



DETERMINING APPROPRIATE GOVERNMENT GUARANTEES FOR CONCESSION CONTRACT: LESSONS LEARNED FROM 10 PPP PROJECTS IN CHINA

Yelin XU ^{a,*}, John F. Y. YEUNG ^b, Shaohua JIANG ^c

^a Department of Building and Real Estate, Zhejiang Sci-tech University, Hangzhou, China

^b Division of Business, College of International Education, School of Continuing Education, The Hong Kong Baptist University, China

^c Department of Engineering Management, Dalian University of Technology, Dalian, China

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ABSTRACT. Governments worldwide are keen to encourage PPP schemes, however PPP is not a foolproof business. Many local governments and private investors have suffered severe or trying experiences. In this research, 10 case studies were conducted to identify the obstacles and difficulties for successful implementation of PPP projects from the perspective of government guarantees. These PPP projects include two water supply plants, two sewage treatment plants, two power supply plants, two highway projects, and two bridge projects. The findings obtained indicate that the local governments are familiar with “the type of guarantees” to provide to the private investor but they are unsure of the “amount” that should be given. Many PPP projects have therefore been heavily criticized for over benefiting the private investors as the government provides them with too many guarantees. The inappropriate guarantees offered by the government are regarded as one of the root causes of PPP projects’ failure. The lessons learned are valuable for determining appropriate government guarantees for future PPP projects and broadening the opportunities for infrastructure development with PPP procurement model.

KEYWORDS: Government guarantee; Public Private Partnership; Case study; Risk sharing

1. INTRODUCTION

Public Private Partnership (PPP) is a well-established procurement model for delivering public infrastructure projects in which “both the public and the private investor will contribute their expertise and resources to the project and share the risks involved” (Cheung *et al.* 2010). Successful implementation of PPP demands many prerequisites, such as a business-friendly environment, a well-established legal system, a clean administration and open markets (Sobhiyah *et al.* 2009). Given the high-risks involved and the lack of favorable environment needed, many local governments usually provide supports (government guarantees) in promoting the success of PPP projects to the extent allowed by laws, policies, and their capacities (Zhou 2004). However, determining a reasonable

government guarantee for concession contract is a complicated issue. As too many guarantees provided by the government would decrease social welfare, increase project financing costs, and even induce government credit risks, while too few guarantees provided may make the project unfeasible in economic viability (Sobhiyah *et al.* 2009). Thus, a comprehensive and reasonable government guarantee structure is necessary for the success of PPP projects. This paper aims to take a closer look at the government guarantees in PPP projects through content analysis of cases, and explore management implications for determining appropriate government guarantees for concession contract. The study is believed to provide governments with practical experiences to design equitable risk sharing scheme and to benefit the private investor from effectively mitigating and managing risks in future PPP projects.

* Corresponding author. E-mail: zjyelinxu@163.com

2. LITERATURE REVIEW

The government's goal in launching PPP schemes is to facilitate infrastructure development under risks acceptable to the private investor who would in turn gain "reasonable but not excessive" returns (Zhang, Kumaraswamy 2001). However, privatization of infrastructure involves political, economic, legal, and environmental dimensions (Zhang 2005). To achieve a "win-win" result for both government and private investor, PPP requires favorable con-

ditions. Longer-term uncertainties and wider-risk portfolios of PPP projects need substantial government guarantees to promote their success (Zhang, Kumaraswamy 2001). A comprehensive literature review (e.g. Lu 2006; Wang 2001; Liu 2004a) indicates that government guarantee may involve various aspects, such as political and legal guarantee, financing guarantee, construction and operation guarantee, and macro-economic environment guarantee as compiled in Table 1. Government guarantees have been extensively adopted in PPP projects

Table 1. A summary of government guarantees (GG) in PPP concession contract

Political and legal guarantee	GG1: Franchise right guarantee	The government promises don't retract franchise right in advance during the concession period. If, indeed required by public interests, the municipal government or its authorized department will provide reasonable reimbursement to the private investor.
	GG2: Legal risk guarantee	The changes of legal environment will inevitably change the rights and obligations of PPP participants, and affect the economic anticipation of concessionaire. When the legal changes bring the private investor economic loss beyond a certain extent, the government promise to compensate the private investor's losses.
	GG3: Administrative license guarantee	The local government promises that the project approval documents, such as government ratifications, licenses or consents needed in the development of projects, can be obtained smoothly.
	GG4: Free business guarantee	The government permits the private investor to operate other facilities within the prescribed scope so as to ensure the private investor can gain some additional operating income.
Financing guarantee	GG5: Loan guarantee	The government provide guarantee to the bank for private investor's debts, and convince that the private investor has the capability to make repayments on time.
	GG6: Provision of standby loans	When the business income is reduced to a minimum due to some reasons, the government will provide standby loans to repay the prior debts for the private investor.
	GG7: Stock capital guarantee	The host government promise to provide stock capital funds to the private investor.
Construction and operation guarantee	GG8: Non-competition guarantee	The host government provides competition protection to the private investor so as to guarantee the anticipated income. For example, the government promises not to build a secondary competitive project in a certain times.
	GG9: Raw material supply guarantee	The government guarantees to provide the raw materials needed in project construction and/or operation to the private investor.
	GG10: Operating revenue guarantee	The government promises to provide the private investor with minimum income guarantees in the aspects of minimum purchase amount, minimum purchase price, or/and minimum investment earnings.
	GG11: Force Majeure guarantee	The government provides some financial support to offset the uninsurable force majeure risks for the private investor.
	GG12: logistical support guarantee	The host government promises to provide logistical support to the private investor, including land, labor forces, and relevant necessary infrastructures such as roads, electric wires and communication facilities needed in the construction and operation of PPP projects.
Macro-economic environment guarantee	GG13: Tax preference guarantee	The local government promise to provide the private investor with guaranties on tax reduction and exemption.
	GG14: Inflation guarantee	When inflation exceeds the agreed margin, the government guarantees to reimburse the private investor by adjusting the concession price or/and extending the concession period.
	GG15: Foreign exchange guarantee	The government promises that the investors can exchange the project income into convertible currency and remit it abroad. If the exchange rate fluctuation exceeds the agreed margin, the government guarantees to share the losses incurred from the fluctuations of exchange rate, and provide investors with economic reimbursement.
	GG16: Interest rate guarantee	The host government provides the private investor with interest rate guarantee. When the increase of interest rate exceeds the prescribed percentage within the concession period, the private investor will obtain reimbursement from the government.
Other	GG17: Comfort letter	The comfort letter issued by the government is not legally binding, but is important in project financing as an intention guarantee.

