PAYING FOR INFRASTRUCTURE IN THE 21ST CENTURY

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Matthew Styer

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ABSTRACT

In the US, policymakers have contracted with a fragile model that treats the risks held by public and private partners as completely independent. The result has been an inadequate system of frustrating relationships and project failures. Case studies from California and Texas illustrate the dynamics of the traditional US approach that make it inadequate as a continuing practice. As a corrective, the experiences from France, Spain and Chile are presented. Having experimented in previous decades with the model now used in the US, these countries have since adopted new mechanisms to share risk and bolster the stability of their transportation projects. These mechanisms provide smart and efficient tools to procure and structure contracts, provide responsible public subsidy, deal with revenue risks, and connect the public and private sector in a true partnership. The policy tools profiled here are from toll roads, but they are potentially applicable to other transportation projects.

BIOGRAPHICAL SKETCH

Matt Styer is, basically, a native of Phoenix, Arizona. He will likely live and work there for some time after finishing this paper. He enjoys basketball, the outdoors, and thinking about how the future can be made a better place.

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Introduction

Private finance of highway infrastructure has taken on an increasing role around the world since the 1980s. As both developed and developing countries experienced economic growth, the resource constrained public sector couldn't cope with the demand for building and upgrading infrastructure, and countries sought private investment (Gomez-Ibanez 1993, 1-3). The results have been mixed. While the experience of some countries has been largely successful, others have largely failed. In a study of Latin American concessions in the water, utility, and transportation sectors, it was found that a third of all concessions and half of transportation concessions had to renegotiate the financial terms of their deals within the first two years (Sirtaine, et al 2005). Such renegotiations are deeply unpopular because of perceived gaming of the agreement's terms by the private partner, who is often both more financially sophisticated and in a position of leverage through the risk of default to the public partner. Given the global recession, greater concern among political elites about unsustainable public debt, and suspicion about the role of large public outlays as a primary contributor – as well as the financial sector's growing perception of infrastructure as an asset class for standardized mass investment, comparable to real estate securities, commodities stocks, and bonds[1] – it is unreasonable to expect the role of private finance in infrastructure to shrink. From a public interest perspective, there is an urgent need to develop appropriate regulatory and partnership structures that make private infrastructure finance a safe and fiscally responsible option going forward.

[1] https://www.ubs.com/global/en/asset_management/infrastructure/about_iaf.html , http://www.pwc.com/gx/en/capital-projects-infrastructure/asset-classes.jhtml

This guide compares several alternative models of highway infrastructure financing, focusing on the experiences in the US, France, Spain and Chile. Its purpose is to serve as an overview, so each national model is broken down into the unique mechanisms it relies on to function. Each model relies primarily on private investment, but they differ widely in how they treat the length of the contract, how contracts are procured, the availability of public subsidy, and the treatment of traffic risk. Following academic literature, all these national models are subsets of the "build-operate-transfer" (BOT) model. Under a BOT, a public agency contracts a private entity to finance, construct, and operate an infrastructure facility. Following construction, the private entity transfers ownership to the public partner and in exchange is awarded a concession contract to operate the infrastructure for a specified number of years. During the operating period specified in the concession contract, the private entity charges tolls to recover its construction investment as well as operating and maintenance expenses, plus some rate of return. A common variation of the BOT model, including several examples in this paper, makes the private partner responsible for the physical upgrade of an existing asset, rather than the construction of a new one.

The key risks for the concessionaire are closely linked to traffic levels, which are influenced by competing infrastructure, demographic/technological changes in the market, and new legislation. Without sufficient traffic, toll revenues will be too small to cover costs. For the public partner, the main risks are failure costs and managerial costs. In concession failure, history shows the public partner will almost certainly buy out the private partner's concession rights, or in near-failure, provide deep subsidy. Managerial costs are incurred trying to direct the concession's operation towards the public interest. The private partner may want to manage traffic or tolls to assure optimum financial success, but this may be at odds with public willingness to pay and optimum traffic flow. The public partner also incurs

costs monitoring the private partner's compliance with quality standards, as well as their financial performance when sharing excess revenue is part of the contract. A proper balance of risks in a successful concession means that each partner benefits financially from the others' involvement: the public partner gets infrastructure that it could not have paid for, and the private partner profits from a project that it would not have had the opportunity to be involved with.

The American model is closest to the simple theoretical BOT model and lacks much regulatory or partnership structure. It specifies relatively few real world contractual and external variables affecting the success of a concession, and leaves both parties open to tremendous downside risk in exchange for tremendous upside gain – a new road at no public capital cost for the public sector, and an extremely profitable concession for the private partner. The French model is structurally similar to the American one in that it is a concession for a specified number of years, but contracts are more formally procured, and private partners are required to maintain a certain financial structure. The Spanish and Chilean models are altogether different. Rather than fixed contract lengths and highly variable revenues, both employ mechanisms that make the contract length variable while constraining revenues to a predefined range. Also unlike the Franco-American approach, Spain and Chile offer partial public loan financing options to their private partners. This difference of approach entirely changes the risk profile, and is a much deeper form of public-private partnership.

The goal of this paper is to explain in detail the risk profiles and real-world consequences associated with each concession model. The core argument is not only that the deeper partnership approach exemplified by Spain and Chile is likely a superior model, but just as importantly, that this model evolved from something closer to the American style.

The hands-on approach of French infrastructure policy, too, offers important lessons. The problem with the traditional, American model is that it sets up incentives that give governments and their private sector partners risk profiles that are much too high. The unnecessarily high risk that private sector concessions face often materializes, and they are driven into financial failure. Often, however, concessionaires in failure bear few of those costs. Faced with a private partner in failure, public agencies offer deep operating subsidies or buy out concessions at well above market price. Because the private concession model allows infrastructure to be built that the public sector could not have otherwise paid for, suddenly having to (or choosing to) pay for it is a grave risk. The innovative mechanisms employed by France, Spain and Chile work to limit the risk of private default by providing tools to procure and structure contracts, provide responsible public subsidy, and help the concessionaire deal with revenue shortfalls. These mechanisms are recent innovations from only the past decade and a half. As such, they remain somewhat untested, though early indications suggest that they actually do avoid many of the pitfalls of the traditional style. The case studies that follow and comprise the bulk of this report recount what is known about their performance.

