirrored in the Indian firms as well. Overall, the results show the important role of institutional quality when explaining the benefits of PPP firms, and this leads to my further cross-country analysis on how institutional quality influence PPP benefits.

Third, my study aims to examine the effects of institutional quality on partnering private sector firms. By using a sample of 625 PPP partnering private firms from nine countries (1980–2015) at varying degrees of economic development and PPP markets (i.e. Australia, the United Kingdom, the United States, Canada, Japan, China, India, Brazil and Russia), I find

a variance in the motivation of firms that undertakes PPP investment. While private sector firms in economies with low institutional quality opt for PPPs to alleviate capital constraints attributed to underinvestment, those in economies with high institutional quality opt for PPPs to solve the problem of overinvestment caused by abundant cash flow. In the long run, the benefits of low capital constraints and increased firm value through PPP investments are more pronounced in the economies with high institutional quality. Hence, my study contributes to the extant debate on the role of institutional quality by stating that the law–finance–growth hypothesis is more plausible than the political tie hypothesis for understanding why private sector firms undertake PPP investments.

6.3 Research Contributions to the Literature

First, my study contributes to the emerging literature on the development of PPPs and their related impacts on partnering parties. Previous literature focuses on an exploration of the efficacy of PPPs from the public sector's perspective by examining whether PPP projects outperform the traditional public procurement in terms of achieving government financial benefits and improving the social welfare as a whole (e.g. Burger and Hawkesworth, 2011; Tang et al., 2010). My study aims at understanding the influence of PPPs on partnering private sector firms. There are currently a few existing studies that explore the advantages of PPPs for the private sector in terms of reducing political risk and regulatory hurdles, and improving future demand guarantees (Engel et al., 2010; UNESCAP, 2011). My study adds another corporate finance dimension to that literature by considering on how PPPs affect the financial constraints and performance of PPP-invested private firms in comparison with their non-PPP firms competitors.

Second, my study contributes to the extant literature on corporate investment decisions and investment efficiency originated by Fazzari et al. (1988); Jensen (1986) and Myers and Majluf (1984) and more recently developed by Moshirian et al. (2017); Pindado et al. (2011) and Cleary et al. (2007). While previous literature emphasizes two different channels, investment asymme-

tries and agency problems, that may distort investment behaviors, my study on PPPs departs from these studies by adding another channel: that is, the conflict between the government (as a regulator, asset and capital provider) and partnering private firms (as constructors and operators) in which the government may use free cash flow generated to pursue political/social purposes at the expense of its private partners.

Third, my study contributes to the previous debates on partnering private sector firms and their reliance on government support by disentangling the rationale for changes in investment efficiency caused by underinvestment or overinvestment, which is influenced by the issue of government intervention. I argue that the distinct role of government support depends on the varying degree of government ownership of a firm as a whole, the role of state equity participation in a firm's single project, political connection, and more importantly, the political set-up. Furthermore, in addition to the previous studies that mainly focus on what macro-level factors drive the choice of PPP contract mechanisms such as in Bajari et al. (2008), my study provides insight into the influence of the government via contract mechanisms to partnering private sector firms. My study also identifies several determinants of contract mechanism, namely the types of projects that have different levels of private ownership, contract awarding methods and private firms' revenue sources with varying degrees of demand risk guaranteed by the government. Therefore, it further adds to the extant literature on ownership structure and risk transfer by arguing that ownership and risk allocation not only depend on the ability of the party who manage it well at a low cost, as discussed in Cooper (2005), but ownership and risk allocation also relates to the political setting. The unitary polity encourages ownership and risk to be allocated to the government while the federalism system prefers ownership and risk to be transferred to the private sector.

Fourth, my study contributes to the extant literature by providing a better platform from which to reexamine the SLH and the extant debate on whether either the law–finance–growth nexus or the political tie hypothesis is more plausible in explaining financing conditions. The previous literature uses the sample of general corporate investments that are not aligned with the social interests of the government. They posit that attaining political connections to easily

access external financing may lead to social loss as related politicians engage in corruptive practices, which supports the "Political Corruption" view point such as in Dinç (2005) and Khwaja and Mian (2005). Hence, these authors are testing political corruption in general rather than directly testing the SLH. In contrast, my study provides a PPP sample with a clearer social alignment in which the government cooperates with the private sector to manage the large social infrastructure projects as part of national building exercises. As a result, the preferential treatment extended by the government that enables private firms to access bank loans may improve social welfare as well since it can lead to an efficient allocation of resources. The approach I take in my study provides a better setting to test the SLH. Moreover, the PPP sample provides a platform in which political connection can be more active since the private sector need to seek government-backed support for the smooth running of large, risky infrastructure projects. As a result, my study has a better setting to gauge whether the law–finance–growth or the political tie nexus is more pronounced. If PPP financial benefits are more profound in firms that have high institutional quality (with better protection of private properties from public expropriation and corruption), the law–finance–growth nexus is supported. Otherwise, if these benefits are more significant in low institutional quality which encourages political elite, the political tie hypothesis is supported.