* Adopted from Lu (2006), Wang (2001) and Liu (2004b).

across countries and sectors, such as North-South highway project in Malaysia, Karachi power plant in Pakistan (Kumaraswamy, Zhang 2001), Laibin B power plant in China (Wang, Tiong 2000), Rude-shur gas turbine power station in Iran (Sobhiyah *et al.* 2009), Huaibei power plant in China (Smith *et al.* 2004), and harbor tunnel in Sydney (Yeo 2003).

Early project practices also indicate that government guarantee is not only an important factor for improving the enthusiasm of private capital to participate in PPP projects, but can also greatly affect a PPP project's financial feasibility (Deng 2007). Take one of the most classic cases in the world, Channel Tunnel as an example, in order to enhance the project's resistibility to market risks, the UK and French government provided a series of guarantees to the private investor to ensure the tunnel's financial viability (Ke *et al.* 2008). These guarantees include: 1) competition protection guarantee: no-secondary facility will be built in next 33 years; 2) commercial independence guarantee: grant concession pricing right to the private investor; 3) long-term sales guarantee: establish interconnection with the railway network. Ke *et al.* (2008) considered that government guarantees adopted in this project set a good example for the implementation of subsequent PPP projects in the past decades. Despite the construction cost was overspent due to geological conditions and the present operating status is still not optimistic, the method for dealing with huge risks through government guarantee is appraisable.

Reasonable government guarantee structure is vital to PPP project's success. However, if the government guarantee is inequitably or inappropriately provided, or beyond the capacity of the government, PPP projects would fail (Xu 2010). A failing PPP project may further deter investors from investing in similar projects or in the same area and ultimately, the host government will suffer a greater loss in economic and social development (Tam 1999). Moreover, as the application of PPP in many areas hasn't been fully developed yet, many local governments lack necessary knowledge in PPP procurement and have less experience of concession projects than private investors (Deng 2007). The insufficiency of information can easily induce the governments to make undue or wrong decisions on government guarantees (Deng 2007). Take the most famous project, Sha Jiao B power plant in China as an example, the government provided excessive guarantees to Hehe power Ltd. of Hong Kong for attracting private capital, which

caused the government to assume 16.8 billion HK Dollar of exchange rate losses and 4.7 billion CNY of fuel cost escalation losses, while the private investor's internal rate of return during the concession period reached 38.8% (Cao 2006).

In order to take a closer look at the government guarantees in PPP projects, the remainder of the paper is organized as follows. The third section presents the background of 10 cases and the following fourth section deals with the relationship between government guarantees and corresponding project performance. Afterwards, the analysis and discussion of the ten case studies is presented. Finally the last section provides the conclusion remarks.

3. BACKGROUND OF SELECTED CASES

Case studies were selected as an appropriate mean for the research in identifying how government guarantees influence the success of PPP projects. It is considered the preferred research strategy when a "how" or "why" question is being asked about a contemporary set of events over which the investigator has little or no control (Laishram, Satyanarayana 2009; Yin 2009). A total of 34 PPP projects were first collected from journal papers, doctoral/master thesis, and news reports from official media. 10 of them were finally selected and studied in this study as they contained all the information as required according to the project selection criteria as follows:

(1) The projects have detailed information on government guarantees and their corresponding project performance can serve the purpose for an in-depth investigation;

(2) The projects cover different types;

(3) The projects are distributed in different cities and operated under different social, economical, political and legal environments;

(4) The data obtained can be triangulated to ensure the internal validity of the results (Yin 2009).

Their background information is summarized in Table 2. To improve the generality of research findings, these cases were selected from five different project types including water supply, sewage treatment, power supply, highway, and bridge as PPPs are widely used in these sectors.