In the following section, background information is provided on financing differences between traditional public procurement and public-private procurement, a general account of risks involved that the public partner seeks to transfer to the private partner, and the kinds of institutional structures that must be in place for public partners and organizations acting on their behalf to be effective at transferring those risks. Next is a brief discussion of the sources and methodology that explain the style of analysis used in the latter parts of the paper. After that, there are three case studies of American public-private partnerships that illustrate in different ways some shortcomings of American public-private mechanisms,

especially with regard to how concessions are unable to deal with revenue shortfalls (operational risk), and how this poses a financial risk to the public sector. Following the American case studies, public-private mechanisms from Spain, Chile and France are presented and analyzed as correctives to the problems highlighted in the American cases. A short conclusion follows thereafter.

Financing Differential

Despite private finance's potential to facilitate infrastructure development, especially in times when it is impossible or undesirable for the public sector to finance, a fundamental parameter of all deals is that privately financed toll roads will cost more to consumers than they would if they were publicly financed. In privately financed infrastructure, toll rates will tend to be higher than corresponding public tolls for four reasons. First, the historical default rate for investment-grade municipal bonds is up to 40 times lower than comparable corporate bonds; estimates of the risk-derived interest rate spread in the US between public and private borrowing judge it to be 2-3% (Municipal Bond Fairness Act 2008). Given the typical size of concessions, the monetary difference will be hundreds of millions of dollars. Accordingly, in Spain, the cost of private finance has been double the cost of public finance (Acerete, et al 2009, 23-24). Second, private partners must make a profit to compensate them for the risk they undertake, so they will add a margin of profit to their toll rates. Third, tax-exempt bonds are generally not available for private projects.[2] Such bonds exempt the interest received by the bond purchaser, which allows the purchaser in turn to charge a lower interest rate. Fourth, when the length of the concession period is shorter than the life of the asset, toll levels must be raised to cover its full cost over that shorter time period. These higher financing and profit costs are fully passed onto users. In publicly financed infrastructure, costs can be recouped through either general taxation, or through tolling. Publicly-issued revenue bonds are also repaid through tolling a small

[2] In recent years, the US Federal government has started the Transportation Infrastructure Finance and Innovation Act (TIFIA) program, which provides private activity bonds that are rate-competitive with tax-exempt bonds. The latest federal surface transportation bill, SAFETEA-LU, passed in 2005, provides tax-exempt financing for projects with private involvement.

population of users, although tolls can be lower because financing is less costly and can be repaid over a longer period of time.

Risk Allocation

In traditional procurement, the public sector takes on all risks because it is the sole financier, owner and operator. In public-private procurement, the public sector allocates some risk to a private party. In return, the private party is awarded (the chance of) some rate of profit to compensate for taking on those risks. There are several broad categories of risk: financing, design, construction and operation. In most of these categories, the public partner allocates the risk to the private partner, trading off higher cost to consumers in the form of higher toll rates, for more certainty about its level of long-term financial commitment to the project (Deloitte 2004, 10).

The financing stage entails risk because it is difficult and costly to figure out how much financing is needed, and then how to go about getting debt or equity financing from investors. Once secured, financing may be subject to changes in interest and taxation rates. Repayment and revenue collection are of course obligatory risks with financing. This is an important area of risk transfer; private investors possess expertise in bearing financial risks, while for the public sector it is but one part of the course of business (Geddes 2011, 78-81).

Risks in the design stage are due to costs from developing a design that is compliant with safety, technological and environmental standards, with additional costs possibly accruing from changes to those standards during the lengthy process. The designer may incur additional risks from the legal ramifications if their design is flawed and fails during or after construction. In practice, responsibility for design can be borne by either the public or private

partner. If the project is seen as simple and uncomplicated, the public partner may choose to bear the risks by itself; in larger, more complicated projects that are seen as risky, the public partner may choose to allocate some or all of the design risk to its private partner (Hodge 2004, 40, 43).

The construction stage is one of the most important areas of risk transfer, because of its complexity: large functional structures that must be delivered on time with physical precision. Getting off schedule typically leads to huge cost overruns, and this could be caused by supply chain disruptions, extended permitting process costs, labor disputes, site problems, and so forth (Hodge 2004, 40). In the cases relevant to this paper, a private partner will take on most or all of these risks for the chance of a higher rate of profit as a single contractor than as one of many. One notable case of risk transfer is Melbourne's CityLink project, where unforeseen geological conditions were encountered that led to massive cost overruns, including the tunnel's failure. Per the contract, the private partner took on all the risk and incurred all the expense (Geddes 2011 79).

The operation stage is the most important area of risk for private partners. When private partners provide financing and construction, they repay their debt and equity investors with revenue from toll collection. Traffic is highly variable and difficult to predict with accuracy because it is determined by a number of factors: the health of the economy and level of commerce, as well as competing infrastructure, changing demographic patterns, and variable toll rates. Private providers' willingness to take on the risk of low traffic and the inability to pay back their investors is why a substantial rate of profit is acceptable when healthy traffic projections do bear out. Operators of infrastructure take on further costs and risks due to the need to maintain the infrastructure subject to safety, environmental and technical standards, which may change and increase over time. When financing and

maintenance costs outweigh revenue, a concession will enter bankruptcy and the business often fails. A major problem in two of the American cases analyzed later in this paper is a non-compete agreement, which prohibits the public partner from building competing infrastructure. This is an attempt to keep some of the risk with the public partner, under the aegis that the public partner controls the provision of competing infrastructure, which is a determinant of traffic risk.

Despite the theory that specialized, experienced, and profit-motivated private sector partners can handle the above areas of risk more efficiently and cheaply, there is mixed evidence as to whether private sector construction and operating costs are lower than the public. The standard story is that private sector partners are more responsive to, and possess greater technical expertise, so that they have economic incentives and ability to lower costs. The story is complicated by the fact that concessions are granted monopolies, that infrastructure markets appear highly local and imperfect, and that the 40-50 year average lifespan of a Fortune 500 company is roughly concurrent with the lifespan of concessions, meaning that maintaining their market reputation to attract new business may not be significant (de Gus 2002, 1). Study results from other areas of private infrastructure finance present mixed findings. A meta-study analyzing 27 other studies of cost savings in private delivery of solid waste and water services found no clear evidence of cost savings, though some evidence to support greater quality from efficiency gains (Bel, et al. 2010). A study of road repair in Denmark found strong evidence of private sector cost savings and quality improvements where multiple private companies must bid for the right to do road repair in certain areas (Blom-Hansen 2003).

Where infrastructure concessions with large capital investments are concerned (any toll road construction or substantial physical upgrades), private efficiency gains in operating

costs would have to be enormous to make up the difference between the costs of public and private debt financing. This fact means that private sector efficiencies should not be the main focus for projects of this scale. The desirability of private infrastructure finance then rests on whether a potential gain in quality or speed is worth the higher price, and whether the higher cost of private finance is worth the gain in freeing the public sector from some financial and operating risks.

