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An Analysis of Transitional Public-Private Partnerships Model in China: Contracting with little recourse to contracts

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Abstract

Since 2013, the Chinese government has attempted to make a transition from user-pay PPP to government-pay PPP systems with the aim of facilitating infrastructure investment and government transformation. Whilst the application of government-pay PPP systems can considerably expand the areas where PPPs are suitable, the lengthy procurement time experienced in the implementation of similar systems (e.g., Private Finance Initiative (PFI)) presents a tough challenge to Chinese procuring authorities who are under increasing pressure to get the earmarked PPP projects off the ground swiftly to stem the downward pressure in the economy. The first PFI-ish project in China, the Anqing Urban Road PPP project, has been successfully tendered in May 2015 with an impressive record on procurement time. Through the scrutiny of this project, it is found that speedy procurement is achieved by leaving some of the major risks ill-defined and vaguely allocated in the tender document. However, this apparent high risk exposure did not deter investors. This research maintains that the greater risk tolerance revealed among SOE-led investors should be attributed to the power structure embedded in China's administrative system. Whilst leveraging this mechanism can reduce transaction costs, it could hold back the participation of private investors in future Chinese PPP projects.

Keywords

Public-Private Partnerships, China, informal control mechanism, procurement time, PFI

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Introduction

Public-Private Partnerships (PPPs) have been employed worldwide as a mechanism to usher private capital and expertise into the provision of public services and infrastructure assets (National Audit Office, 2015; United Nations Economic Commission for Europe, 2008; US Department of the Treasury, 2014). Since the time Build-Operate-Transfer (BOT) gained momentum as an infrastructure delivery system in mid-1980, China had started its experimentation with this system to channel foreign direct investment into the construction and operation of Shajiao B power plant in Shenzhen city (Sachs et al., 2007). According to the WB/PPAF PPP database, there are 1,269 (concession and greenfield) projects implemented in China over the period 1990-2014. The Chinese PPP market received another boost recently. In the 3rd Plenum of the 18th Chinese Communist Party Central Committee in Nov 2013, the Chinese government set out the vision of expanding the applications of PPPs in infrastructure investment. A series of ambitious plans and measures have been announced since then to promulgate PPPs from top down and as many as 1,043 projects (1.95 trillion RMB in investment value) identified as potentially suitable for PPP models by China's central planner, National Development and Reform Commission. With huge commercial opportunities lying ahead in this fast growing market, there is a need for the global PPP community to deepen the understanding of how and why Chinese PPP systems work in practice, thereby positioning themselves correctly in the value chain of this market.

In this wave of PPP investment, the Chinese government has dual goals: in the short term, to offload debt from the government account to corporate accounts through PPP arrangements; in the long run, to precipitate the transformation of public investment from asset-focused to service-focused. The former is primarily achieved through the Transfer-Operate-Transfer model, while the latter has to rely upon PPP models that enable the government to purchase asset-based services from private suppliers (e.g., Private Finance Initiative (PFI)). The current research explores how

the Chinese government can overcome barriers in the process of ushering in the first PFI-style PPP model in China.

Generally, PPPs provide a contractual structure to allow the private investor to undertake works normally executed by the government using their own capital in hopes of recouping the investment via delayed payments that are funded by user charges, government budgets or third party revenues. In practice, PPPs have two subsystems: government-pay (e.g., PFI) and user-pay (e.g., BOT) (Chang and Chou, 2014; World Bank, 2014). As regulated by different laws in France, Brazil and China, two systems exhibit distinct features. Under user-pay systems, the key test for project viability is to what extent the capital investment can be covered by the revenue from project users while maintaining a non-negative social surplus in cost-benefit analysis. Yet, fully self-financeable projects are rare in practice. Miscellaneous supporting measures (e.g., minimum volume guarantee, direct subsidy and revenue sharing mechanism) are often used by procuring authorities to spur market interest (Engel et al., 2014). By contrast, government-pay systems emerged as an alternative route for public service provision, so the best justification is grounded in efficiency improvement. Of the 700 plus PFI projects, the vast majority were contracted through a variant of PFI, known as design-build-finance-operate (DBFO), under which the private investor's return is made dependent upon the availability of project assets and the performance of services provided. The robustness of output-based payments is built on two conditions: output specifications must be complete enough to cover every aspect of project output and fairly priced to provide strong incentives for desired behaviour. Both conditions require intense negotiations between parties, making the procurement process particularly lengthy. According to a comprehensive review of PFI by HM Treasury (HM Treasury, 2012), "[a]verage PFI procurement times, from initial project tender to financial close, have stubbornly remained at around 35 months"

(p.38). Given that Chinese procuring authorities were under pressure from the central government to get projects off the ground swiftly, this weakness could present a major hindrance to the transition from user-pay to government-pay PPP systems. Since the first PFI-style PPP project in China, the Anqing Urban Road Project (Anqing project, hereafter), was successfully tendered in May 2015, this research takes a positivist's perspective to explore in what ways the concern of lengthy procurement time has been tackled in the project and discuss what that could implicate for other Chinese PPP projects.

It is found that the Anqing project is a hybrid model, possessing the features of both BOT-style and PFI-style PPP systems. Whereas the investment return is dependent upon the performance of project output, the construction work is guided by input-based (rather than output-based) specifications. Procuring a PPP project in six months is an impressive record, but it also begs a question: is it a model that other local governments should imitate? This research maintains that the outcome of fast delivery is achieved by leveraging the power structure embedded in China's unique political system, which enables Chinese State-Owned Enterprises (SOEs) to negotiate with procuring authorities on equal footing without contractual protection. The major contribution of this research is to reveal how this unique mechanism has facilitated the implementation of government-pay PPP projects in China with the effect of reducing *ex ante* transaction costs. This research represents an effort to expand the construction holdup literature (Chang, 2013a; Chang, 2012; Chang and Ive, 2007a, b; Chang and Qian, 2015b; Ive and Chang, 2007) to include the effect of business environment, which can eventually lead to building an integrated understanding of construction procurement design from the perspective of bargaining power.

Literature Review

The nature of this research concerns the study of mechanisms by which PPPs can be driven to function. Within literature, there are three generic mechanisms for inter-organisational coordination: legal enforcement, reputations, and relationships (MacLeod, 2007).