Last but not least, to my best knowledge, my study is the first to examine the effects of PPPs on partnering private sector firms in the corporate finance dimension. Despite the emergence and dominance of PPPs in emerging economies, previous studies mainly focus on case studies in developed economies. Given the distinct institutions and development of developed economies and emerging economies, this may lead to generalization problems. My study uses a PPP sample from the two largest emerging economies, China and India, each of whom commands the lion's share of PPP projects with active private sector participation. Therefore, it has implications for evaluating the influence of PPPs in emerging markets, for testing the intended purposes of reducing capital constraints for the private sector and bridging infrastructure gaps for social welfare. More importantly, by using a cross-country analysis of nine economies at varying degree of institutional quality, which composes more than 67% of the global PPP deal

value (IJGlobal Database, 2015), my study further compares PPP associated benefits between developed and emerging economies. Hence, it sheds light on the direction and viability of PPPs in different stages of economic and institutional development.

6.4 Implications and Recommendations

For PPP-invested private firms, participating in PPPs has been increasingly common as one of strategic investment decisions, apart from diversification, Mergers and Acquisitions (M&A), or Research and Development (R&D). Since PPPs involve large and long-term projects, the increasing number of cancelled projects and, more importantly, the low average return on capital, for example just 6% to 8% compared with around 10% for equity investment in China (Ma, 2016), may limit the appeal of PPPs to the private sector. In the meantime, earlier literature has mainly focused on case studies looking at single PPP project-level data rather than PPP partnering firms as a whole. Therefore, my thesis on firm-level study has implications for partnering private firms by drawing out both financial benefits and associated risks that PPPs bring to firms. This may help the private sector take into account some added critical financial issues in their attempt to secure PPPs over other investment opportunities and answer their question on whether private sector firms engage with PPPs based on the set of assessment criteria in corporate finance. For instance, in addition to the traditional measurement of project success, net present value (NPV), private sector firms should evaluate other incentives of PPPs, such as firm market valuation, investment efficiency through investment–cash flow sensitivity and access to bank lending. Moreover, my thesis suggests the kinds of support private sector firms should require from governments to ensure their commitment to PPPs and future success. For example, equity participation from governments or other government support as a result of political connections should aim at achieving mutual benefits between governments and the private sector. For the private sector, securing government support should be exercised to fulfil the intended purposes of reducing underinvestment, rather than being detrimental to firms by overinvesting their free cash flow to pursue the government's preferred political/social

purposes. To cite another example, for sustainable long-run benefits, the private sector should prefer, and require from the governments, an institution that provides strong protection for the sector's private properties rather than being over-reliant on political ties which may induce expropriation risk.

From the perspective of governments, given the private sector's lack of strong commitment towards PPPs, governments are attempting to establish an institutional structure that promotes private sector firms engagement and benefits. For example, this can be seen in the following publications: "Several opinions of the state council on encouraging and guiding the healthy development of private investment" issued in May 2010 in China (Wang et al., 2012) or the "National Public Private Partnership policy of India" (World Bank Group, 2012*b*). However, although the aim of these publications is to provide an overview of PPP regulations, with an emphasis on some strategic institutions, the feasibility of these institutions in the real world would still need to be tested. The findings on institutional quality in my thesis suggest some governance features the government should prioritize in their attempt to encourage private sector participation. In other words, my thesis suggests the benefits that governments can promote and the costs that governments can help to manage in PPPs. As in China, private sector firms may get more benefits in terms of reducing investment–cash flow sensitivity and increasing market valuation when the government focuses its policies and regulations on promoting private sector development (in time of high regulatory quality). By contrast, in India, when the government promotes high accountability which aims at encouraging freedom and independence from political pressures, this may help the private sector obtain more benefits in positive market reaction when announcing new PPP projects. Additionally, my thesis has implications for governments in deciding which firms are most attracted to PPPs and what criteria government should use to make those decisions. In the case of China, the attracted PPP firms are large, mature, highly valued with small debt burden, while in India, the opposite is true as PPP firms are young with a high leverage. More over, my thesis suggests the kinds of resources governments can provide to firms to ensure their commitment and future success. For example, the Chinese government can help private firms lower the overinvestment problems

that arise between managers and shareholders by increasing the government's role as an equity investor in PPP projects and combining this with its role as a regulatory controller. In the case of India, when governments award PPP projects to private sector firms, this can help the firms solve their capital constraints; however, this impact is only possible when firms do not engage with political connections; otherwise firms' capital constraints may become inversely increased due to overinvestment problems. Finally, my findings on the Social Lending Objectives through the political connection channel has implications for governments in terms of how they might re examine their allocation of bank lending. In the case of PPP firms in China, preferential treatment for politically connected firms leads to social gains since banks efficiently allocate capital to firms with high growth opportunities. In India, however, high access to bank loans through government bank support is allocated to low investment opportunity firms, which may lead to overinvestment and social losses.