If poor contracting does not effectively transfer these risks, the public partner will end up paying for much of what it sought to avoid – this is especially true when failed concessions are bought out, which is the main concern of this paper. A failed contract can also happen in successful concessions, but ones where the private partner profits too much for the risks they took on. The political risk of lost public support comes with both. Properly recognizing these risks and keeping them clear during procurement is highly important and far from easy.

Public Partner Contracting Capacity and Organization

It is not correct to speak as if the public sector decides to allocate some amount of the risk to a private sector partner. Risk allocation is imperfect and difficult because humans' limited perspective keeps the parties to the contract incapable of identifying all future risks, and because the private partner often knows more about the nature of the risks than the public partner. As a result, the public partner needs sophistication, structure and a high degree of competence to rightly allocate risk to a private partner. In parts of the world where public-private procurement has a longer history, dedicated organizations have been established to oversee contract formation and administration (Farrugia et al 2009, 5). These

organizations coordinate stakeholders, as well as provide technical assistance and quality control.

In the US, a typical infrastructure project will involve at least three governmental bodies – the local, state and federal governments. In practice, the local level may be fragmented between several municipalities, as well as a regional planning organization. Multiple parties are similarly involved in other parts of the world. The overseeing organization can coordinate the responsibilities between these entities as well as be a single-source provider of relevant information to carry out their respective duties (Istrata and Peuntes 2011, 7). Outside of convening legal and technical participants, involving and educating the public and civic interest groups, it is important for maintaining accountability and protecting the public interest (Rall et al 2009, 26).

Overseeing organizations also provide two kinds of technical assistance. At the project level, they scrutinize highly specific details of the contract such as whether the private partner's assessment of risks, performance projections and profit projections are reasonable. Beyond project-specific questions, the unit's role as a coordinator of agencies gives it the capacity to establish strategy and fit with long term plans, evaluate the financial impact of the project in relation to long-term plans, and from these, evaluate overall public partner capacity (Istrata and Peuntes 2011, 7). An example of the necessity of effective oversight is the Chicago Parking Meter deal. This was a related kind of infrastructure deal, wherein a private investor made a one-time $1.15 billion payment to the City of Chicago for the rights to operate its 36,000 parking meters over 75 years. Later analysis by the City's Inspector General concluded that the deal undervalued the contract's worth by at least $974 million (Hoffman 2009, 22-24). While the Inspector General's office had the expertise to oversee the financial and long-term implications of the deal, it was not involved with during

the process. Much to the City of Chicago's detriment, the Mayor's Office seemed unable or unwilling to conduct the necessary calculations to ensure good value, because there was an urgent need to solve short-term budget shortfalls (Hoffman 2009, 24-30).

The quality control function of oversight organizations governs the process itself. The core function they perform is as the first reviewer of proposed contracts. They ensure that contracts are consistent with safety and compliance standards, while ensuring transparency in bidding and contractual stipulations (Pew Project on the States 2009, 23-25). They also attempt to streamline the process to reduce transaction costs for current and future projects, and work on market development and bid attraction, to ensure competition and hopefully bolster bid quality (Farrugia et al 27-28).

The setup of oversight organizations is critical to their functionality. First, they need to be politically independent. Large public works projects are of interest to politicians because of their popularity (or unpopularity) with constituencies. Therefore an oversight organization needs a structure that provides it insulation from political meddling. Second, different functional areas of the organization also need to be separated. If the organization is located in an agency that directly procures infrastructure projects, such as a department of transportation, then the coordinating, technical assistance and quality control functions need to be operated separately from procurement. This prevents the advisory functions from making business for themselves by influencing the procurement side to go ahead on a deal that should not be made, and prevents overriding the advisory functions to procure for procurement's sake. This separation is analogous to the Sarbanes-Oxley legislation developed in the wake of the Enron scandal, which prohibits auditing firms from providing accounting and other oversight services to the same client.

An oversight organization also needs an administrative location that provides it the ability to efficiently offer its services to the relevant governmental bodies, planning organizations, and public/civic interest groups. There are a range of such locations for oversight organizations in other countries. In many places they are a division of a finance department or ministry. By necessity, finance divisions already possess some political insulation, and have the setup and experience necessary to provide services to other groups. Some are set up as public corporations, or mixed ownership corporations; others are NGOs which are line item funded by the government, and may receive some sort of commission as well (Istrata and Peuntes 2011, 9-10). It is also critically important for an oversight organization to be a permanent entity. It cannot be formed as an ad-hoc team. PPP deals are too complex and the ramifications too far reaching for public teams which lack the ability to develop focus, experience, and sophistication to negotiate head-to-head with private sector counterparties (Farrugia et al 2009, 27).

When analyzing the cases that follow in this paper, it becomes apparent how critical it is for these functions to exist and work together. In the American cases, better technical assistance would have helped the public partner better understand the long-term financial and strategy implications of their contracts, where the contracts could potentially go wrong, and the expected results. With the Camino Columbia case in particular, an oversight organization with effective technical assistance quality control might even have blocked the deal. These functions do exist and work together in the cases of Spain, Chile and France. Well-developed, sophisticated oversight not only screens good deals from bad – it enables them be proactive in developing new mechanisms that can better allocate, and even reduce risk.

Methodology

This paper is structured as a series of case studies: three individual concessions in the United States, and then the broad, national-level systems of France, Chile and Spain. The three US concessions profiled are the Camino Columbia Toll Road in Laredo, Texas, the SR91 Express Lanes near Los Angeles, California, and the South Bay Expressway near San Diego, California. These concessions were chosen as case studies because they highlight certain crucial places in concession contracting where risks are dramatically and needlessly high. While there is no overarching concession system in place at the national level in the US, concessions seem to have defaulted to follow a basic BOT model, largely unadorned by additional policy mechanisms or heavy regulation. There are some largely successful American toll road concessions under this model, including the Dulles Greenway and the I-495 Capital Beltway HOT Lanes (FHWA 2003). However, because these successful concessions are still susceptible to the same risks, it is appropriate to focus on cases where these risks materialize. The Camino Columbia case is meant to show the importance of good contract procurement and planning, as well as to show how the capital structure of the concessionaire affects both its quality and risk of default. The SR91 Express Lanes case is meant to show how private-led renegotiations pose a risk to the public partner, even with good planning and a financially healthy concession. The South Bay Expressway case is meant to show that even a successful failure – a concession that cleanly entered and exited bankruptcy – displays some degree of irrationality, and could be handled more deftly with better contracting tools.