First, in economic analysis, the "default model" of contracting behaviour is Principal-Agent theory, where the order of a contracting process is maintained by two conditions (Laffont and Martimort, 2001): incentive alignment (i.e., making parties feel it desirable to choose the action that maximizes the joint output of parties) and enforceability of contractual terms by a third party (i.e., disputes resolved cost-effectively by a party with legal enforcement power [e.g., arbitrator, court] in accordance with the agreed-upon terms). As encapsulated in Engel et al. (2014), PPP research working in this paradigm has made a significant advancement. Engel et al. (2001) develops a new contracting method to allow the concession duration to vary with the project revenue, while Iossa and Martimort (2012) formally prove that the benefits of service bundling can make the DBFO model outperform conventional procurement in efficiency terms. On the empirical front, sophisticated econometric models have been employed to explain why renegotiations have frequently occurred (Guasch, 2004; Guasch et al., 2008). The logic of the Principal-Agent theory (Laffont and Martimort, 2001) or more broadly contract theory (Bolton and Dewatripont, 2005) dominates the analysis. Under this framework, the central mechanism lies in the use of incentive-compatible contracts that emphasize "sharp in by clear agreement and sharp out by clear performance" (p.738) (Macneil, 1974). There are two inter-related issues at hand:

1) The contract may be strategically designed to be incomplete. In organisational economics (Gibbons and Roberts, 2013), an essential distinction is made between complete and incomplete contracting. A construction contract is said to be incomplete if some contingencies are not well stipulated in contract clauses (Chang and Ive, 2002). Theoretically, the owner has to trade off the

degree of contractual incompleteness against the frequency and severity of change orders and the attendant transaction costs (Bajari and Tadelis, 2001; Chang and Qian, 2015a).

2) Empirical evidence reveals that there is high variation in the enforcement cost of contracts across countries (Djankov et al., 2003), so contracts are not always the most effective choice for the governing of transactions. The contract enforcement gap arising from both causes will create room for non-legal enforcement mechanisms.

Apart from legal reliefs, traders can fall back on reputations or relationships in enforcing contractual obligations (MacLeod, 2007). In Axelrod's term, both reputations or relationships can "*enlarge the shadow of the future*" (p.126) (Axelrod, 2006), making cooperation become a dominant strategy for traders. Incorporating the future return or penalty into the current decision can, on the one hand, increase the range of random shocks under which the contract can enforce itself (known as "self-enforcing range) (Klein and Leffler, 1981) and, on the other, reduce the likelihood of occurring opportunistic exploitation of one's vulnerability (Klein, 1996). Actually, there has been evidence that the enforcement of PPP contracts may resort to informal control mechanisms (Caldwell et al., 2009; Parker and Hartley, 2003; Zheng et al., 2008), which are characterized by open communication, information sharing, trust, and cooperation (Poppo and Zenger, 2002). These two mechanisms work complimentarily with legal enforcement in most commercial transactions and also in PPP transactions. If used properly, formal and informal mechanisms can buttress each other (North, 1990). The choice of PPP governance is sensitive to institutional environments (Cunha Marques and Berg, 2011; Essig and Batran, 2005). China's unique public administration system should have a fundamental impact on the way Chinese PPP systems are run.

Before 2013, China had only user-pay PPP systems, officially known as concession systems. Of the fourteen variants implemented so far (Adams et al., 2006), BOT is the most common form. To distinguish the new arrival of government-pay PPP systems from the preexisting concession systems, PPP is a term reserved for the former in China. However, to harmonize with the international terminology, PPP refers to both systems in the current research. In the thirty-year history of implementation, PPP investment in China comes in three waves with SOEs playing an increasingly pivotal role (Mu et al., 2011). A weak legal system has been identified as the key inhibitor to construction in general (Sha, 2004) and PPP development in particular (Chan et al., 2010; Chen and Doloi, 2008). Low trust in the enforcement of legal obligations in China could either scupper PPPs as a viable procurement system or precipitate the development of alternative enforcement mechanisms. On account of the prevalent use of PPPs in China in recent decades, there must be a mechanism sustaining its working in China. As reported in the literature, PPP procurement is fraught with opportunistic behaviour, which could originate from the investor side (Chang, 2013a; Chang and Ive, 2007a; Cruz and Marques, 2013; Lonsdale, 2005; Ubbels and Verhoef, 2008) or the government side (Guasch and Straub, 2009). In China, the government is in a dominant position, so post-contract exploitation from the government could present a real concern to investors. Under this environment, state-owned enterprises (SOEs) have a competitive edge relative to private investors (Lu et al., 2013): first, from the perspective of procuring authorities, commissioning PPP projects to SOEs can lower the risk of being charged with privatizing state assets, as it could be deemed politically wrong by the staunch Leftist; second, SOEs have adequate financial and physical resources to undertake the work. This is why "social capital", instead of "private capital", is used to reflect the active role of SOEs in the current Chinese PPP market. Different from prior attempts to understand the evolution of PPP environment at the

institutional level (Matos-Castaño et al., 2014; Zhang et al., 2015), the current research is concerned with the micro-analytical issues, where the context-specific nature of power relations should be properly addressed (Chen and Hubbard, 2012). Whereas power provides a useful analytical lens, it could become tautology if the source of power is not specified (Williamson, 1995). In the literature of construction holdup problems (Chang, 2013a; Chang, 2012; Chang and Ive, 2007a, b; Chang and Qian, 2015b; Ive and Chang, 2007), the concept of bargaining power is operationalized in terms of quasi rent (the return in excess of the minimum required by the trader to continue with the transaction (Milgrom and Roberts, 1992)).

In transaction cost economics, one of the most influential approaches to organisational analysis, bargaining power balance occupies the central ground in explaining the root cause of transaction costs that matter in comparing alternative governance structures (Chang and Ive, 2000; Williamson, 1996). Efficiency can be assured by resorting to market competition if switching to an alternative supplier incurs little loss during the contracting process. However, the difficulty of switching increases as the amount of specific investment is locked into the transaction. Quasi rent is a general measure for one party's incentives to complete the transaction (Klein et al., 1978). The differential in quasi rents of two parties is a decisive factor for bargaining power in post-contract negotiations (Chang, 2013a; Chang, 2012; Chang and Qian, 2015b). In general terms, the construction owner has to face increasing bargaining disadvantage as the construction work progresses on site (Chang and Ive, 2007b). Given the incompleteness of the contract, uncertainty could upset the original transaction (Chang and Ive, 2002). The prevalence of change orders is a case in point (Alnuaimi et al., 2009; Hsieh et al., 2004; Ibbs, 2005).