Finally, as my study on PPPs involves firm market valuation, it has implications for investors in response to PPP announcements and the investors' diversification strategy. My findings suggest that PPP announcements may bring abnormal return relative to the market and the matched non-PPP firms. The abnormal return may be even more pronounced in the politically connected firms in China, but there is no difference in India. However, the window for positive average abnormal return may differ between the Chinese and Indian markets. For the PPP Chinese firms, the window ranges from t=-8 to t=+8, while in India, the window is smaller, about (-3,+3). Moreover, since PPPs involve foreign investors, my study on institutional quality has implications for investors' choice of investment time and destination. My findings suggest that investors may gain a better return at the time of increased ratings on regulatory quality in China; however, this is not the case in India. Investing in Indian PPP firms may offer a better return for investors at a time of increased ratings on accountability. In general, on one hand, there are PPP firms that operate in an economy whose institutions are focused on the protection of private properties. On the other hand, there are PPP firms who do business in an economy that aims at promoting political elites and government-backed support. In the long run, an investment in the firms that protect private properties may offer better gains.

6.5 Limitations and Future Research

According to Grimsey and Lewis (2007), infrastructure is divided into hard and soft infrastructure. My study focuses on hard infrastructure (i.e. energy, information and communication technology, transport, water and sewerage). Additionally, hard infrastructure is further classified into economic infrastructure (e.g. energy, technology and transport) and social infrastructure (e.g. water, sewerage, schools, hospital, housings, childcare) (Grimsey and Lewis, 2007). As mentioned above, my study covers all economic infrastructure and a large portion of social infrastructure, namely water and sewerage. The main rationale for this scope is that such hard infrastructure involves large, risky and long-term PPP projects that demand more expertize and engagement from the private sector. More importantly, compared with social infrastructure that provides services to households, hard infrastructure is considered to be essential to business and industry, hence playing a crucial role to infrastructure and economic growth. Therefore, my empirical results validate the benefits of PPP for partnering private firms, especially in developing economies. However, given the new investment trend in infrastructure in developed economies– that is, the transfer from hard to soft infrastructure (e.g. financial institutions, social and community services), and from economic to social infrastructure (e.g. housings, school, hospital)– there is an opening for further research to follow this trend and focus on whether the characteristics of soft and social infrastructure can modify private sector firms' financial benefits through PPPs. There is also scope for future studies to compare the viability of PPPs for private firms in terms of economic infrastructure as opposed to in social infrastructure. This would help the government form separated institutions and policies for either economic or social infrastructure in its attempt to encourage the private sector to participate in PPPs.

Since PPPs involve governments as both regulators and project participants, my study aims to explore government inference as a core determinant of PPP benefits for the private sector, through various channels (i.e. firm equity participation, project ownership, political connections, contract mechanisms, institutions). This has implications for how governments frame legal frameworks, encouragement policies and contract clauses with the private sector. There is

room for further research to focus on other factors, such as culture contexts and diversity, environmental and social factors. For example, PPPs involve large infrastructure projects, which may provoke strong social objection due to land acquisition or other expropriation. This social factor has the potential to influence completion time and transaction costs. Another area for future research relates to large PPP projects may involve the exploitation of natural resources that affect the environment (e.g. energy or water and sewerage projects). How PPP partnering firms behave in response to these consequences, in light of their business culture and sense of their corporate social responsibility is still questionable. Such factors may also determine PPP benefits and PPP firms' engagement, but these are less-explored in the existing literature and warrant further investigation.

6.6 Concluding Remarks

PPPs have emerged to fill the infrastructure gap, given the failure of public finance and privatization programs. However, PPPs have received low engagement from the private sector. This poses a challenge for government attempting to sustain this model. In this circumstance, most previous studies align with the public sector's perspective to explore whether PPPs bring more benefits to governments than the conventional public procurement, and there is inconclusive evidence of the advantages and disadvantages that PPPs afford the private sector. My study fills this research gap by offering a less-explored angle of research into PPP engagement. Aligning my study with the private, rather than the public sectors point of view, I examine whether PPPs– which witnessed a nine-fold increase in emerging markets in the last decade– accomplish the intended purpose of reducing capital constraints faced by the private sector.