The national systems of France, Spain and Chile will be discussed in turn, broken down according to what each policy tool does to alleviate an area of traditional weakness,

and decrease the risk of both default and negotiations. These countries are profiled because of their history with concessions: there is simply more to be learned from the experience in these places. What is significant across these profiles is how well each country's different policy tools correspond with each other. While the tools employed by each country may be very different, they respond to the same underlying issues confronting concessions. Broadly, I categorize these tools in terms of planning and procurement quality, traffic risk mitigation, and public sector financing. Each tool will be analyzed by the way that each gives a better balance of economic incentives between the partners, and lowers the overall risk profile of the concession. Ways in which these tools remain defective or can be improved are discussed where it is relevant. Data for these is drawn from professional and academic journals in planning, economics and civil engineering, as well as local sources (for the US case studies) such as newspapers and legislative texts. It must be noted that the number of sources for the non-US case studies is small. There simply has not been very much published work on their innovations in infrastructure public-private partnerships.

Analysis

Texas' Camino Columbia

The Camino Columbia Toll Road (CCTR), also known as Texas Highway 255, is a 22-mile rural highway near the city of Laredo, Texas. The CCTR was built as a branch off US Interstate 35, which travels from Minneapolis through Dallas and San Antonio, and ends in Laredo, Texas at the Mexican border. It is the most active commercial trade route between the US and Mexico because of its proximity to the Mexican city of Monterrey, from where the US imports huge quantities of manufactured goods. Branching off the I-35 just north of Laredo, the goal of the CCTR was to allow commercial truckers to bypass Laredo's downtown congestion and more efficiently reach their destination.

In January of 1997, the Texas Transportation Commission passed Minute Order 107059 approving a private toll road to be financed, constructed, and maintained by Camino Colombia, Inc. near Laredo, Texas (Keel 2006, 6). The project had been in planning for 6 years, and with the approval of local officials, was constructed and financed for a cost of $90 million (Samuel 1997). At the time of opening in October 2000, the road had capacity for 7,000 vehicles per day, with expected traffic of 1,500 per day. As early as September of 2001, local landowners, who voluntarily provided equity for the CCTR in their land and right of ways, began complaining about being misled by overly-optimistic traffic projections. In December 2003, the road was foreclosed on for missing its debt payments; traffic had been 1/10th what was predicted (Samuel 2003).

Following foreclosure, the road was publicly auctioned and remained closed to traffic until a new buyer was found. The only two bidders to come forward were the Texas Department of Transportation (TxDOT) and a new group called the Camino Texas

Partnership, led by John Hancock Life Insurance, which was one of the primary original debt investors. TxDOT bid $11.1 million for the road, but rescinded its offer after it came to believe that the Camino Texas Partnership was only interested in the auction as a means to raise the price, leading to a purchase price of $12.1 million for The Camino Texas Partnership. Following further negotiations, the Camino Texas Partnership offered to sell it to TxDOT for $33 million; TxDOT countered, and purchased the CCTR in September 2004 for $20 million (Keel 2006, 1).

Several factors were at work in the demise of Camino Columbia, Inc. and the failure of the toll road; they reflect poor timing, poor planning and conflicts of interest. In April 2000, several months before the CCTR opened, the City of Laredo opened the World Trade International Bridge 4 and TXDOT completed the Loop 20 highway (Samuel 2003). This new bridge provided another access route across the border, and Loop 20 allowed commercial traffic to bypass other downtown traffic congestion as a direct link from the I-35. As the CCTR was primarily designed with commercial trucking in mind, the problem with this approach is that the network of Mexican highways that branch out into Monterrey and the rest of Mexico do so from a point just south of Laredo. To reach this network using the Camino Columbia, drivers have to take what, on a map, would look like two sides of a triangle: whereas I-35 goes straight south into Laredo, the CCTR branches off to the southwest, where upon crossing the border drivers must switch onto an eastbound highway running parallel to the border. With congestion freed up in Laredo, taking extra driving time and paying extra tolls does not make sense.

The CCTR was also poorly planned in that its success relied on external interventions. First, the City of Laredo had wanted to force hazardous materials cargo onto the Colombia–Solidarity International Bridge to which the CCTR is directly connected, but was unable to do

so (Keel 2006, 2). Second, the team behind the CCTR had hoped that with NAFTA coming into effect, trucks originating in one country could simply pass through on the way to their destination. This did not happen – and is still today a contentious issue. Drivers had to switch trailers off to drivers approved on that side of the border, and the CCTR didn't have facilities for it (Keel 2006, 2; Samuel 2003).

Why such a poorly planned project proceeded - not in accordance with any regional strategy, but to the ignorance of it – in part reflects the incentive in its ownership structure. Camino Columbia, Inc. was led by Carlos Benavidez, a prominent local businessman with deep familial ties to the rural farming area west of Laredo where the CCTR was built. Camino Columbia, Inc.'s capital structure was risky, with only 16% equity ($15M out of $90M), and up to $9M of this in land right-of-ways (Gonzalez 2004; Samuel 2003). There is at the least the appearance of a conflict of interest here in that the Camino Columbia, Inc. itself had little cash equity of its own to lose, and that Mr. Benavidez and friends were perhaps the primary beneficiaries of this risky setup.

Much of the fault also lies with TXDOT and the City of Laredo for approving what should have looked like a bad project. The private sector is entirely capable of delivering high-quality, unsolicited proposals that deliver regional benefits, but the original investors in Camino Columbia were relying on a number of circumstances beyond their control and apparently acting in willful ignorance of competing projects. Knowing full well that toll roads often fail, only to be picked up by the public sector, TxDOT should have been more discerning. From a regulatory standpoint, it was too distant. It is unclear even now what the public commitment to the road is. There are talks between Laredo and Mexican officials about expanding Bridge 4, which would further detract from the road. Alternately, there has been talk about building a shipping rail line along the CCTR's right of ways, which could

recoup some positive value (Saenz 2009, 15), though Keel's 2006 audit report points in the opposite direction (1):

> When the Department purchased the Camino Colombia Toll Road, it did not intend to purchase it as an investment, and it did not plan to recoup the purchase cost. Since the Department purchased the toll road, maintenance and operation expenses have totaled $1,296,594 and toll revenues have totaled $712,249.