The cost of switching to an alternative supplier can serve as a good measure of quasi rent in the construction context (Chang and Ive, 2007b). This cost is also identified as a major

contributor to holdup problems in western PPP procurement (Ball and King, 2006; Lonsdale, 2005). The greater the loss incurred in changing the trading partner, the less bargaining power one has in negotiating with the partner. Nevertheless, owing to the dominance of the Chinese government over other parties, this reasoning may not have a good predictive power in the Chinese PPP context. Inspired by the practice in the Anqing project, the current study attempts to enrich this line of inquiry by analyzing the role of external power structure in balancing out the appropriability hazards from the government side and linking this benefit to shorter procurement time achieved in the project.

The Method

Case study is chosen as the research method because the issues of interest in this research satisfy Yin's three conditions (p.2) (Yin, 2013): (1) the central question is a why question, i.e., why has the Anqing project been procured faster than similar government-pay projects in western countries?; (2) the investigator has no control over the way the project was procured; (3) the focus is a contemporary phenomenon, i.e., the first PFI-ish project in China just tendered in May 2015. Apart from the aforementioned research question, there are four other elements in the research design (p.27): (1) this research has two propositions: the shorter procurement time was achieved at the expense of contractual completeness and, given the fact of the tender being successful, the uncertainty arising from contractual incompleteness was not deemed excessive because the investors did not feel vulnerable in negotiations, should the uncertainty materialize. (2) this research takes the Anqing project as the unit of analysis with the aim of exploring what mechanism has made it work; (3) the logic linking the data to the propositions runs as follows: through the scrutiny of tender documents and comparison with standard PFI contracts, it is expected to find that the allocation of some significant risks was left ill-defined at tender in order to save

procurement time, but that does not deter some investors as a result of their strong bargaining position in the face of the procuring authority, which can possibly be shown by examining the socio-political resources of these investors; (4) the criteria used in judging the quality of arguments are through the comparison of alternative explanations in terms of logical plausibility, thereby making suggestions for further studies.

The Case Study: Anqing Urban Road PPP project

Project background

Anqing is a municipal city in the southwest of Anhui Province. To upgrade a main traffic artery of the city to urban A-grade road, the city government decided to utilize private expertise and capital to expedite the progress of the project. The road starts from the city airport and crosses the city from north-west to south-east with a total length of 14.93 kilometers, 29% of which are bridges and tunnels. Prior to choosing the PPP route, the government completed the engineering design of the project, so both drawings/specifications and bills of quantities are available to potential bidders at tender. The prospective investor is responsible for the financing, construction and operation of the project. The key information and transaction structure of the project is exhibited in Table 1 and Figure 1.

In 2014, the Anqing project was earmarked by the Ministry of Finance as one of the pilot projects for trialing a government-pay PPP system in China. In principle, the decision on the choice of government-pay PPP system should be justified by a practical test, known as the value for money (VfM) assessment (HM Treasury, 2006) in which the new private finance model is compared against the conventional procurement to see if there is a cost savings. In comparing relative efficiency, a critical factor that could tip the balance from one route to the other is the cost of risk transfer. As one of the most complicated procurement systems, PPP projects are susceptible to a

wide variety of risk impacts (Ke et al., 2010; Tiong, 1990). The risk premiums required by the investor are a decisive factor for the relative desirability of PPPs. As the Anqing project was a pilot project, value for money was not a primary concern. The key issue was how the government can secure investment speedily while minimizing road service charges. The government introduced a competitive tendering process to reduce the payments to the winning investor. Squeezing the investor's profit margin can achieve better value for money, but it also constrained the room for shortening procurement time. In an output-based procurement, time is mainly spent negotiating output specifications, related risks and their prices, so speedier procurement is only possible by leaving some of the requirements and risks vaguely defined when tendering the project. Certainly, this comes at a cost: the investor will demand a higher compensation for the uncertainty, which might totally undermine the project's viability. In the presentation of the case, this research first elaborates on the competitive mechanism used and secondly investigates the soundness of risk allocation to set the stage for the analysis of procurement time.

How to maintain competition pressure?

To understand how competition works in the Anqing project, it is useful to introduce a mathematical model to illustrate the crucial linkage between risks, pricing, and payments. The rules of the tender consist of four parts (see Figure 2): (1) the estimated construction costs and relocation cost are provided in the tender document, which are 1.526 billion RMB and 0.45 billion RMB respectively; (2) the total (non-discounted) availability payment (*TAP*) should not exceed 4 billion RMB; (3) the percentage of annual availability payment to total availability payment (d_t, t=3,…,13) should not exceed 15% a year in the first six years and 10% in year 7 to 13; (4) annual performance payment for operating and maintaining the road (PP_t, t=3,…,13) must not exceed 10

million RMB. Under these rules, the bidder's revenue-related decision variables can be denoted by a row matrix $\boldsymbol{D_R} = \{TAP,\ d_t, PP_t\}, t = 3 \cdots 13.$

In bidding for this project, the investor *k* has several factors to consider. First, part of the total capital investment involves the cost of relocating residents from the construction site, which is capped by a fixed payment of 540 million RMB to the government. Second, according to the bills of quantities provided by the government, the construction cost (*CC*) is likely to center around 1.526 billion RMB, which is incurred in year one and year two separately (CC_t, t=1,2) and subject to a random risk $\xi_{c,t}$ with mean $\mu_{c,t}$ and variance $\sigma_{c,t}$, i.e.,

$$CC = \sum_{t=1}^{2}(CC_{c,t} + \xi_{c,t}) = 1.526 + \sum_{t=1}^{2}\xi_{c,t} \tag{1}$$

Third, the operating cost (*OC*) can be expressed in a similar way, i.e.,

$$OC = \sum_{t=3}^{13}(OC_{o,t} + \xi_{o,t}) \tag{2}$$

where $OC_{o,t}$ and $\xi_{o,t}$ indicate the operating cost in year *t* and the random shock that could impact upon it. For the investment consortium *k*, after choosing annual availability payments (AP_t) and annual performance payments (PP_t), the expected net present value of the project cash flows $E[NPV^k]$ becomes

$$E[NPV^k] = \sum_{t=1}^{2}\frac{-0.54 - (CC_t^k + \mu_{c,t} + RP_{c,t})}{(1+r)^t} + \sum_{t=3}^{13}\frac{AP_t + PP_t - (OC_t^k + \mu_{o,t} + RP_{o,t})}{(1+r)^t} \tag{3}$$

where $RP_{c,t}$ and $RP_{o,t}$ represent the extra prices (i.e., risk premiums) which the investment consortium *k* could charge for bearing the risks $\xi_{c,t}$ and $\xi_{o,t}$.