One of my main findings is that PPPs help partnering private sector firms become less reliant on their internal cash flow and better able to access bank loans when financing for their investment in both China and India. Also, investors responded positively to PPP announcements, which generate abnormal returns to PPP-invested firms over their non-PPP counterparts. My study further explores government-related determinants of PPP benefits and finds that a high

dependency on governments, in terms of public equity participation, political connection and contract mechanism, is beneficial to the Chinese PPP firms but detrimental to the Indian firms. This is because a higher reliance on the government helps the Chinese PPP firms decrease their underinvestment and overinvestment problems, while such synergy increases overinvestment in the case of the Indian firms. With regard to social welfare, such a higher reliance on the government leads to social gains in China, since the preferential treatment for politically connected firms also causes the efficient allocation of bank financing to firms with high growth opportunities. By contrast, political connections may lead to social loss in India. The contrasting findings suggest the need for further research on how the difference in institutional quality mediates PPP benefits. In regard to firms that opt for PPPs, I find that there is a variance in the motivation and consequent benefits that the firms enjoy, depending on the firms' level of institutional quality. While firms in low-quality institutions opt for PPPs to alleviate capital constraints attributed to underinvestment, those in economies with high institutional quality choose PPPs to solve the problem of overinvestment made by abundant cash flow. In the long run, the benefits of lowering capital constraints and improving firm value are more pronounced in economies with high institutional quality.

Therefore, my study contributes to the emerging literature on PPPs in the corporate finance dimension, and it complements the extant literature on corporate investment decisions and investment efficiency. It also adds to the current debate on the role of government reliance, ownership structure and risk transfer. Moreover, it contributes to the previous examination of the Social Lending Objectives and the extant debate between the law–finance–growth nexus and the political tie hypothesis in terms of which one offers the more plausible explanation of financial benefits. My study also has implications for PPP-invested private firms, governments and investors attempting to sustain and maximize PPP benefits. It concludes by opening room for future studies, including an exploration of the nature and viability of PPPs in social or soft infrastructure and an examination of other determinants of PPP benefits (e.g. social, cultural and environmental factors).

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Appendix

A Variables Definition

Firm-level variables	Definition
1. Investment	The changes in gross fixed assets, divided by the previous year's fixed assets
2. Cash flow	Income before extraordinary items, depreciation and amortization, divided by the previous year's fixed assets
3. Size	The natural logarithm of total assets
4. Leverage	Total debt divided by total assets
5. Age	Measured from the year of a firm's incorporation
6. Tobin's q	The market value of assets (market capitalization + liabilities' market value) divided by the book value of assets (common stock's book value + liabilities' book value)
7. ROA	Earnings before interest, tax, depreciation and amortization scaled by average total assets
8. Capex/sales	Capital expenditure divided by sales to measure investment intensity
9. Sale growth	The average growth over three years in net sales to capture growth opportunities
12. Market risk	Calculated by estimating the market model on the monthly returns in the previous five years

Institution quality variables	Definition

1. Accountability	Perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media
2. Political stability	Perceptions of the likelihood of political instability and/or politically-motivated violence
3. Government effectiveness	Perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies
4. Regulatory quality	Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development
5. Rule of law	Perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence
6. Control of corruption	Perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests
7. Public uncertainty	A dummy variable taking value 1 when PPPs enter into contracts in the year of general election, else zero

Country-level variables	**Definition**
1. Log GDP	The natural logarithm of Gross Domestic Product in the US dollars
2. Credit to private sector	Financial resources that financial corporations provide the private sector (measured as % of GDP)

B Sensitivity Test for Determinants of Wealth Effects Arising from PPP Announcements

Table B2: Chinese Firms: Barber and Lyon Cumulative Abnormal Returns, Reliance on the Government and Institution Quality

This table presents the effect of government support and institution quality on the cumulative abnormal return of PPP firms. $BLCAR01$, the dependent variable, was the Barber and Lyon cumulative abnormal return of day 0 and day +1. ***,**,* indicate significant at the 1%, 5% and 10% levels, respectively.