Bluntly, the CCTR appears to be a Texas boondoggle – considered as it happened, the project probably could not have been rectified by any kind of intervention. However, picking apart different facets of the project is analytically useful. First, it seems clear that this project should never have been allowed to proceed. Could it have been prevented from being built with tighter control at the state level? Because TxDOT did approve it, tighter controls would represent a more standardized procurement process, whereby a range of factors, including the presence of competing bids from unrelated companies, would be used to judge project feasibility. If certain transparent criteria are not met, projects do not go forward. Second, could the subsequent purchase by the state of the failed project be avoided if risks between the public and private were more clearly delineated? While in some cases it may make sense for the state to share in traffic risk, it should not share in risks from private managerial incompetence. With knowledge that their investment can be rescued by the public sector only under very specific conditions, investors and creditors would likely be more diligent in project design and operation.

California's SR-91

California's State Route 91 (SR91) deal, while implemented better on almost every level than the Camino Columbia, illustrates other problems. Whereas the Camino Columbia's downfall was poor planning, the SR91 was undone by limiting the public partner's strategic flexibility, and by overly complex political and financial maneuvering.

The SR91 concession was planned under a framework set up by California law AB680 in 1989 to introduce private funding sources for transportation improvements in cash-strapped California. The bill's aim was to introduce private sector efficiency and reduce congestion while providing a "reasonable profit" to the state's potential private partners (California State Assembly 1989). AB680 was model legislation in that it provided a framework not only to regulate concessions before any were even in the negotiation phase, but also in that it provided testing grounds for the concession model. Under the bill, the California Department of Transportation (Caltrans) was only authorized to undertake 4 demonstration projects across the state. These projects could be constructed by private sector partners under the condition that they function as a part of the state highway system, and revert back to the state after no longer than a 35-year lease (FHWA 2003).

The SR91 concession was one of these, built in southern California along a heavily congested corridor east of the LA area known as the Riverside Freeway. Rather than constructing an entirely new route, a conglomerate known as the California Private Transportation Company (CPTC), constructed two tolled express lanes in the median of existing lanes.3 SR91's design was innovative, implementing both congestion pricing, and

[3] CPTC was comprised of Peter Kiewit & Sons, Cofiroute Corporation, and Granite Construction, Inc. Kiewitt is one of the premier American contracting companies; Cofiroute USA is the American division of Vinci, a French multinational concession and construction company, specializing in tollway

open road tolling (tolling solely with radio transponders so traffic keeps moving), which at the time was outside the scope of public sector expertise.

To build support for its project, CPTC made a concerted effort to conduct focus groups, surveys and studies about public support and willingness to pay. To strengthen public support, CPTC publicized support from state and local officials, and organizations as diverse as the Environmental Defense Fund, and the Reason Foundation, a libertarian think tank, and kept up the outreach as it opened the lanes in 1995, doing radio, TV, newspaper and pamphlet advertisements. It posted operating profit in its first year, and profits grew steadily from traffic growth in proceeding years, reaching $13M in 2001 according to company financial statements.

CPTC's concession hit a major hitch in 1999 when they attempted to enforce a non-compete agreement they had put into their contract with Caltrans that disallowed competing projects or improvements within 1.5 miles of the highway for a 30-mile length. Due to renewed congestion problems on the untolled portions of the road, Caltrans wanted to build more general purpose lanes on sections of the highway to improve vehicle entry and exit, but was sued by CPTC under the terms of the non-compete agreement to stop any plans (FHWA 2003).

According to the FHWA, the dustup between the organizations made it clear that CPTC's healthy toll revenues were dependent on continued congestion. In response to CPTC's lawsuit, public opinion turned against the toll lanes and depressed toll revenues, and brought

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management; and Granite Construction another large American construction company. Together, these firms had considerable and relevant expertise.

on three legislative efforts to invalidate the non-compete agreement or even CPTC's operating concession lease (Sullivan 2003).4

In the midst of the legal disputes over the non-compete agreement, CPTC began trying to refinance its debt. A group of local businesspeople and investors incorporated as a non-profit called NewTrac and entered into negotiations with CPTC to buy the toll lanes and operating franchise for $274M, using state-issued tax-exempt bonds. As a nonprofit acting for the public benefit, NewTrac could get the California Infrastructure and Development Bank to issue tax-exempt bonds on its behalf, and use the new bonds to pay off the existing debt. The new financial structure was claimed as a means to reduce the debt service, giving the SR91 Express Lanes a much easier path to the "reasonable" profits set forth in the AB680 framework. CPTC would retain the operating contract for the next 15 years on a no-bid basis, while surplus profits they estimated in the range of $400-500M over the remaining 30 years in the life of the contract would be returned to the public in the form of road improvements in the area (FHWA 2003). The math behind these claims was thinly plausible at best: the lanes cost $135 million to construct, and CPTC would receive $225 million for the lanes and concession, with the rest going to set up a reserve fund and pay down the debt service. It is unclear how taking on much more additional debt, even with substantially lower interest rates, would provide such a surplus. The deal was alternately approved and denied as it worked its way up the ladder of state approvals. At the heart of the back-and-forth were suspicions over the close ties between CPTC and NewTrac, and over the use of state bonds for a project in which the state would not receive any direct financial benefit. After legislative

[4] The legislative effort consisted of two lawsuits at the state level, AB 1091 and AB1346, and one lawsuit by Riverside County, where most of the users lived.

hearings and investigations, the deal met a final denial at the hands of the state treasurer (Shigley 2000).

In 2002, in order to finally resolve the issues that had been hampered by the non-compete agreement, the Orange County Transportation Authority purchased the lanes and the operational franchise agreement for $207.5M. Given the newness of the physical lanes and potential operating revenue stream from continued tolling – all but assured to grow with long-term population growth – the Transportation Authority likely paid a CPTC a fair price.

The experience with CPTC and their insistence on enforcing the non-compete clause show the conflict between tolling as revenue for debt service, and tolling as congestion pricing. In the first instance, CPTC itself blocked true congestion pricing by enforcing artificial congestion on the untolled portions. CPTC was successful at pricing its lanes so that they moved more fluidly, but not so that all traffic could be made to flow more optimally. In the second instance, CPTC's insistence was shortsighted in the face of long-term population growth. With more drivers in the long run, even the newly widened untolled lanes would not detract from the tolled lanes. For a private concessionaire making large debt payments, however, the short run is important.