4. GOVERNMENT GUARANTEES AND CORRESPONDING PROJECT PERFORMANCE OF SELECTED CASES

This section illustrates government guarantees provided in the above ten cases and their correspond-

Table 2. Background information of PPP cases selected

Case No.	Project name/ location	Project type	Project scale	Total investment	Construction period	Concession period	Concessionaire	Public sector	Source
1	No. 6 water plant of Chengdu, China	Water supply	400 thousand m ³ /day	106.5 million USD	2.5 years	18 years	Chengdu Tongyong water group	Chengdu municipal government	Xu (2004)
2	No. 9 water plant of Shenyang, China	Water supply	100 thousand m ³ /day	25 million USD	1 year	20 years	Hong Kong Huijin Ltd.	Shenyang water company	Liu (2004)
3	Bei Jiao sewage treatment plant, China	Sewage treatment	50 thousand km ³ /day	10 million USD	1.5 years	20 years	Beijiao sewage treatment Ltd.	Local municipal government	Lu (2006)
4	HuiJin sewage plant of ChangCun, China	Sewage treatment	390 thousand km ³ /day	39.7 million USD	1 year	21 years	Huijing Ltd.	Changcun municipal government	Zi (2005)
5	Laibin B power plant, China	Power supply	360 thousand KWH×2	620 million USD	2 years and 9 months	18 years	EDF consortium	Guangxi Zhuang autonomous government	Zhou (2004)
6	Sha Jiao B power plant, China	Power supply	350 thousand KWH×2	540 million USD	3 years	13 years	Hehe power Ltd. of HongKong	Guangshen Shajiao power Ltd.	Cao (2006)
7	Xiang Fan Highway of Hu Bei, China	Highway	185.4 km	541 million USD	3.5 years	35 years	Xiangfan highway Ltd.	Xiang Fan municipal government	Zhao (2002)
8	An-Jing Highway of Yun-Nan, China	Highway	39 km	210 million USD	2 years	26 years	China railway construction corporation Ltd.	Kunming municipal government	Ma (2004)
9	CiTong bridge of Quan Zhou, China	Bridge	1.530 km	36 million USD	1.5 years	30 years	CiTong bridge Ltd	Quanzhou municipal government	Ji (2006)
10	Nanjing No. 3 Yangtze River Bridge, China	Bridge	4.744 km	454 million USD	2.5 years	32.5 years	Nanjing No. 3 Yangtze River Bridge Ltd.	Nanjing municipal government	Li (2006)

ing project performances to present the impact of government guarantee on PPP projects' implementation. Various types of information on the 10 projects have been collected. Data collected in different means were thoroughly analyzed by content analysis, which contains a systematic analytic process of three steps, (1) identification of government guarantees provided in each project, (2) identification of their corresponding project performances, and (3) analysis of the relationship between government guarantees and their corresponding project performance (Song *et al.* 2013). The coding system for government guarantees, as shown in Table 3, follows the coding order in Table 1.

Seven out of the ten cases appear to be failure or less successful (as local government assumed excessive responsibilities, which actually exceed their risk management and sustainment capability). Three are seen as successful, or at least, as most of the project stakeholders are happy with their project performances. The criteria for measuring

project success include three dimensions (Khang, Moe 2008): (1) The efficiency of the implementation process (time, cost, technical goals and working relationship); (2) Products and service quality of PPP projects; (3) The satisfaction of stakeholders. To simplify the information of above projects, government guarantees and their corresponding PPP project performances were extracted and summarized in Table 3.

5. LESSONS LEARNED FROM CASES

To sort the findings reported above, the government guarantee can be classified into three categories.

(1) The government provided excessive guarantees to the private investor.

(2) The government provided appropriate guarantees to the private investor.

(3) The government provided insufficient guarantees to the private investor.

Table 3. A summary of government guarantees and corresponding project performance