BLCAR01	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Firm-characteristic variables										
Cash flow	-0.0001	0.0001	-0.0002	-0.00001	-0.00001	0.0005	-0.0002	0.0002	0.0002	-0.0001
	(-0.07)	(0.10)	(-0.27)	(-0.02)	(-0.01)	(0.59)	(-0.31)	(0.28)	(0.21)	(-0.05)
Leverage	-0.0183	-0.0257	-0.0185	-0.0213	-0.0294	-0.0034	-0.0396	-0.0424*	-0.0180	-0.0287
	(-0.85)	(-1.00)	(-1.03)	(-0.82)	(-0.90)	(-0.09)	(-1.43)	(-1.76)	(-0.60)	(-1.17)
Size	-0.0102	-0.0086	-0.0111	-0.0104	-0.0068	-0.0186	-0.0058	-0.0132	-0.0120	-0.0072
	(-0.91)	(-0.66)	(-1.08)	(-0.93)	(-0.45)	(-1.04)	(-0.49)	(-1.18)	(-0.84)	(-0.56)
Age	-0.0001	-0.0003	-0.0002	-0.0001	-0.0004	0.0005	-0.0006	-0.0001	0.00001	-0.0005
	(-0.15)	(-0.26)	(-0.24)	(-0.13)	(-0.34)	(0.35)	(-0.54)	(-0.16)	(0.01)	(-0.48)
Tobin's q	0.0068**	0.0065**	0.0086***	0.0069**	0.0074***	0.0065***	0.0073***	0.0077***	0.0072***	0.0075***
	(2.58)	(2.16)	(3.39)	(2.40)	(2.92)	(2.67)	(2.70)	(3.09)	(2.91)	(3.24)
Panel B: Government involvement variables										
Public equity		-0.0178								
		(-0.70)								
Political connections			0.0013*							
			(1.71)							
Panel C: Institution quality variables										
Public uncertainty				-0.0293***						
				(-2.74)						
Accountability					-0.0407**					
					(-1.80)					
Political stability						0.0481				
						(0.96)				
Government effectiveness							0.0699			
							(1.32)			
Regulatory quality								0.0771***		
								(3.11)		
Rule of law									-0.0212	
									(-0.46)	
Control of corruption										-0.0404
										(-1.32)
Constant	0.0751	0.0737	0.0831	0.0786	-0.0066	0.1430	0.0548	0.1190**	0.0744	0.0378
	(1.31)	(1.16)	(1.52)	(1.25)	(-0.07)	(1.31)	(0.88)	(1.90)	(0.88)	(0.61)
R-squared	5.69	6.03	8.37	5.8	6.34	6.4	7.02	7.54	6.13	6.41
N	124	124	124	121	117	117	117	117	117	117

Table B3: Chinese Firms: Buy-and-Hold Abnormal Returns, Reliance on the Government and Institution Quality

This table presents the effect of government support and institution quality on the cumulative abnormal return of PPP firms. $BAH01$, the dependent variable, was the buy-and-hold abnormal return of day 0 and day +1. ***,**,* indicate significant at the 1%, 5% and 10% levels, respectively.

BAH01	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Firm-characteristic variables										
Cash flow	-0.00002	0.0001	-0.0002	0.00002	0.00001	0.0005	-0.0002	0.0002	0.0002	-0.00002
	(-0.03)	(0.14)	(-0.24)	(0.03)	(0.02)	(0.62)	(-0.33)	(0.34)	(0.25)	(-0.03)
Leverage	-0.0147	-0.0221	-0.0150	-0.0173	-0.0281	0.0003	-0.0389	-0.0400	-0.0141	-0.0264
	(-0.66)	(-0.84)	(-0.81)	(-0.64)	(-0.85)	(0.01)	(-1.40)	(-1.67)	(-0.46)	(-1.04)
Size	-0.0105	-0.0089	-0.0114	-0.0106	-0.0060	-0.0188	-0.0052	-0.0135	-0.0123	-0.0069
	(-0.94)	(-0.69)	(-1.12)	(-0.95)	(-0.40)	(-1.05)	(-0.45)	(-1.22)	(-0.86)	(-0.53)
Age	-0.0001	-0.0002	-0.0002	-0.0001	-0.0005	0.0005	-0.0006	-0.0001	0.0001	-0.0005
	(-0.12)	(-0.23)	(-0.20)	(-0.10)	(-0.39)	(0.37)	(-0.60)	(-0.14)	(0.04)	(-0.50)
Tobin's q	0.0073**	0.0070**	0.0091***	0.0074**	0.0079***	0.0070***	0.0078***	0.0082***	0.0076***	0.0080***
	(2.54)	(2.15)	(3.36)	(2.37)	(2.88)	(2.64)	(2.68)	(3.04)	(2.86)	(3.22)
Panel B: Government involvement variables										
Public equity		-0.0176								
		(-0.70)								
Political connection			0.0026*							
			(1.70)							
Panel C: Institution quality variables										
Public uncertainty				-0.0304***						
				(-2.82)						
Accountability					-0.0482**					
					(-2.22)					
Political stability						0.0475				
						(0.95)				
Government effectiveness							0.0789			
							(1.41)			
Regulatory quality								0.0811***		
								(3.16)		
Rule of law									-0.0196	
									(-0.42)	
Control of corruption										-0.0448
										(-1.47)
Constant	0.0746	0.0732	0.0830	0.0789	-0.0247	0.1420	0.0501	0.1210*	0.0751	0.0319
	(1.32)	(1.17)	(1.55)	(1.26)	(-0.26)	(1.30)	(0.82)	(1.94)	(0.89)	(0.52)
R-squared	5.88	6.2	8.67	5.98	6.62	6.58	7.43	7.84	6.32	6.66
N	124	124	124	121	117	117	117	117	117	117

Table B4: Indian Firms: Barber and Lyon Cumulative Abnormal Returns, Reliance on the Government and Institution Quality

This table presents the effect of government support and institution quality on the cumulative abnormal return of PPP firms. $BLCAR01$, the dependent variable, was the Barber and Lyon cumulative abnormal return of day 0 and day +1. ***,**,* indicate significant at the 1%, 5% and 10% levels, respectively.