The complexity of the NewTrac deal also highlights a significant problem common to concessions. Often the complexity of private investment finance leads to the public partner taking on undue risk when the financing becomes the subject of negotiation because they do not have the expertise to fully understand it. California public officials showed prudence in eventually blocking the deal, but not without cost. First, a great deal of political capital was spent, in a way likely hard to regain. Should private infrastructure finance ever again become an appealing strategy in the area, its reputation, political viability and ease of doing business could be compromised. Second, it must be asked whether this conflict is a productive and

ethical use of society's resources. There is no doubt that the three lawsuits against CPTC seeking to invalidate their non-compete agreement or even the entire concession were in part politically motivated by the politicians bringing forth the lawsuits. It is not clear that this is an effective use of policymaker's time and energy. Furthermore, we should ask whether this is a productive use of the private sector's resources. The common sentiment among many proponents of private infrastructure investment is that they are designed to let a less-financially capable public sector shift its financial risk to a private partner, who is then free to fail (Geddes 2009, 79). However, the willful destruction of capital at this scale when it could instead be put to productive uses is certainly questionable, even if business failure is also important to economic health. That concessions have so often come close to failure raises the question of whether it would be better to have a more coordinated investment policy.

South Bay Expressway

The South Bay Expressway is a 10-mile tolled road link on the southernmost portion of State Route 125, a north-south corridor in the San Diego region of California. The SR-125 was built in sections during the 1990s and 2000s to help spur development and growth in southern San Diego, and to facilitate commerce with Mexico to improve connectivity across San Diego's system of freeways and expressways. The South Bay Expressway link had been long-planned, but went unbuilt due to lack of public funds.

In 2003, private financing closed on the project, led by owner California Transportation Ventures, a subsidiary of Australia's Macquarie Infrastructure Group, enabled by the same AB680 legislation as the SR-91 Express Lanes. Like the SR-91 Express Lanes, the South Bay Expressway was well-planned, fit into an established transportation system, and displayed a mix of innovative and ideal features. AB680 limited the concession term to 35 years, consistent with rough limits for realistic demographic planning and the life of the road, and it followed a competitive procurement process in which the same designer, design subcontract, and design price were mandated to each bidder (AASHTO 2011).

It was most significant for its receipt of a loan from the federal government under the Transportation Infrastructure Finance and Innovation Act of 1998, called a TFIA loan (US DOT 2012). TIFIA is designed to provide federal credit assistance to major transportation infrastructure projects that address critical national needs, and to further public-private partnerships. Not only was the South Bay Expressway one of the earliest projects awarded a TIFIA loan, it was the first to receive a TIFIA loan in combination with significant private debt financing. At a cost of $658 million, the TIFIA loan covered $140 million, with $130 million in investor equity from Macquarie Infrastructure Group, $48 million in donated right of ways,

and $340 million in foreign bank debt from Spanish BBVA and Irish Depfa Bank (AASHTO 2012). It was hailed from the start by US Transportation Secretary Norman Mineta, and was widely seen as a success for the region (Outlaw 2003). Despite these positives, the South Bay Expressway would go into bankruptcy less than three years after opening in March 2010.

The South Bay Expressway had the great misfortune of opening in November 2007, just as the economy was collapsing from the subprime mortgage and financial crises. Unemployment in the area tripled to 15%, construction of new home developments planned along the corridor stopped, foreclosures and vacancies picked up, and Mexican border traffic dropped 30%. This resulted in traffic levels of 26,000 per day, far below the 60,000 per day predicted. The $22 million in yearly revenue was enough to cover the $19 million debt service, but not enough to cover additional costs from delays (Samuel 2011a).

The contractor to the design-build contract took a year longer than their contractual delivery date to complete the project. Despite having a fixed fee, design-build contract, and having missed the delivery date, they filed against the debt holders claiming they were owed more money. The delay and internal dispute added penalties, extra interest and legal costs totaling $40 million (Samuel 2011a).

In bankruptcy, Macquarie Infrastructure Group wrote off its equity loss and stepped out of the deal, leaving the debt holders as the new owners. In settlement, a group of 10 banks led by original investors BBVA and Depfa wrote down their initial $340 million debt to $210 million, while the USDOT wrote down its $140 million TIFIA loan and $32 million in accrued interest to $93 million in debt and $6 million in equity. The private creditors and USDOT split ownership interests, including rights to surpluses and equity distributions, 68% and 32%, respectively (Jensen 2011).

Upon exiting bankruptcy in April 2011, the San Diego Association of Governments (SANDAG) entered into negotiations with the creditors to purchase the South Bay Expressway, due in part to a non-compete clause like the SR-91's constraining its ability to fully control the Expressway's functioning within the transportation network. SANDAG completed the $350 million transaction for the remaining concession rights in December2011, with funding obtained by assuming the current TIFIA loan, and a $250 million payment to the private creditors, with a $50 million loan from the toll revenue-backed county transportation fund, and $200 million swapped from an expansion project on the nearby regional I-805 freeway (Samuel 2011b). SANDAG justified the swap on the basis that they would sharply cut tolls to pull substantial traffic from the I-805 onto the South Bay Expressway, thereby decreasing the expansion needs of the former from four lanes to two lanes. SANDAG claims that building two lanes instead of four will also save it $268 million in property condemnation, bridge reconstruction and other expenses (Hawkins 2011).

The default was as orderly as one can hope to happen, as Macquarie and credit holders wrote down the whole or large parts of their investments, and the bankruptcy was relatively quick. SANDAG's acquisition of the South Bay Expressway also looks like a good deal. Rather than a forced purchase, the acquisition price will look like a fire sale in retrospect: as the economy and housing markets recover, local traffic will pick back up and cross-border commercial traffic with Mexico will also resume. This should put traffic levels closer to original forecasts, and dramatically increase revenues. Assuming the SANDAG planning methodology with respect to swapping two potential lanes on the I-805 for control of the South Bay Expressway is sound, SANDAG was a beneficiary of good luck, having the resources to capitalize on a potential disaster.

There is a lesson to be learned, however. While it is tempting to see the SR-91 and the South Bay Expressway as merely incidences of the continuing mismanagement of California, or as representatives of poor legislation in AB680, this is not the conclusion to be drawn. While the non-compete clauses included in each concession contract played a role in the public buyback of concession rights in each case, non-compete clauses are a problem common to privately financed toll roads (Dannin 2011, 60-64). Aside from these clauses, the roads were planned and procured in an appropriate way, and the South Bay Expressway defaulted and emerged from bankruptcy in an orderly manner.

This should not be the extent of our options for dealing with failing toll roads, however. What is strange looking back only a few years is that there is no middle ground between letting a concession fail and fall into bankruptcy, and outright public buyout. Could there be ways to keep the concession alive that might avoid the significant costs of (even orderly) bankruptcy? SANDAG's ability to buy out the South Bay Expressway concession was fortuitous, and is not likely to always be the case. Some form of subsidy would be a cheaper option for public agencies that want to maintain private operation and keep their private partner in place. Care would have to be taken to design a middle ground; without careful definition of scope and risk, the private partner would have the leverage to keep asking for more subsidy. Can such a system be designed and effectively implemented?