In the tender document, the government has already laid down the rule that the winning social capital investor must form a joint venture company with the government's own investment company (named "*Anqing city investment company*") with an equity contribution ratio of 88%

(investor) to 12% (government). Under this capital structure, the social capital investor can make a profit from his investment in the consortium company and from the contracting service to the project company. Generally, the consortium offloads the entire risks ($\xi_{c,t}$ and $\xi_{o,t}$) through back-to-back contracts with social capital contractors to perform the construction and operating works (Chang, 2013b). What the contractor may require for return (π^{ks}) is proportional to the standard deviations of the risks (Chang, 2013a; Chang, 2014; Gibbons, 2005):

$$\pi^{ks} = \frac{1}{2}\gamma^{ks}\left(\sum_{t=1}^{2}\frac{b_c^2\sigma_{c,t}^2}{(1+r)^t}+\sum_{t=3}^{13}\frac{b_o^2\sigma_{o,t}^2}{(1+r)^t}\right) \tag{4}$$

where γ^{ks} represents the social capital investor *ks*'s Arrow-Pratt coefficient of risk aversion. The superscript *ks* is to indicate that the social capital investor is just a leading member of the investment consortium *k.* For the investor *ks*, the profit function is therefore

$$E[NPV^{ks}] = 0.88E[NPV^{k} - \pi^{ks}] + \pi^{ks} \tag{5}$$

In the bidding, the social capital investor *ks* has to make two decisions on behalf of the consortium *k* that is not formed until he wins: one is related to the revenue required from the government $\boldsymbol{D_R}$ and the other is associated with the risk premiums required by the consortium, denoted by a row matrix $\boldsymbol{D_C} = \{RP_{c,t}, RP_{o,t}\}, t = 1\cdots 13$.

The contract is placed through a competitive process, so the investor *ks* has to trade off profit margin against winning probability in considering the decision variables $\boldsymbol{D_R}$ and $\boldsymbol{D_C}$. Suppose there are *n* bidders participating in the competition. For ease of notation, the setting of symmetric common-knowledge auction game is followed (Krishna, 2009), namely that all bidders have (1) the same information set and (2) the similar construction capability, reflected in the same cumulative probability distribution of bidding prices, *G*. The bidder *ks* selects a price NPV^k on

behalf of the consortium k and he wins if $NPV^k \le NPV^j \quad \forall\, j \ne k$, which corresponds to the probability of winning $\left(1-G(NPV^k)\right)^{n-1}$. To simplify, it is assumed that the agency problem is not present, namely that the investor *ks* pursues the maximization of the consortium *k*'s profit while considering the likelihood of winning the tender:

$$\begin{aligned} &\max_{\mathbf{D}_R,\mathbf{D}_C} \; E\left[NPV^k\right]\left[1-G(NPV^k)\right]^{n-1} \\ &\text{s.t.} \quad (1)\; TAP=\sum_{t=3}^{13} AP_t \le 4{,}000{,}000{,}000 \\ &\qquad (2)\; AP_t / TAP \le 15\% \quad t=1\cdots 6 \\ &\qquad (3)\; AP_t / TAP \le 10\% \quad t=7\cdots 13 \\ &\qquad (4)\; PP_t \le 10{,}000{,}000 \quad t=3\cdots 13 \end{aligned} \tag{6}$$

where all bidders are required to discount cash flows at the same rate of 8%. Despite no analytical solution, Eq.(6) can still unveil how competition works in this project for attaining better value for money: Whilst it is the investor's interest to set a higher NPV^k to increase profit, its benefit could be offset by a lower winning probability ($NPV^k \uparrow \rightarrow G(NPV^k)\uparrow \rightarrow (1-G(NPV^k))\downarrow$). As a result, auctioning off the project competitively can help the government achieve greater efficiency. However, competitive tendering does not guarantee that the project is able to secure an investor. Actually, PPP procurement is awash with tender failure (Chang and Ko, 2015) and renegotiation problems (Guasch et al., 2006; Guasch et al., 2008). Given a fixed cost envelope, the tender could fail if the risk allocation scheme proposed by the government is perceived to be too risky (i.e., both $\sigma_{c,t}$ and $\sigma_{o,t}$ in large variations). This is the issue to be addressed next.

Soundness of risk allocation

As emphasized in the mathematical model discussed previously, the degree of contractual completeness holds the key to understanding why the Anqing project can succeed in securing investment. Since HM Treasury has been working closely with China's Ministry of Finance for

three years (2012-2015) in the development of a strategy for introducing government-pay PPP projects in China, a judgment can be drawn by comparing Anqing's risk allocation arrangement with the practices recommended in the standardized PFI contract (HM Treasury, 2007). The analysis takes two steps: first, checks if significant risks are properly allocated; and second, if price adjustment mechanisms can provide an effective remedy for inappropriate risk allocation in the post-contract stage.

When it comes to risk allocation strategy, the Anqing project differs from the standard PFI project in one important aspect: the Anqing project's requirements are set out in the form of drawings and specifications and thus it represents an input-based rather than output-based procurement. Unlike the PFI under which the project is delivered to meet design parameters and output specifications, Anqing bidders can only respond to a given risk allocation scheme pre-determined by the government by varying the prices charged. Input-based procurement together with fixed risk allocation lead to a considerable shortening of procurement time (6 months) compared to the PFI average of 35 months (HM Treasury, 2012). Even after considering the fact that the detailed design is completed prior to tender, this record is still impressive. Yet, speediness normally comes hand at the expense of contractual completeness. As discussed in the research methods section, the evidence of contract completeness can serve as the first logical linkage in the case study.

First, the most significant risk in the project is the time and cost needed for relocating existing residents from the project site. This risk rarely appears in the normal PFI project, but could fundamentally change the viability of the project. Whilst the government caps the investor's direct exposure to 450 million RMB, there is a residual risk: the delay in relocation may spill over onto the completion time of construction and thus the timing of receiving availability payments. In

recent years, even in China, relocating residents has been increasingly difficult. There is no reason to be optimistic about the possible impact of this risk in the Anqing project. According to the project agreement, should this risk eventuate, the investor can receive a fraction of availability payment in proportion to the ratio of the value of work completed at the end of the 25th month (one month after the expected completion time (24 months)) to the total investment value (i.e., 1.9625 billion RMB). In current Chinese banking practice, the loan covenant contains flexibility to allow repayments to be made according to the money actually drawn down, so the project company is unlikely to run into cash flow problems because of this risk. Yet, the delayed receipt of payments will hit the shareholder's rate of return and thus the investability of the project.