BLCAR01	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Firm-characteristic variables										
Cash flow	0.0158***	0.0156***	0.0169**	0.0148***	0.0166***	0.0140***	0.0158***	0.0159***	0.0115***	0.0114***
	(3.04)	(3.17)	(2.60)	(2.75)	(4.23)	(4.17)	(3.08)	(2.93)	(2.87)	(3.21)
Leverage	-0.0578***	-0.0606***	-0.0559***	-0.0579**	-0.0669***	-0.0675***	-0.0576***	-0.0587***	-0.0840***	-0.0789***
	(-2.77)	(-3.03)	(-2.82)	(-2.15)	(-3.13)	(-4.90)	(-2.63)	(-3.03)	(-6.72)	(-7.75)
Size	0.0159	0.0182**	0.0152	0.0163	0.0165*	0.0146*	0.0160*	0.0159*	0.0188***	0.0179***
	(1.65)	(2.05)	(1.54)	(1.52)	(1.86)	(1.96)	(1.69)	(1.66)	(3.45)	(3.12)
Age	-0.0003	-0.0005	-0.0003	-0.0002	-0.0004	-0.0004	-0.0004	-0.0004	-0.0008	-0.0006
	(-0.24)	(-0.38)	(-0.19)	(-0.13)	(-0.29)	(-0.35)	(-0.28)	(-0.29)	(-1.00)	(-0.69)
Tobin's q	-0.0009***	-0.0009***	-0.0009***	-0.0009***	-0.0010***	-0.0009***	-0.0009***	-0.0009***	-0.0007***	-0.0007***
	(-2.98)	(-3.19)	(-3.04)	(-3.03)	(-4.03)	(-3.23)	(-3.35)	(-3.16)	(-3.13)	(-3.61)
Panel B: Government involvement variables										
Public equity		-0.0196								
		(-1.48)								
Political connection			-0.0124***							
			(-5.45)							
Panel C: Institution quality variables										
Public uncertainty				0.0112						
				(1.18)						
Accountability					0.2070*					
					(1.89)					
Political stability						-0.0765				
						(-1.53)				
Government effectiveness							-0.0060			
							(-0.12)			
Regulatory quality								-0.0241		
								(-0.54)		
Rule of law									-0.0797***	
									(-3.98)	
Control of corruption										-0.0962**
										(-2.07)
Constant	-0.0952*	-0.1090**	-0.0926*	-0.0970	-0.1810**	-0.1730***	-0.0957*	-0.1030**	-0.0998***	-0.1440***
	(-1.76)	(-2.19)	(-1.71)	(-1.61)	(-2.08)	(-2.92)	(-1.83)	(-2.49)	(-2.96)	(-6.25)
R-squared	8.66	9.52	9.34	9.71	10.72	12.24	8.67	8.8	12.17	11.71
N	98	96	98	98	98	98	98	98	98	98

Table B5: Indian Firms: Buy-and-Hold Abnormal Returns, Reliance on the Government and Institution Quality

This table presents the effect of government support and institution quality on the cumulative abnormal return of PPP firms. $BAH01$, the dependent variable, was the buy-and-hold abnormal return of day 0 and day +1. ***,**,* indicate significant at the 1%, 5% and 10% levels, respectively.

BAH01	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Firm-characteristic variables										
Cash flow	0.0159***	0.0157***	0.0169***	0.0148***	0.0166***	0.0141***	0.0159***	0.0159***	0.0116***	0.0116***
	(3.15)	(3.29)	(2.69)	(2.84)	(4.40)	(4.33)	(3.16)	(3.04)	(2.99)	(3.34)
Leverage	-0.0591***	-0.0619***	-0.0573***	-0.0592**	-0.0680***	-0.0685***	-0.0588***	-0.0599***	-0.0847***	-0.0796***
	(-2.81)	(-3.07)	(-2.86)	(-2.18)	(-3.14)	(-4.97)	(-2.65)	(-3.07)	(-6.48)	(-7.42)
Size	0.0163*	0.0186**	0.0156	0.0167	0.0169*	0.0150**	0.0164*	0.0163*	0.0192***	0.0183***
	(1.70)	(2.11)	(1.59)	(1.57)	(1.92)	(2.03)	(1.75)	(1.72)	(3.48)	(3.15)
Age	-0.0004	-0.0006	-0.0003	-0.0002	-0.0005	-0.0004	-0.0004	-0.0004	-0.0009	-0.0006
	(-0.27)	(-0.42)	(-0.22)	(-0.16)	(-0.32)	(-0.39)	(-0.32)	(-0.32)	(-1.03)	(-0.72)
Tobin's q	-0.0009***	-0.0008***	-0.0008***	-0.0009***	-0.0010***	-0.0009***	-0.0008***	-0.0008***	-0.0007***	-0.0007***
	(-2.96)	(-3.18)	(-3.02)	(-3.02)	(-4.03)	(-3.21)	(-3.35)	(-3.14)	(-3.10)	(-3.56)
Panel B: Government involvement variables										
Public equity		-0.0192								
		(-1.51)								
Political connection			-0.0125***							
			(-5.69)							
Panel C: Institution quality variables										
Public uncertainty				0.0109						
				(1.20)						
Accountability					0.2010*					
					(1.85)					
Political stability						-0.0744				
						(-1.56)				
Government effectiveness							-0.0095			
							(-0.20)			
Regulatory quality								-0.0241		
								(-0.56)		
Rule of law									-0.0779***	
									(-4.23)	
Control of coruption										-0.0932**
										(-2.15)
Constant	-0.0979*	-0.112**	-0.0954*	-0.0998	-0.1810**	-0.1730***	-0.0987*	-0.1050**	-0.1020***	-0.1450***
	(-1.82)	(-2.26)	(-1.78)	(-1.67)	(-2.10)	(-3.04)	(-1.91)	(-2.57)	(-3.06)	(-6.39)
R-squared	8.95	9.81	9.61	10.03	10.94	12.41	8.97	9.09	12.37	11.87
N	98	96	98	98	98	98	98	98	98	98