The answer to this question is yes. While public-private partnerships for highways are relatively new to the US, other advanced countries have been using public-private partnerships as a tool of governance for decades, notably Spain and France. Their experience can prove a substitute for our training ground. It took them decades to learn from the errors in starting with a system like ours, but they have recently overhauled their systems to adopt mechanisms that make their partnerships deeper and more robust. Chile,

whose history with highway public-private partnerships is no longer than ours, learned from Spain and France, adopting and even innovating on their mechanisms. The following pages examine the mechanisms that allow them to procure better contracts, provide responsible public subsidy, and deal with revenue risks.

The Case of Spain

Spain has a long history with private infrastructure finance. Facing surging economic growth, Spain began planning a 3,000 kilometer highway network in the late 1950s, and beginning in 1967, auctioned off 2,000 kilometers of highway through 1975. Only private funding could draw up the necessary capital, and bidders were offered contracts up to 50 years. The economic crisis of the 1970s and rising oil prices brought traffic levels down and private interest in highway concessions to a halt. When the Socialist Party gained power in 1982, they capitalized on the lack of recent investment and latent concerns about private-led building, and by 1984 had recommitted to traditional public finance and free highways (helped in part by regionally-targeted EU funds) and set up a state-owned company to take over troubled concessions (Acerete, et al 2009, 20-21). Of those not taken over, many required contract renegotiations and operating subsidies from the national government. In 1996, the conservative Popular Party came into power and reemphasized concessions, individually renegotiating extremely favorable and profitable terms with the concession companies, as well as offering concession extensions out to 75 years (Acerete, et al 2009, 2-3).

Throughout the political tug-of-war and the economic turmoil, the worst of the BOT model prevailed. The Spanish government provided substantial operating subsidies, and its individual negotiations led to an inconsistent approach. What was ultimately the most devastating aspect to it was the Spanish government's guarantee against exchange rate fluctuations. This was a huge risk transfer to the public sector; whereas the concession company may have been Spanish, for any given project, it solicited debt investors from around the world. When the Spanish currency fell on the global market with respect to

investor currencies in the 1970s and 1980s, concession revenues fell short of investor repayment. As a result, Spain accrued € 4.5 billion in foreign currency exchange insurance liabilities, or almost half the total investment in toll highways (Vassallo & Sanchez-Solino 2007, 2). Underwriting so much of the private partner's risk, combined with operating subsidies, hardly fits with the spirit of public-private partnerships. Rather, it effectively guarantees profit for the private partner, with little chance that the public partner could meet its original goal of not having to pay for infrastructure. Faced with these problems and budgetary pressure from the EU, Spain set out to overhaul its concession system and in 2003 passed the New Public Works Concession Law (Vassallo and Gallego 2005, 1). The law contains three crucial features: a new contract procurement procedure to rebalance risks between partners, a new form of public finance that serves to moderate the financial pressure on concessionaires and would-be investors while protecting the public partner from outsize risk, and a new form of contract that allows concessionaires to deal more easily with traffic risk.

Unfortunately, the global financial crisis has made it impossible to wholly and objectively evaluate the new system – while some features have been successful (below), additional subsidies have been called for by concessionaires in the context of Spain's deep economic crisis. What is below is then both an explanation of what should be, and only partially what it is. Though we can surmise that it would be superior to the old system in normal or even bad financial conditions – it is hard to imagine that the conservative financial structures and risk protection mechanisms promoted do not make concessions more stable – no system is immune to failure. In doing the extensive research for this paper, no literature has ever indicated that these new mechanisms played any role in causing the Spanish crisis.

Contract Procurement in Spain

Spain passed the New Public Works Concession Law in 2003 to overhaul its concession system. New agreements under the New Public Works Concession Law are framed by a set of four principles (Vassallo & Gallego 2005, 2):

1. The private sector should take on most of the market risks; this primarily refers to traffic but also to financing.
2. The public sector should take on most of the non-market risks; this primarily refers to natural disasters, but also to large events that cannot be controlled by third parties, such as terrorist attacks.
3. Risks mitigated by the public sector should not negatively impact the public sector budget. While subsidies can be considered, the law constrains most mitigation effort to the contractual terms, such as toll levels and concession length.
4. Risk is understood to be symmetrical and either favoring the public or private partner. By symmetric, it is meant that if a risk is not held by one partner, it is held by the other. In effect, it tries to say that no risks are considered outside the scope of the contract.

These clauses define the different variables at stake in one contract: which risks will be guaranteed (1), which will not (2), and a clause which provides flexibility in any future financial negotiations, but sets the bargaining positions weighted in terms of the public sector not taking on additional financial/traffic risk (3). The fourth clause (4) is set to "complete" the contract and close any gaps in the terms by relegating additional, unspecified risks to be interpreted according to the previous clauses.

When bidding for contracts, potential private partners can submit as many bids as they want. Each bid is scored based on its technical quality, the financial feasibility of the

project and its promoters, and the amount of public financial assistance requested. Technical quality has tended to be uniform as bidders adhere to government reference standards, so the latter two financial criteria are the locus of most bid competition. Bids score better for shorter loan repayment periods and smaller amounts of public financial assistance. Contracts are legally limited to less than 50 years, and most tend to be around 30 years in length (Vassallo & Gallego 2005, 2-3). Therefore, Spain's contracting system works to assure companies have planned feasibly for the future, have normal capital structures, and aren't receiving outsized subsidies.

Spain maintains similar competitive bidding principles throughout its traffic risk sharing mechanisms as well. In the case of traffic risk management, private bidders must bid on how much risk they will assume without recourse to public help. In the case of direct public sector financial participation, private bidders must bid on the lowest loan amount and most favorable terms of financial participation. All aspects of the system are competitively bid, it is worth emphasizing, before any element of the concession is actually put into play.

Variable Length Contracts in Spain

The most innovative piece of Spain's concession management system is its traffic risk sharing mechanism. This mechanism shares traffic risk in two ways: through toll level adjustments, and through extensions or reductions in the contract length based on the concessionaire's financial performance. The key variable in these contracts is the accumulated present value of revenues, or the APVR. The APVR is calculated as the sum of revenues over each year of the concession period, divided by the cost of capital. Every other feature of the contract revolves around this number.

The series of diagrams below, adapted from Vassallo and Gallego 2005, 3-6, demonstrate how this risk sharing mechanism works.