Second, operating performance strongly depends upon the way the road is used, such as traffic volume and loadings of vehicles. The building of the new road in this project is expected to significantly simulate the local economy and thus to attract higher volumes of car traffic. This risk is not addressed in the tender document.

Third and utmost risk source lies in the occurrence of road excavation requested by other bodies for good cause and the liability of its impact on operating performance. The project agreement contains a provision on this risk: The government retains the right to authorize road excavation for the maintenance and repairs of underground pipelines passing through the project site and the project company must do his best to support the work. If negatively affected, the company's operating performance should be assessed by taking into account the impact of excavation work. Under this general term, how the impact of this risk could be shared between parties seems up in the air in the bidding stage.

Whilst contracting in these terms will expose the investors to considerable risks, the impact would be mitigated if payments can be fairly adjusted post contract. Over the long contract life,

variations may occur, so it is critical to ensure that value for money can be maintained in the pricing of variations during the operational phase (National Audit Office, 2008). In the PFI, small-value changes are normally priced according to an index-linked price catalogue annexed to the contract. However, large-value changes could be priced through a more sophisticated process (e.g., competitive tendering if the work involves low interface problems with the existing operator) or using various techniques, including value testing, market testing and benchmarking, with the assistance of technical advisors. In the Anqing case, government-initiated and investor-initiated changes are treated differently. If the changes are required by the government, the availability payment (TAP_{new}) is adjusted according to the ratio of new total capital investment (CC_{new}) to old estimate (CC_{old}) (i.e., 1.976 billion RMB).

$$TAP_{new} = TAP \times \frac{CC_{new}}{1.976} \tag{7}$$

However, if the change request is put forward by the investor for a justifiable reason (e.g., optimization of the construction process), the adjustment can be made by reference to

$$\begin{aligned} TAP_{new} &= TAP && \text{if } CC_{new} \geq CC_{old} \\ TAP_{new} &= TAP - (CC_{old} - CC_{new}) \times 0.7 && \text{if } CC_{new} < CC_{old} \end{aligned} \tag{8}$$

In other words, the investor is accountable for all cost overruns, but can share 70% of cost savings yielded from innovation. These mechanisms are mainly designed for variations and can provide little safeguard against unexpected losses arising from the risks of resident reallocation, traffic conditions and road excavation. What is more, unlike most PFI transactions where availability and performance payments are linked to a price index series that can best reflect the changes of relevant cost items in the market, only operating costs are indexed in the Anqing case, and thus the investor is exposed to interest rate risk in servicing the debt.

Given the aforementioned contract design and a vague risk allocation scheme, this project can still attract four serious bidders and successfully secure investment, which indicates that the price for taking these risks lies within the cost envelope of the government (the constraints in Eq.(6)). An intriguing question is: why has the project not been held back by the ill-defined risk allocation?

Explanation: external power balance structure

The procurement strategy of the Anqing project indicates that the transitional model emerges as an arrangement of convenience under the influence of the procuring authority's strategic goal and constraints. The Anqing project is among the first wave of pilot PPP projects in China, so the Anqing city government is under pressure to bid out the project speedily. Time pressure proves to be a decisive factor in the design of procurement mechanism. Procurement time can be shortened in the Anqing project owing to two reasons: First, completion of technical design makes it possible to tender the project on the basis of a complete technical design and bills of quantities so the project scope does not require negotiation. Second, there is no risk register provided and no negotiation allowed for risk allocation during the procurement process.

Compared to Government-pay PPP systems in western countries (see Figure 3(a)), the Anqing case has a different price formation mechanism (see Figure 3(b)). A PFI project is normally initiated in response to a set of high-level strategic goals, which guides the formulation of design and requirements. PFI procurement is time-consuming as the procuring authority needs to negotiate with the preferred bidder through a competitive dialogue whereby all risk sources can be clearly defined and allocated, and the price negotiated. Value for money should be recurrently checked during the process. If not, the loop should go one step backward to reconsider the

allocation of risks. In the meantime, if the outcome of negotiations makes the project unaffordable, there is a need to go two steps back to review the project scope, output specifications and service standards required, so as to cut back the project cost to satisfy budget. The iteration of the pricing loop in the competitive dialogue can pay off if the well thought-out payment mechanism becomes enforceable in the end.

Evidently, this is not the case in the Anqing project. With the risks combined, the bidders can only price the project at low precision, thus exposing themselves to greater hidden risks. Since the government retains discretion over how to compensate for the impact of relocation risk, traffic condition risk and road excavation risk on the payments, who bears the consequence of the worst scenario is out of the investor's control. The four bidding consortiums are all experienced in similar projects, and as such these risks should have been foreseen in the preparation of bids. Based on information obtained directly from the cost estimators of two bidders (including the winning bidder) in the Anqing project, there seems to be an agreement that the base cost estimate falls in the region of 3.5 billion RMB, so the upper limit of total payment, 4 billion RMB, is basically reflective of a markup of around 15%. Yet, what the winning bidder actually charges is close to the base cost of 3.5 billion RMB. This bidding behaviour supplies direct evidence that the vaguely-defined risk allocation is largely discounted. By western PFI practices, the risks discussed so far could have put off the investors from bidding as too high a risk premium could be added onto the bidding price. An intriguing question is how to square up the apparent high uncertainty with the fact that the project can still attract sufficient competition. This research contends that the power structure of the Chinese society holds the key.