Case No.	Guarantees provided by government	Project performance	Source
Case 1	<p>Critical government guarantee in Chengdu No 6 plant:</p> <ol style="list-style-type: none"> (GG2) – Legal risk guarantee – if the increase of capital investments or current expenditures caused by legal change fell within the pre-determined scope, the project company will assume the losses. Otherwise, the excessive portion will be assumed by Chengdu Municipal Government. (GG3) – Administrative license guarantee – the municipal government was obligated to help Project Company submit related project document and obtain the administrative license. (GG9) – Raw material supply guarantee – 1) if the raw water supply is not enough for the project company to produce required amount of clean water, such an event should be deemed as a force majeure event, and Chengdu Water Supply Company will pay additional force majeure fee to the project company in addition to paying the fee for the actually supplied water. 2) If raw water failed to meet the quality standards, then the project company would add or change the clean water treatment process or equipment to ensure clean water quality. However, the increased operational costs will be reimbursed by Chengdu Municipal Government through paying additional fees and/or extending the concession period. (GG10) – Operating revenue guarantee – Chengdu Water Supply Company and the project company signed a “take-or-pay” water purchase agreement, stipulating that the Water Supply Company will purchase 400,000 cubic meters of purified water at pre-determined price every day. (GG11) – Force majeure guarantee – Uninsurable force majeure risks, such as the risks arising out of policy changes or government acts, were borne by the government, otherwise jointly assume by the Project Company and Chengdu Municipal Government. (GG14) – Inflation guarantee – Inflation factors was considered in water price formula. The project company made an assumption on inflation rate within the whole concession period and determine the operational water price for each operational year according to that assumption; If the inflation exceeds the assumed inflation rate, the government guaranteed to reimburse the project company by adjusting the concession price or/and extending the concession period. (GG15) – Foreign exchange guarantee – The government guaranteed the private investor to convert the operating revenue into foreign exchange and remit it abroad. 	<p>Since the start of No. 6 B Plant, Chengdu Water Supply Company's daily capacity of water supply increased to 1,380,000 cubic meters. However, the economic situation had greatly changed from that of project decision-making stage, the demand for water used in industries and businesses declined dramatically. The water supply market turned from being insufficient to being in surplus.</p> <p>In order to consume the 400,000 tons of water produced by No. 6 B Plant every day, Chengdu Water Supply Company had to close No. 2 Plant with the capacity of 230,000 cubic meters/day and No. 5 Plant with the capacity of 150,000 cubic meters /day.</p> <p>Two third water fees charged by Chengdu Water Supply Company were used to purchase clean water from No. 6 B Plant. As a result, in the first year after B Plant started production, Chengdu Water Supply Company changed from making profits into having 150 million CNY in debts.</p>	Xu (2004)
Case 2	<p>Critical government guarantee in Shenyang No. 9 water plant:</p> <ol style="list-style-type: none"> (GG10) – Operating revenue guarantee (Fixed Investment Return) – This is a cooperation project between private investor of Hong Kong and government owned company of Chinese mainland. In this project, the Hong Kong investor invested 25 million USD, the Chinese mainland party undertook the construction and management of the Water Plant, and provided fixed returns to the Hong Kong party according to the contract at regular intervals. The agreed rate of investment returns was 18.5% from the 2nd to the 4th years, 21% from the 5th to the 14th years, and 11% from the 15th to the 20th years. The cooperation period was 20 years. As the contract specified the price and purchase amount of the tap water, the Hong Kong party assumed no risk. 	<p>Hong Kong CW Company recovered all investments during the first five years. By the end of 1999, Shenyang Municipal Government had paid 130 million Yuan to the investor, which accounted for 63% of the total investments. The average water price in Shenyang was 1.4Yuan/ton in 1996, but Shenyang Water Supply Company paid 2.5Yuan/ton to No. 9 Water plant. By 2000, Shenyang Water Supply Company's debt had reached more than 200 million Yuan.</p>	Liu (2004)
Case 3	<p>Critical government guarantees in Beijiao sewage treatment plant:</p> <ol style="list-style-type: none"> (GG10) – Operating revenue Guarantee – The government pays sewage treatment fee to the project company at the price of 0.35 Yuan/ton, and promised that the minimum amount of water supply is 70% of the designed water amount. If the actual amount of water supply is lower than 70%, the government will pay the sewage treatment fee to the project company at 70% of the designed amount. (GG11) – Force Majeure Guarantee – If the operation is delayed due to a force majeure event, the concession period will be extended automatically. (GG12) – Logistical support guarantee – 1) The local government promised to provide the project company with land use rights without charge. 2) The local government promises to build the water supply and discharge pipe network for the sewage treatment plant, and guarantees the completion of such ancillary engineering before the trial operation of the sewage treatment plant. 	<p>The project is generating considerable profits and has a promising future.</p> <p>However, it should be noted that the project company was willing to accept a low investment return guarantee (0.35Yuan/ton*70% of the designed water amount), because of high credibility of the local government.</p> <p>The private investor regarded that the government's credit standing is beneficial for decreasing policy risks of the investments and the investment costs of the project.</p>	Lu (2006)

(Continued)