C Sensitivity Test for Investment–Cash Flow Sensitivity Analysis

Table C6: Chinese and Indian Firms – Sensitivity Test: Sale Growth is Used as Proxy for Investment Opportunities

This table presents the sensitivity test in which I used Sale growth (instead of Tobin's q) as a proxy for investment opportunities. *Sale growth* was measured by the changes in net sales divided by the previous sales. ***,**,* indicate significant at the 1%, 5% and 10% levels, respectively

Investment	China	China	China	China	China	India	India	India	India	India
Cash flow	0.216***	0.928**	5.478***	3.075**	0.127**	-0.086	0.407***	0.089	-0.267	-0.252
	(381.238)	(2.395)	(11.834)	(2.476)	(2.591)	(-0.754)	(9.013)	(0.214)	(-1.608)	(-1.437)
Size	-0.868	-0.048	-0.020	-0.152	0.279*	0.131	0.105**	0.079	0.010	0.096**
	(-1.481)	(-0.592)	(-0.271)	(-1.562)	(1.975)	(0.424)	(2.649)	(1.067)	(0.092)	(2.307)
Leverage	1.116	0.003	1.153	1.551	0.950	1.498*	0.158	-0.017	-0.252**	-0.244**
	(0.628)	(0.010)	(1.348)	(1.639)	(1.360)	(1.920)	(1.059)	(-0.060)	(-2.421)	(-2.116)
Age	0.070	-0.010**	-0.017	0.021	-0.030**	0.031	-0.015**	-0.023**	-0.017	-0.036***
	(1.110)	(-2.244)	(-1.109)	(1.264)	(-2.626)	(0.659)	(-2.687)	(-2.314)	(-1.460)	(-3.752)
Sale growth	0.003*	-0.001	-0.002***	-0.002**	-0.001	0.008	0.001*	0.001	0.001	-0.001
	(1.717)	(-0.491)	(-6.430)	(-2.935)	(-1.086)	(0.894)	(1.804)	(1.157)	(1.401)	(-0.135)
PPP	-0.138	0.213				-1.461***	0.025			
	(-0.335)	(1.469)				(-4.390)	(0.214)			
PPP * Cash flow	-0.230***	-0.787**				2.496***	-0.116			
	(-21.464)	(-2.192)				(4.284)	(-0.335)			
Public equity			3.834***					-0.369**		
			(10.914)					(-2.262)		
Public equity * Cash flow			-13.485***					2.3662***		
			(-11.262)					(3.246)		
Political connection				0.423					-0.369*	
				(1.425)					(-1.760)	
Political connection * Cash flow				-3.006**					1.438*	
				(-2.386)					(1.983)	
Public uncertainty					-0.608*					-1.097***
					(-1.861)					(-3.900)
Public uncertainty * Cash flow					4.907***					3.012***
					(4.509)					(3.906)
Constant	5.513*	0.504	-1.138*	0.052	-1.788*	-1.597	-0.653***	-0.210	0.487	0.0247
	(1.702)	(1.267)	(-1.665)	(0.068)	(-1.697)	(-0.906)	(-3.001)	(-0.592)	(0.612)	(0.078)
R-squared	88.07	9.09	67.9	60.68	70.68	76.68	17.5	15.97	20.06	33.18
N	293	93	50	50	50	326	97	52	52	52