In western business environments where economic logic dominates, it is the construction owner who is vulnerable to appropriability hazards in Oxley's term (Oxley, 1997). However, this

reasoning may not work in the Chinese PPP environment. As opposed to western governments which are overseen by elected parliaments, independent judicial systems and media, governments in China command supreme authority particularly in the economic arena. This peculiar system consigns economic bargaining power to the party with political power. In China's unique public administration system, power is generated by the place of the organisation in the ranking system, which is made up of a hierarchy of six levels, including section (ke), division (chu), bureau (jei), province (shen)/minister (bou) and state (guo). This system is not only applied to all levels of government, but virtually to all non-private bodies, including state-owned enterprises, universities, parliaments, associations, judicial institutions, and commissions. The head of the organisation holds a corresponding position in the Chinese Communist Party, in which political and thus economic power resides. Owing to this system, non-private Chinese organizations become comparable and the relative position in the rank serve as an indicator of power in inter-organizational negotiations. In the Anqing case, three of the four bidders are led by state-owned enterprises and the winner, Beijing Urban Construction Design & Development Group Co, is a subsidiary company of Beijing Urban Construction Investment & Development Co (BUCID), which is a publicly listed corporation but still under the direct control of Beijing city government. In PPP projects procured by Beijing city government, BUCID may assume the role of shareholder to project companies on behalf of the city government, while in PPP projects commissioned by other local governments, BUCID can play the role of social capital investor. In the ranking system, BUCID is equivalent to the Anqing city government and that puts both parties on equal footing in resolving disputes, which in turn can help them settle disagreements in mutually agreeable terms. For this reason, when it comes to the allocation of risk impacts under the Anqing government's discretion, BUCID is at no disadvantage in securing a fair deal. The implicit power structured

embedded in the administrative ranking system gives SOEs a unique strength in undertaking the risks that are not explicitly allocated in PPP contracts. The existence of this power structure could create an unintended benefit for Chinese PPP procuring authorities: with no need to nail down risk allocation to every detail prior to tender, procurement time can be considerably shortened. The underlying mechanism can be understood in light of the Coase theorem (Coase, 1960). In the world of Coasian bargaining, there is no need to spend resources settling the property right allocation ex ante as the optimal allocation of surplus can naturally come out ex post through frictionless bargaining. The efficiency (in terms of transaction costs) can be maintained because traders can call upon a no-cost bargaining mechanism to resolve disputes whenever needed. The availability of this (hypothetical) mechanism in a dynamic fashion is the fundamental reason why the Coase theorem could work. This research maintains that the "callable" mechanism embedded in China's power structure can serve the similar role of frictionless bargaining in reducing transaction costs in PPP procurement. With no fear of being exploited by the procuring authority, the SOE-led consortiums are more comfortable to sign into a contract with large room for negotiations in the enforcement stage. In the Anqing project, this mechanism is more significant than legal enforcement and relationships in enforcing the contract (see Fig.3(b)).

Alternative explanations and limitations

As explained in the research methods section, the criteria used in interpreting findings compares the plausibility of alternative explanations. Aside from the explanation of power structure, on *a priori* ground, there could be two alternative propositions: first, as in conventional procurement, opportunistic bidding could occur when the bidders try to secure work at an abnormal low price and seek compensation through renegotiations; second, the bidders exhibited no fear because

expropriation hazards from the government can be stemmed via bribery. The former seems more likely to be the case than the latter given the ongoing anti-graft campaign in China. Whilst this research is not able to test the plausibility of two competing explanations (power balancing mechanism v.s. opportunistic bidding) directly, there is some strong reason to believe that the explanation set out in this research is a more promising line of argument. Over the past two decades, user-pay PPP systems have been heavily employed in China. This market is characterized by two striking features: dominance of SOEs as investor and relative simplicity of the contract. In the extreme case, the contract of a multi-million RMB PPP project may only contain a couple of pages. There must be a fundamental force behind the prevalence of these peculiar practices. This research maintains that the key to reconciling the apparent incongruence between the complexity of PPP procurement and the simplicity of contractual arrangements lies in the exogenous power structure in China.

Implications

The Anqing project represents the first step China has taken to transform its PPP system from user-pay PPP to government-pay PPP model. Speedy procurement has been prioritized by the central government as utmost important. Owing to this project, the Anqing city government can obtain the finance of 450 million RMB to clear up the project site, which otherwise would come out of its own fiscal budget. The investment of 1.926 billion RMB into this project can provide a direct boost to economic growth with a price within the budget envelope, with all this achieved in a relatively short time. By these criteria, the Anqing project is successful. But, in terms of procurement design, there are several deficiencies: first, input-based procurement considerably limits the room of innovation; second, tendering the project with a fixed risk allocation scheme

reduces the possibility of achieving higher risk-bearing efficiency; third, leaving too much discretion over the liabilities of risk impacts in the government hand could create a disadvantage to private and foreign investors owing to the fear of appropriability hazards. Weighing up the pros and cons, this research argues that the Anqing model proves to be a workable solution that allows the Chinese government, central and local alike, to implement infrastructure projects swiftly via PPPs. Compared to the opaque transactions conducted through "local government financing platforms" (Lu and Sun, 2013), transacting through PPPs can make local governments more accountable for the investment decisions they make, which could curtail the leeway for corruption.

The Chinese central government looks set to keep pressing for fast delivery in the short run to meet its macroeconomic targets. For this reason, in spite of the deficiencies in its contract design, the Anqing model could be an imitable model for other local governments who endeavor to tap into PPP models to deliver their pipeline investment plans without laboring through the lengthy negotiation process (which is 3-5 times longer in PFI). As discussed before, this model relies on an implicit power balancing mechanism between SOEs and local governments, so only SOEs are well placed to handle the potential hazards. Sticking to the Anqing model can perhaps speed up the implementation of investment, but it will militate against the effectiveness of PPPs in facilitating China's transformation from an investment-focused to a service-focused government.

Conclusions

Since 2013, the Chinese government has strived to set in motion the transformation of Chinese economy into "a new normal", which signals an attempt to shift the focus of macroeconomic management target from quantity (e.g., GDP growth rate) to quality (e.g., sustainability or living standards). Against this backdrop, PPPs are embraced for dual purposes: in the short run, offload

debt from government balance sheet to corporate balance sheet in order to increase transparency and fiscal sustainability; in the long run, drive forward the transformation of government to be more service oriented. The Anqing project is regarded as the first PFI-ish project in China because the investor's return is explicitly tied to construction and operating performance. Compared to PFI projects, a distinguishing feature of this project is the much shorter procurement time, which is achieved by not permitting negotiation over risk allocation in the tendering process and leaving the allocation of some significant risks to the government's discretion. By western standards, vague contract design could lead to a failure in securing investment owing to the excessive risk premium required for accepting the uncertainty. However, the project turns out to the contrary: it can still attract serious competition. This research contends that a plausible explanation resides in the power structure shaped by China's administrative system, which enables SOEs to bargain with local governments on the equal footing, which in turn can mitigate the severity of appropriability hazards from the government. Whilst, from the perspective of procuring authorities, utilising this power balancing mechanism can reduce transaction costs, it could hold back the development of Chinese government-pay PPP systems in the long run.