Case No.	Guarantees provided by government	Project performance	Source
(Continued)			
Case 4	<p>Critical government guarantees in Huijin sewage plant:</p> <ol style="list-style-type: none"> 1. (GG8) – Non-competition guarantee – The municipal government promised to grant priorities to HJ Co., Ltd. in developing, building, and operating a secondary HJ sewage treatment project and/or the sewage re-utilization project. 2. (GG10) – Operating revenue guarantee – 1) The sewage discharge company should provide no less than 390,000 tons of sewage (i.e. “standard treatment amount”) to the HJ Co. Ltd. every day. If the “actual treatment amount” of the sewage of any month is less than the total sum of the “standard treatment amount” of that month, the sewage treatment amount will still be calculated based on the total sum of the “standard treatment amount” of that month. 2) The sewage treatment fee was 0.60 Yuan per ton in 2002 and is adjusted every year. 3) The municipal government pays the sewage treatment fee to HJ Co., Ltd with priority. If the sewage discharge company is unable to pay the sewage treatment fee to HJ Co. Ltd. the municipal government will allot special funds from the fiscal urban maintenance funds to make up the margin so as to guarantee HJ Co. Ltd. to receive the sewage treatment fee on time. 3. (GG12) – Logistical support guarantee – 1) The municipal government approved the sewage discharge company (representing the government) to assign HJ Co., Ltd. land use rights, and to provide conveniences to fulfill the land use right procedures. 2) The local government promised to provide HJ Co., Ltd with public facility services such as electricity, water, heat, gas, and communication facilities. 4. (GG13) – Tax preference guarantee – HJ Co., Ltd. can apply for tax reduction or exemption according to the preferential policies on public infrastructural projects. The rise of electricity price, taxes or other fees prescribed by the State will be absorbed by the Changchun municipal government. 5. (GG15) – Foreign exchange guarantee – If the exchange rate of RMB to USD on the “settlement date” is more than 5% lower than that on the contract signing date, the sewage treatment fee on the “settlement date” can be raised accordingly. 	<p>The project was opened officially at the end of 2000. However, since the middle of 2002, the sewage discharge company began to default the HJ’s sewage treatment fee. By the end of October 2003, the cumulative default treatment fee was up to 97 million CNY.</p> <p>In August 2003, the HJ project company brought an administrative lawsuit to the Intermediate People’s Court against Changchun Municipal People’s Government.</p> <p>After losing the case in the first trial, the HJ project company appealed to the Higher Court of Jilin Province. The project was then liquidated and bought back by the Changchun Municipal People’s Government.</p> <p>The main cause for the government to breach the concession contract lies in that the designed and guaranteed concession price was too high.</p>	Zi (2005)
Case 5	<p>Critical government guarantees in Laibin B power plant:</p> <ol style="list-style-type: none"> 1. (GG3) – Administrative license guarantee – Guangxi Government promised to provide the project company with all necessary coordinations and assistances upon government approval within the concession period. 2. (GG9) – Raw material supply guarantee – The fuel, i.e., the coal needed by the project company, was guaranteed and supplied by Guangxi Construction Fuel Limited Liability Company. 3. (GG10) – Operating revenue guarantee – Guangxi Power Company promised to purchase 3.5 billion KWH of minimum output of electric power every year from the project company, and transmitted electric power into power grids in Guangxi. The total electricity price was composed of two electricity prices. One was the electricity price for 3.5 billion KWH, which Guangxi Government guaranteed to purchase at a fixed agreement price. The other was the electricity price for the portion above the 3.5 billion KWH; the government guarantee the project company to recover project operation costs. 4. (GG12) – Logistical support guarantee – Guangxi Government promised to provide the project company with land, water supply, electricity supply, communications, roads, railways, etc. for the construction, operation and maintenance of the power plant without charge or at preferential prices. 5. (GG13) – Tax preference guarantee – The local government helped the project company to apply for the tax preferences prescribed by the central and local governments. 6. (GG14) – Inflation guarantee – In the event of any fuel price change, the electricity price could be adjusted. 7. (GG15) – Foreign exchange guarantee – The investor was guaranteed to convert the remaining money into foreign exchange and remit it abroad after deduction of expenses and payment of taxes. Meanwhile, if the exchange rate between RMB and the foreign currency was greatly changed due to government policies, the electricity price was allowed to be adjusted. When the margin of the exchange rate fluctuation was within 5%, the electricity price should not be adjusted; but when it was more than 5%, the electricity price could be adjusted. 	<p>The Laibin B Power Plant project, as the first experimental BOT project in China, was commonly praised for its specific methods of operation, and was granted a number of domestic and foreign awards on project financing. However, behind such honors was the unpleasant fact that Guangxi Government had to bear the high electricity price.</p> <p>Due to the promised electricity purchase amount and the adoption of the fixed electricity price system, the government carried a heavy burden for a long period after the formal operation of the project.</p> <p>In 2001, with the relieve of intense consumption of electricity around China, the average price of electricity supplied by the interconnected power plants within Guangxi was merely 0.28 CNY, but the price for the government to purchase electricity from Laibin B Power Plant was 0.39 CNY. The after-tax price reached 0.4685 CNY, much higher than the price of the electricity purchased from other provinces.</p>	Zhou (2004)

(Continued)