D PPP Private Sector Firms in the Cross-Country Analysis

Figure D1: PPP Listed Private Sector Firms by Countries and Industries

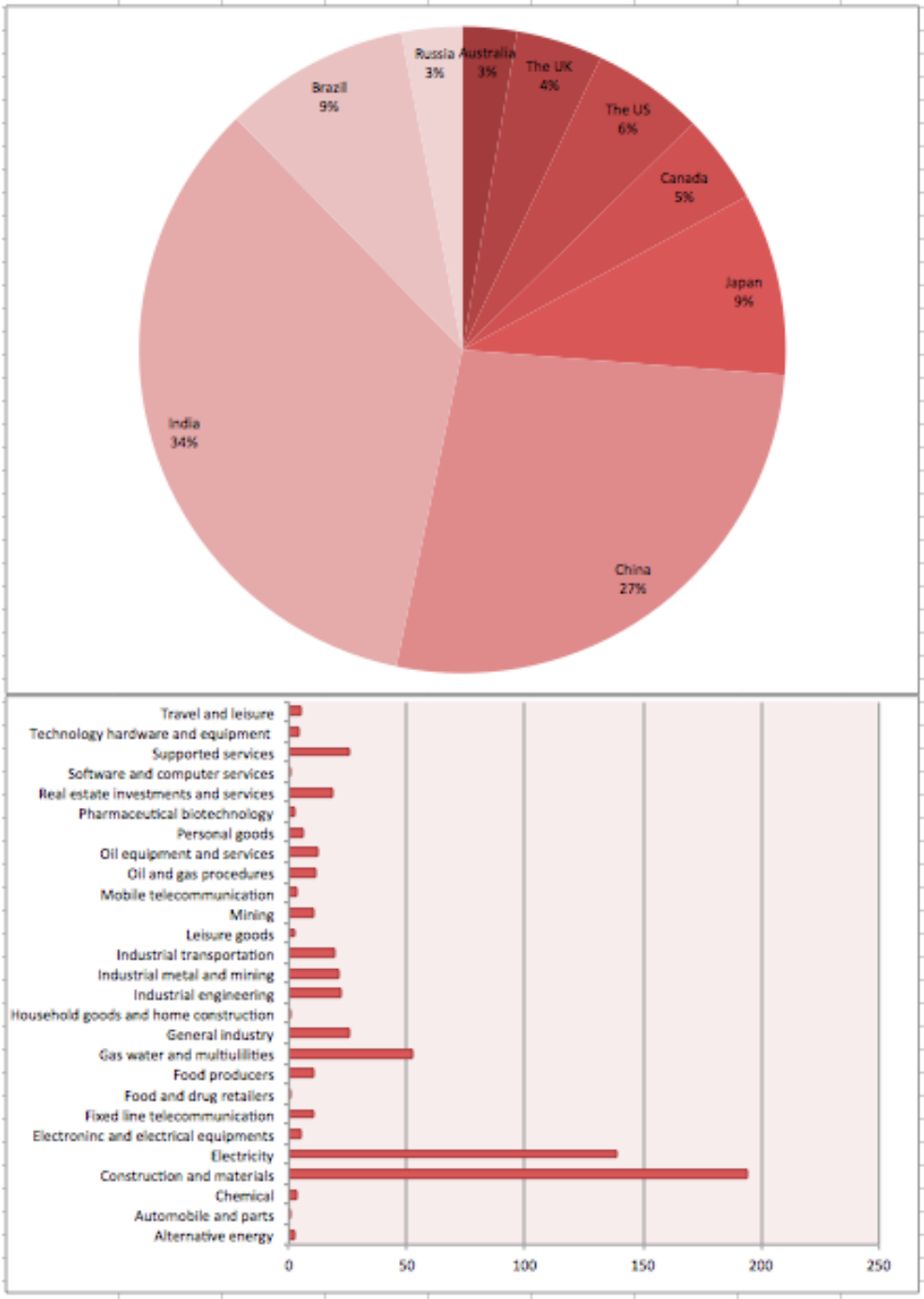

Table D7: Cross-Country PPP Data Sources

Country	Organization	Link
Australia	Infrastructure Australia	http://infrastructureaustralia.gov.au/ policy-publications/public–private-partnerships/index.aspx
The UK	HM Treasury and Infrastructure UK	https://www.gov.uk/government/publications/ private-finance-initiative-projects-2013-summary-data
The US	The National Council for PPPs	http://www.ncppp.org/resources/case-studies
	Federal Highway Administration	http://www.fhwa.dot.gov/ipd/p3/project_profiles/
Canada	The Canadian Council for PPPs	http://projects.pppcouncil.ca/ccppp/src/public/ search-project?pageid=3d067bedfe2f4677470dd6ccf64d05ed
Japan	Japan PPI-PPP Association	http://www.pfikyokai.or.jp/pfi-data/pfi-list_g.html
China	The World Bank PPI Project Database	http://ppi.worldbank.org
India	The World Bank PPI Project Database	http://ppi.worldbank.org
Brazil	The World Bank PPI Project Database	http://ppi.worldbank.org
Russia	The World Bank PPI Project Database	http://ppi.worldbank.org