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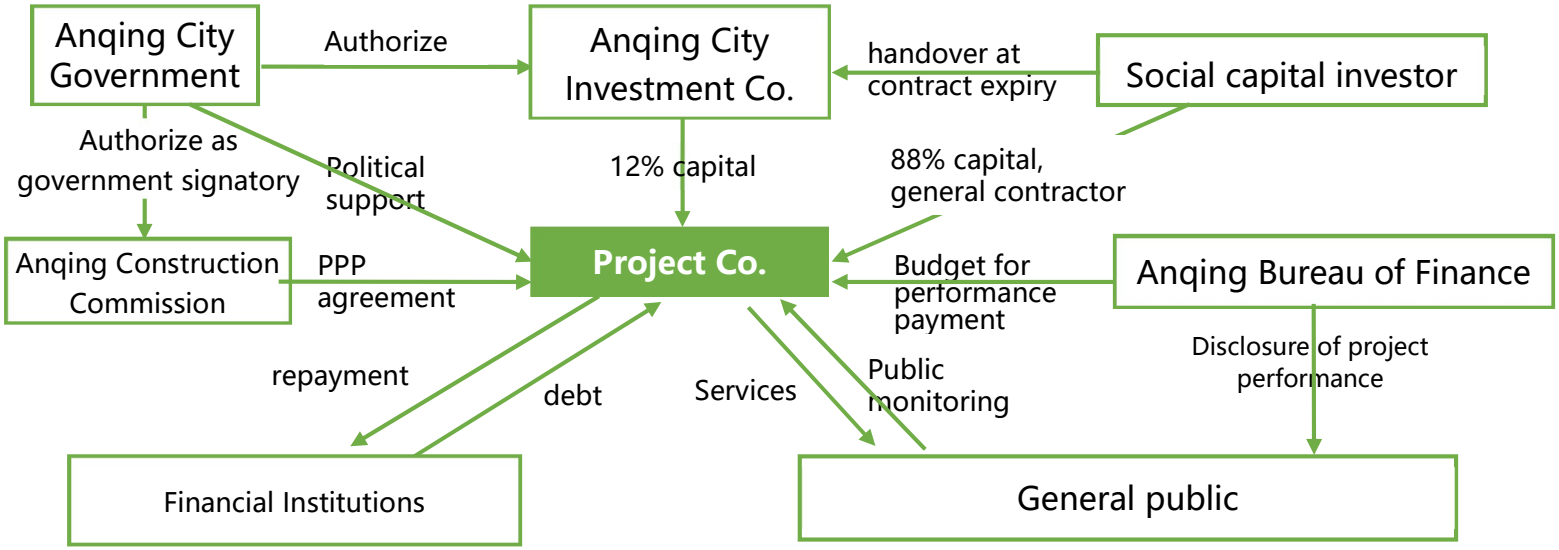