Case No.	Guarantees provided by government	Project performance	Source
(Continued)			
Case 6	<p>Critical government guarantees in Shajiao B power plant:</p> <ol style="list-style-type: none"> 1. (GG5) – Loan guarantee – The Chinese party promised to provide a standby loan to the foreign party on conditions that the project expenditures were higher than the project income. 2. (GG9) – Raw material supply guarantee – The Chinese party guaranteed to provide all coal needed for power generation at a fixed price. This guarantee actually excluded the project's energy price risk, supply risk, and part of operation cost overrun risk. 3. (GG10) – Operating revenue guarantee – The Chinese party promised to purchase a minimum amount of electric energy generated during the project operation period to exclude the major market risks of the project. 4. (GG10-1) – Operating income re-guarantee and raw material supply re-guarantee – Guangdong International Trust and Investment Company guaranteed the Chinese party's electric power purchase agreement and coal supply agreement. 5. (GG15) – Foreign exchange guarantee – During the concession period, 50% of the income from electric power sale in the project was paid in RMB; the other 50% was paid in foreign exchange. The RMB income was used to pay the costs for coal purchase in the project and other operation expenses incurred in RMB; the foreign exchange income was used to pay the project operation expenses incurred in foreign exchange, including the repayment of the project loans and profits to the foreign parties. Moreover, the Chinese party assumed exchange rate risk for the project operation costs and foreign exchange loans. However, the exchange rate risks for the foreign party's profits were shared by both parties, with 30% borne by the Chinese party, and 70% by the foreign party. 6. (GG17) – Comfort letter – A supporting letter issued by the government authority was used as an intention guarantee. 	<p>The successful transfer of Shajiao B Power Plant made it become the first completed BOT case in China, but the government bore too many risks during the concession period.</p> <ol style="list-style-type: none"> 1. High Rate of Investment Returns – Shajiao Power Plant's average price of electric power in the past ten years was 0.38 CNY/KWh, while the average price of electric power of other thermo power plants in the province was 0.235 CNY/KWh. It was estimated that the internal rate of return of the private party reached 38.8% within the concession period. 2. Foreign Exchange Risks – During the concession period, both HK Dollar and Japanese Yen were up-valued continuously. The government assumed 16.8 billion HK Dollar of exchange loss in total. 3. Raw Material Supply Risk – The contract stipulated that the government should provide all coal necessary for power generation at a fixed price. However, the coal price rose dramatically within the concession period. It was estimated that the Chinese party bore 4.7 billion CNY of fuel cost loss. 	Cao (2006)
Case 7	<p>Critical government guarantees in Xiangfan Highway of Hubei:</p> <ol style="list-style-type: none"> 1. (GG3) – Administrative license guarantee – For the purpose of supporting project construction, Hubei Provincial Government specifically formed a Xiangfan-Jingzhou Highway Commanding Department, composed of the vice governor as the commander and all key department leaders as the members. They actively coordinated with other local governments of the regions where the express way passes, and guaranteed the successful implementation of the project. 2. (GG8) – Non-competition guarantee – The government promised to prevent the construction of any other express ways parallel to the Xiangfan-Jingzhou Highway. 3. (GG10) – Operating revenue guarantee – The concession period was set at 30 years. If, within 30 years, the earnings gained by the project company were not sufficient to repay the loans and earn reasonable profits, the government promised to extend the concession period. 4. (GG13) – Tax preference guarantee – Within five years after completion of the project, business tax would be levied at a half rate, and income tax would be exempted. 	<p>The actual construction cost of the express way was 20 million CNY per kilometer, lower than the average expressway construction cost within the province. Presently, the express way is generating considerable profits and has a promising future.</p>	Zhao (2002)
Case 8	<p>Critical government guarantees in An-Jing Highway of Yunnan:</p> <ol style="list-style-type: none"> 1. (GG3) – Administrative license guarantee – The local government accomplished the relevant preliminary services in the project, coordinated and promoted all relevant government affairs, and timely obtained all approvals from the Central Government and the local government. 2. (GG5) – Loan guarantee – the government promised to provide all necessary assistances for the project company to get loans. 3. (GG8) – Non-competition guarantee – The government promised to provide the project company with competition protection during the concession period to guarantee the state income of the project. That is, the government would not approve any highway of the same direction to be built within 10 kilometers along An-Jin Expressway or any existing highway to be rebuilt or enlarged. 4. (GG11) – Force Majeure guarantee – Both parties were exempted from their respective liabilities and were able to extend the concession period. 	<p>The traffic volume in the project was far beyond the anticipated amount, and the project is operating smoothly.</p>	Ma (2004)

(Continued)

Case No.	Guarantees provided by government	Project performance	Source
(Continued)			
Case 8	<p>5. (GG12) – Logistical support guarantee – The government provided necessary roads and other necessary facilities required by the project, and guaranteed the supply of water, electricity and communication facilities to the project company during the construction and operation period. Moreover, the government was responsible for project-related land requisition and relocation of residents. The land needed in building the express way was provided by the government free of charge, and the project concession period commenced on the date when the land was provided. If the government was delayed in providing the land, the project company had the right to extend the concession period. Prior to the end of the concession period, the project company should own the project facilities, which can be mortgaged as long as such mortgage do not affects the normal operation of the project.</p>		
Case 9	<p>6. (GG13) – Preferential tax guarantee – Kunming Municipal Government was guaranteee to exempt the project company from taxes and local fees during the construction period.</p>		
Case 9	<p>Critical government guarantees in CiTong bridge of Quanzhou:</p> <ol style="list-style-type: none"> 1. (GG3) – Administrative license guarantee – Quanzhou Municipal Government approved the project company to build, develop and operate the bridge, and also granted a permit to use the land for bridge construction. 2. (GG4) – Free business guarantee – The government granted the project company the right to develop and operate the ancillary highway (the southern connecting highway of 2.3 kilometers). 3. (GG5) – Loan guarantee – Quanzhou Municipal Bureau of Public Finance issued the “Letter of Commitment on Repayment of Loans for the Quanzhou Citong Bridge Project” and convinced the bank that the project company is capable of making repayments on time. 	<p>The government’s supports and guarantees provided the project a good investment environment, and improved the project’s economic viability and financing feasibility. However, after the toll for Quanzhou Bridge, which is parallel to Citong Bridge, was cancelled in 2005, the operation of Citong Bridge faced a huge crisis. The traffic volume of Citong bridge was greatly decreased and the investments were therefore unable to be recovered.</p>	<p>Ji (2006)</p>
Case 10	<p>Critical government guarantees in Nanjing No. 3 Yangtze River Bridge:</p> <ol style="list-style-type: none"> 1. (GG1) – Franchise rights guarantee – The local government promised not to take back the concession right in advance within the concession period. When required by public interests, the government can take back the concession right in advance; however, it must provide reasonable reimbursements to No. 3 Bridge Company. 2. (GG3) – Administrative license guarantee – The municipal government provided necessary help for the construction and operation of the No. 3 Bridge project, and guaranteed the lawful approval for the land used of project construction. 3. (GG8) – Non-competition guarantee – 1) If Weiqi cross-river tunnel shared too much of the traffic volume of No. 3 Bridge, the municipal government would restrict freight vehicles through the tunnel. 2) The municipal government agreed not to build any highway bridge or tunnel project except the Weiqi Road cross-river tunnel before the traffic volume of No. 3 Bridge reached 80% of the maximum traffic volume forecasted in the “Feasibility Study Report on the Project of Nanjing No. 3 Yangtze River Bridge”. 4. (GG10) – Operating revenue guarantee – Nanjing Municipal Government guaranteed that the tolls for various vehicles pass through No. 3 Bridge would not be lower than those for Nanjing No. 2 Yangtze River Bridge during the same period, and the rises of tolls should not be lower than those for Nanjing No. 2 Yangtze River Bridge during the same period. 	<p>Since the project opened to the public in October 2005, the cumulative deficits have accounted to more than 100 million CNY (6.2CNY = 1USD). It is estimated that the deficits in 2010 was 40 million CNY. The causes for the deficits lie in the remote location of the bridge, the insufficient roads on either side of the bridge, the slow increase of traffic volume. The actual traffic volume only reached 62% of the predicted amount. For the purpose of reimbursing the financial losses incurred from insufficient traffic volume, the local government agreed to extend the concession period by 5 years.</p>	<p>Li (2006)</p>