Figure 1 Transaction Structure of the Anqing Project

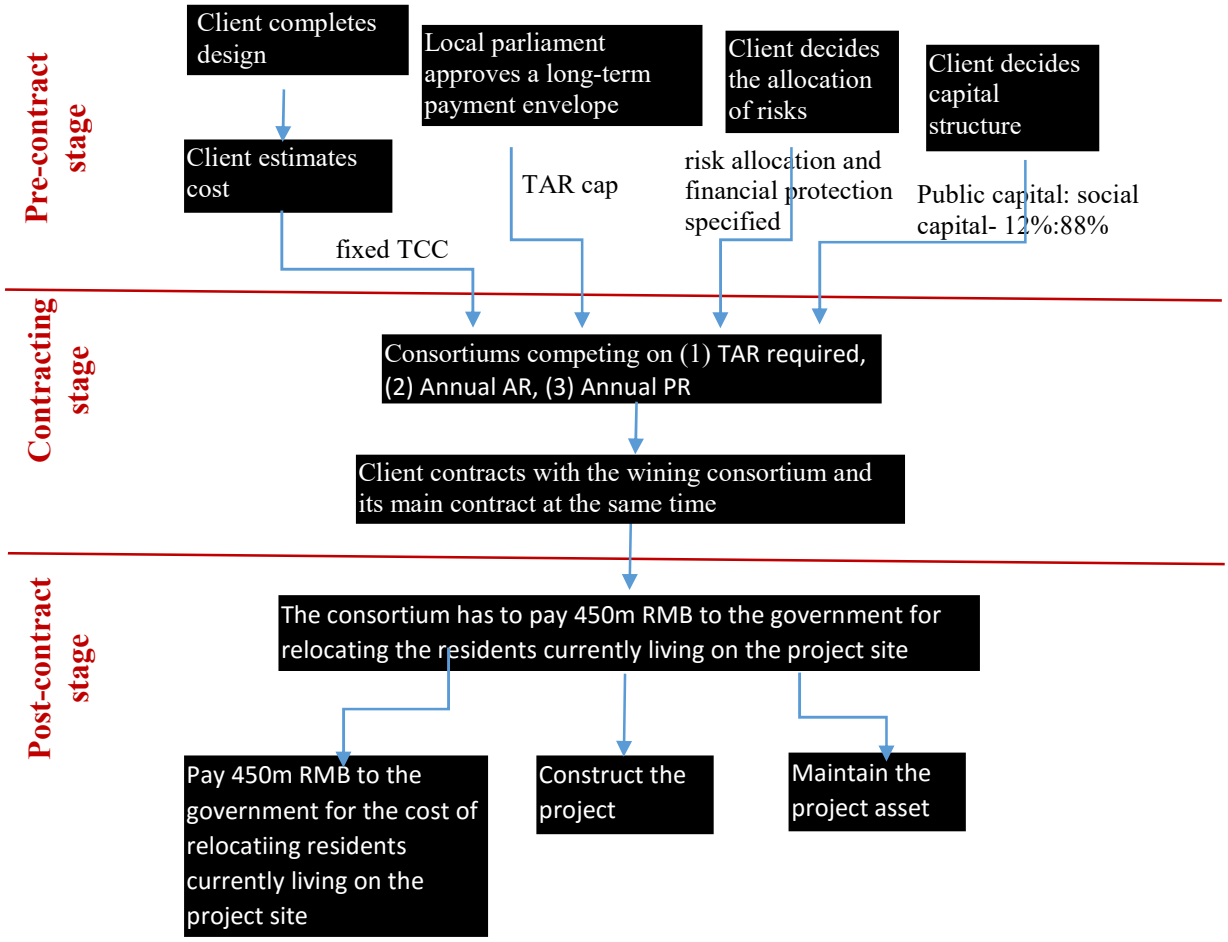
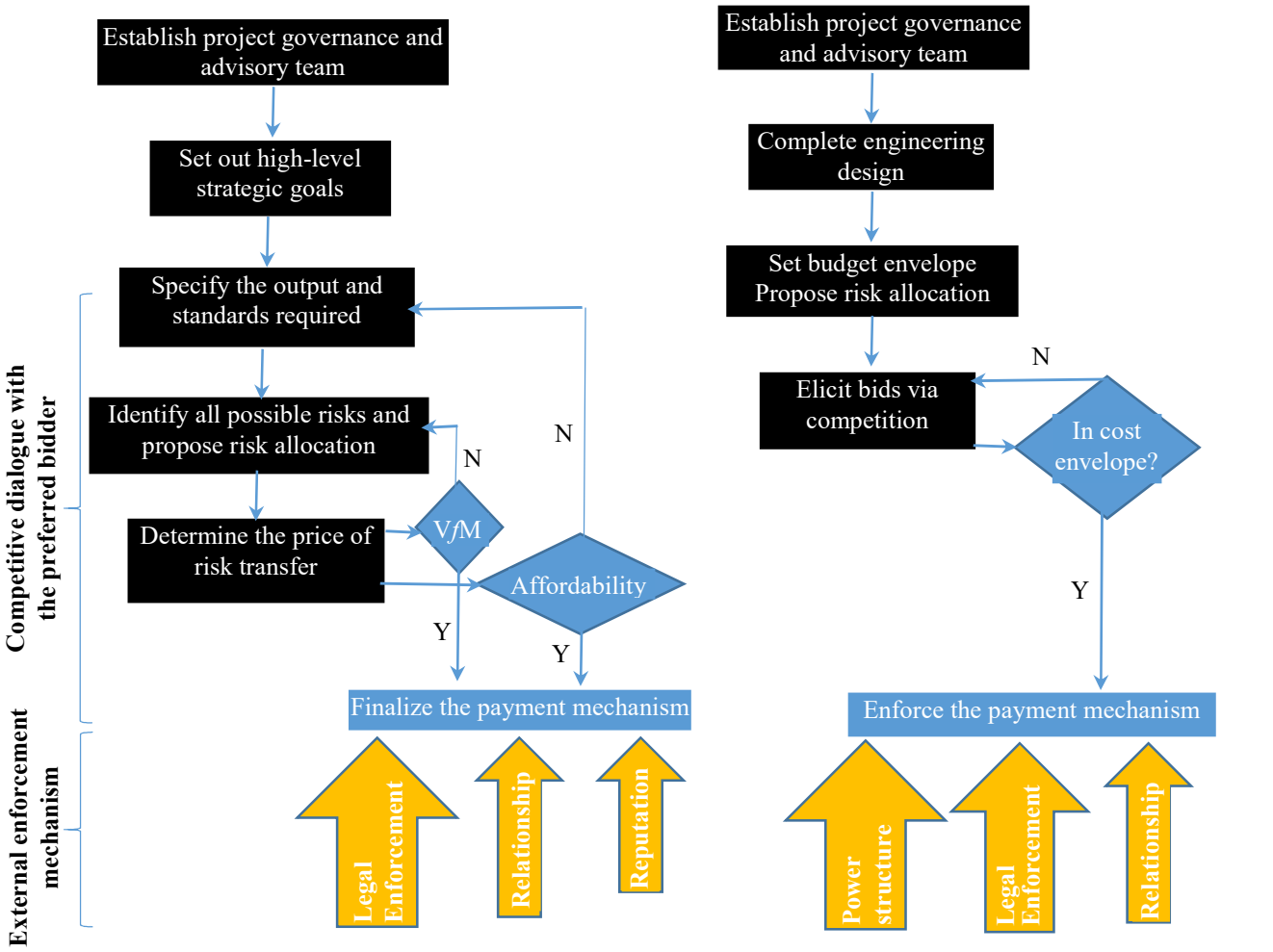


Figure 2 Contract Design of the Anqing Project



(a) PFI procurement (competitive dialogue) (b) Price formation in the Anqing project

Figure 3 Price formation in PFI and in the Anqing project

Table 1 Key Information Sheet for Anqing PPP Project

Road standard parameters	Design speed: 60km/h; design axial loading: BZZ-100; loading grade: Urban-A grade
Length	14.93 kilometers in total; 4.33 kilometers of tunnels and bridges
Estimated cost	Relocation cost: 0.45 billion Construction cost: 1.526 billion
Project scope	road engineering, bridge engineering, interchange engineering, pipe line engineering, transportation engineering, lighting engineering, landscaping engineering and other ancillary engineering work
Scope of operations	Maintenance and repair of road and sewerage system; maintenance and repair of public green land and road lighting; cleaning and other maintenance work related to the project or requested by the related government authorities
Qualifications of the bidder	1. Existing legal enterprise 2. Good credit rating with an audited net asset value of no less than 500 million RMB 3. Registered company capitalization of no less than 350 million RMB 4. Track record of having completed at least one civil road project within the recent five years. 5. With the qualification of Grade I contractor in the class of civil engineering 6. Joint bid permitted with no more than two constituent companies participating; each company contributing at least 40% of the capital required 7. Any individual constituent company allowed to have no more than two affiliated companies to participate 8. Any individual constituent companies pledging not to join other bidding consortium

Table 2 The Benefit and Limitation of the Procurement Strategy in the Anqing case

Benefits (compared to conventional procurement)	**Limitations**
Financing The investor funds the relocation cost of 450 million RMB which should have come out of the fiscal budget.	*Lack of room for innovation* Input-based procurement leaves the investor little room for innovation.
Growth stimulation A 1.926 billion RMB investment is made to the economy rather swiftly.	*Suboptimal risk allocation* Without a constructive competitive dialogue, the government could miss the opportunity of improving risk allocation.
Transparency of government debt The long-term financial commitment is approved by the local government, so the transparency of government liability can be much improved.	*Vaguely-defined risk allocation* In the face of this risk, private investors have a higher risk-bearing cost, so it might impede the participation of private and foreign investors.
Cost saving (?) Whilst the price the government pays is within the cost envelope estimated in the same way as in conventional procurement, it is not clear whether PPP has achieved a cost saving	