Note: “Project company represents “private investor”.

An analysis of project performance indicates that the government guarantees provided in six cases out of the ten were inappropriate (excessive or insufficient). Five out of six cases provided excessive guarantees to the private investor and one provide inadequate support to its concessionaire as compiled in Table 4.

Table 4 indicates that governments assumed excessive responsibilities in half of PPP projects, which actually exceed their risk management and sustainment capability. It may be due to the fact that developing market/government, with imperfect legal and regulation systems and unstable market environments and greater investment risks, tends to make excessive commitments and guarantees to the private party for the purpose of attracting private funding (Deng 2007). However, such unreasonable government guarantees led to unsuccessful project performance to the PPP scheme as shown in the following cases:

- In Case 1, Chengdu Municipal Government not only assumed political and legal change risks but also bore market risk, raw water supply risk, and partial exchange rate risk. The risk sharing mechanism in this project is significantly unreasonable. Generally, a rea-

sonable sharing structure is that the private investor bears the price risk of raw water, while the market risks, directly arising from price fluctuations, were shared between the government and the private investor through a price adjustment mechanism. The private investor could transfer or mitigate such risks through signing a long-term energy and raw material supply agreement with the supplier. However, in this project, raw water supply risk was solely assumed by Chengdu Municipal Government, as well as all operating revenue risks. This resulted in the Chengdu Water Supply Company to use two third of the water fee revenue to pay for B Plant's clean water (Xu 2004).

- In Case 2, the average water price in Shenyang was 1.4 Yuan/ton in 1996, but Shenyang Water Supply Company paid 2.5 Yuan/ton to No. 9 Water plant. Since the government provided excessive guarantee on fixed rate of investment returns, the private investor recovered all principal of investments during the first five years, and would continue to recover profits in following 15 years (Liu 2004b).
- In Case 4, the government provided the private investor a purchase guarantee of no less

Table 4. Appropriateness of government guarantees provided in ten cases

Case No.	Project name/location	Government guarantee			Note
		Excessive	Appropriate	Insufficient	
1	No. 6 water plant of Chengdu, China	×			Excessive operating income guarantee Excessive raw material supply guarantee
2	No. 9 water plant of Shenyang, China	×			Excessive operating income guarantee
3	Bei Jiao sewage treatment plant, China		×		
4	HuiJin sewage plant of Chang-Cun, China	×			Excessive operating income guarantee
5	Laibin B power plant, China	×			Excessive operating income guarantee
6	Sha Jiao B power plant, China	×			Excessive operating income guarantee Excessive foreign exchange guarantee Excessive raw material supply guarantee
7	Xiang Fan Highway of Hu Bei, China		×		
8	An-Jing Highway of YunNan, China		×		
9	CiTong bridge of Quan Zhou, China			×	Inadequate competition protection
10	Nanjing No. 3 Yangtze River Bridge, China		×		

than 390,000 tons of sewage at the price of 0.60 Yuan per ton. The high revenue guarantee results in the sewage discharge company, representing the government, was unable to pay the sewage treatment fee to the private investor within two years of operation (Zi 2005).

- In Case 5, Guangxi Government promised Laibin B Power Plant to purchase 3.5 billion KWH of electricity per year at the price of 0.39 Yuan per KWH. However, the average price of electricity supplied by the other power plants in Guangxi province was just 0.28 Yuan. The excessive price guarantee became a millstone round the neck of the local government (Zhou 2004).
- In Case 6, the private investor's internal rate of return during the concession period reached 38.8%. While the government assumed 16.8 billion HK Dollar of exchange rate losses and 4.7 billion CNY of fuel cost escalation losses (Cao 2006).

Government guarantees can reduce risk but are not free of cost (Wibowo *et al.* 2012; Wibowo 2004). Excessive guarantees will lead to high performance costs for the government and prevent the concession agreement to be fulfilled smoothly. This has been verified by the above cases.

The governments usually do not know the full extent of contingent liabilities when providing guarantees, because they account and record guarantee costs only when guarantees come due (Wibowo 2004). In above five cases, operating revenue guarantee is the first risky government guarantee, which needs both sides' special attention, as nearly all projects with excessive revenue guarantees eventually fail or do not succeed. The second risky guarantee is raw material supply and the third is foreign exchange guarantee as shown in Table 4. According to the principle of risk allocation, risks should be allocated to the party best able to handle them, i.e. the risk bearer should be the one most able to prevent risk from occurring and able to minimize the consequences if risk does occur. However, it has never been easy to obtain an equitable risk sharing, as so many other factors also have strong impacts on it, such as bargaining power and negotiation tactics of practitioners, risk attitude, market compulsion caused by competition, cooperation history, and so on (Lam 1999). At the present, many local governments in China starve for private capital and lack necessary expertise and experience in PPP implementation. They usually tend to offer excessive preferential conditions to the private investors for attracting

private funding by promising fixed rate of investment returns, minimum purchase amount, and fixed price of products or services. These guarantees not only lead the private investor to have a high expectation on investment return rate, but also make the private investor less motivated to be efficient in project management or/and risk management because it believes that the local government will provide a downside protection for risk losses (Wibowo 2004). However, the fulfillment of such unreasonable government guarantee would be greatly influenced by the change of session of the local government, the conflict between central policies and local ones, and the change of market environment (Deng 2007). Thus, the rate for government's breach of contract is rather high and many projects were therefore liquidated, such as that in case 4.

Compared to developing markets, developed markets or regions have relatively mature markets, sound legal systems, and fewer state risks. In the developed markets, governments are usually only willing to bear the systematic risks and necessary commercial risks relevant to the projects (Zhao 2002). Take Hong Kong tunnel as an example, the franchise consortia of HK tunnel assumed risks related to construction, engineering, geology, environment, climate, financing, inflation, and cost escalation. The government provided guarantee on the risk of land acquisition; however, no guarantees or warranties are given with regard to the program for commencement or completion, tax exemption, minimum traffic flows, economic returns, and future competitive routes (Zhang, Kumaraswamy 2001). Similar projects located in western countries also have similar government guarantee structure.

The practices of above five cases confirmed that excessive guarantee would result in difficulties for the government to perform its obligation, and may even lead to project failure. However, inadequate government guarantee may also have a similar negative impact on project's implementation.

- Case 9: the government cancelled the toll for Quanzhou Bridge, which is parallel to Citong Bridge from 2005. The operating revenue of Citong Bridge is then declined immediately, and the private investor faced a huge financial crisis. It was evaluated that Citong Bridge's original investment recovery goal was unable to be achieved (Ji 2006).

Different from the above six failed cases, the government guarantee provided in Case 3 are relatively reasonable. Due to the good reputation of local government (means lower credit risk), the

private investor requested a relatively reasonable investment return guarantee i.e. 70% of the designed water amount at a price of 0.35Yuan/ton. The relatively equitable risk sharing promoted the success of this project to some extent. The project is currently operating smoothly. This case implies that the local government's high credibility may be beneficial for mitigating the investment risks and decreasing the private investor's requisition on government guarantee (Lu 2006). Wibowo (2004) and Irwin *et al.* (1999) also considered that one of the bests that a government can do to make a project more attractive without providing excessive guarantees is to formulate good policies and establish a favorable environment that generally reduce risks and raise expected returns.

In addition, the performances of cases 7, 8, and 10 indicate that the risk of the project itself is still the key factor for the government to fulfill the contract. No matter how enthusiastic the government is and how attractive its guarantees are, sufficient market study is still the prerequisite to the success of PPP projects (Wang, Tiong 2000). For example, due to inaccurate market forecast, Nanjing No. 3 Yangtze River Bridge of case 10 suffered a huge market risks. Although the government provided concession price guarantee and non-competition protection, the actual traffic volume only reached 62% of the designed volume due to the remote location of the bridge, insufficient roads that connect the bridge, and the slow increase of traffic volume (Li 2006). Since it was open to the public in October 2005, the cumulative deficits of the project have reached more than 15 million USD in past four years (Li 2006). On the contrary, the actual traffic volume of cases 7 and 8 are far more than anticipated; the projects are receiving considerable profits and have promising futures (Zhao 2002; Ma 2004). These three cases imply that government guarantees should not be deemed the only tool to ensure the success of PPP projects, which is more greatly dependent on the financial viability of projects themselves.

6. CONCLUSIONS

PPP model offers a viable vehicle for accelerating the pace of infrastructure construction and economic development. However, not all projects are successful. In this study, ten typical PPP examples were selected and analyzed to explore root causes behind successful implementation of PPP projects from the perspective of government guarantee.

Three valuable experiences were learnt, which include:

1. There are a total of 17 different government guarantees available. However, operating revenue guarantee, raw material supply guarantee, foreign exchange guarantee and competition protection guarantee are the four most common guarantees adopted in China's PPP concession contracts.
2. An analysis of 10 PPP cases reinforces that government guarantees can reduce risk but are not free of cost. Excessive guarantees will lead to high performance costs for the government and prevent the concession agreement to be fulfilled smoothly.
3. The economic viability of the project self, instead of government guarantees is the key factor for the success of PPP projects. Well-established regulatory framework and favorable project implementation environment are beneficial to decrease the private investor's requirement on government guarantees.

The result from the case studies indicate that both private and public sectors need to have a better understanding of risk sharing in order to develop a reasonable guarantee mechanism/structure and enable the project to generate better outcomes. Moreover, there is a limitation in this research. The case studied may not precisely reflect the generalized features of PPP projects in China. Further research is needed to verify the research results obtained.

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