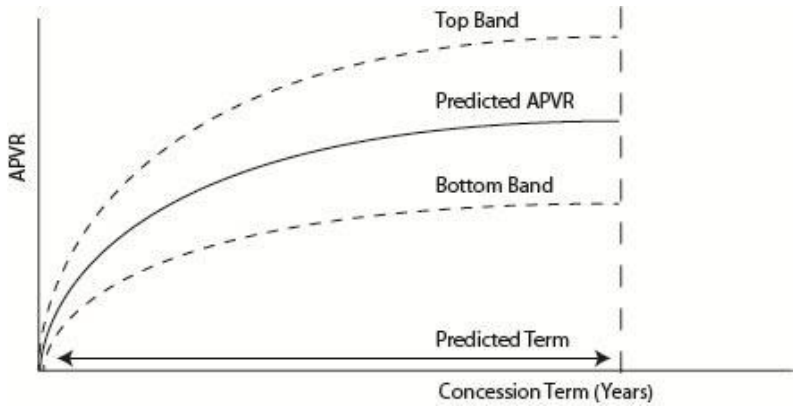

Figure 1: Basic APVR
Source: adapted from Vassallo and Gallego 2005

Prior to the bidding period, the public entity establishes the target APVR, shown as the thicker middle band, representing their best calculation of the roll revenues required to pay off the cost of the asset, as well for the concessionaire to reasonably profit. Then, during the bidding period, potential contractors submit bids including Top and Bottom revenue bands symmetrical to the target APVR, with the Bottom Band below a risk exposure limit established by the public partner (not pictured) to ensure the private partner takes on some downside traffic risk. The concession is awarded for a fixed period of time to the bidder who scores best based on the position of the Top and Bottom bands relative to the APVR band, the bidder's efficiency in terms of cost, and the cost of capital.

When the real APVR achieved by the concessionaire falls between the Top and Bottom bands, the concession ends at the designated time. A real APVR between the Predicted band and the Bottom Band will be a revenue loss with respect to expectations (not shown). A real APVR between the Predicted band and the Top Band will be a revenue gain with respect to expectations (shown below).

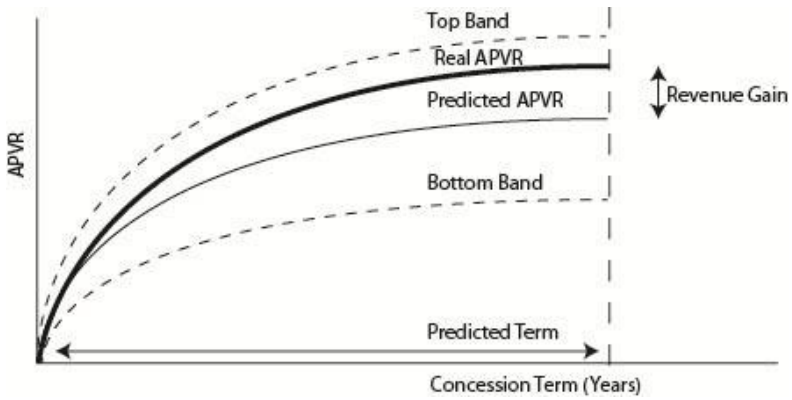

Figure 2: Expected Term APVR
Source: adapted from Vassallo and Gallego 2005

When the real APVR achieved by the concessionaire falls below the Bottom Band because traffic revenues are lower than expected, the public partner allows the concessionaire to raise tolls on the road above their initial contractual agreement. If this does not put the concessionaire back above the Bottom Band, then the term of the contract is extended until the time they equals the Bottom Band they bid (shown below).

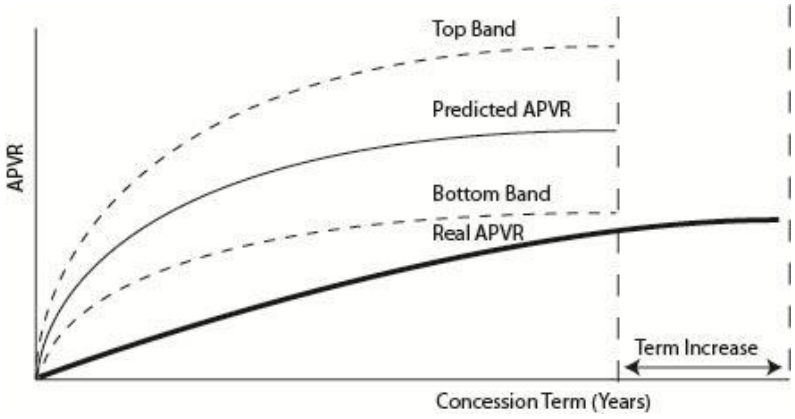

Figure 3: Extended Term APVR
Source: adapted from Vassallo and Gallego 2005

When the real APVR achieved by the concessionaire rises above the Top Band because traffic revenues are higher than expected, the public partner requires the concessionaire to lower tolls on the road below their initial contractual agreement. If this

does not put the concessionaire back below the Top Band, then the length of the contract is shortened, ending at the time their real APVR equals the Top Band they bid.

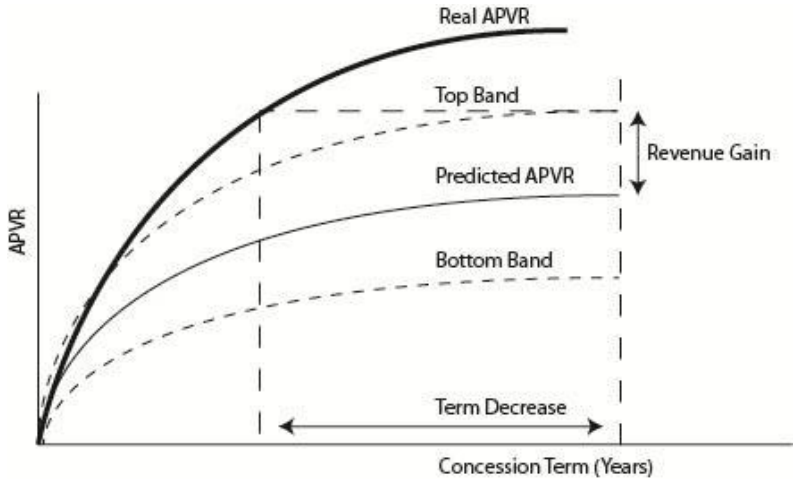

Figure 4: Shortened Term APVR
Source: adapted from Vassallo and Gallego 2005

Protecting the private sector partner against too-low traffic revenues makes it a more favorable investment. In terms of corporate valuation, eliminating downside risk increases the option value when deciding where to invest. However, because the public sector is also protected against too-high traffic revenues on the part of its private partner, the investment decreases in value. Between the two, the concessionaire retains risk because revenues can fall significantly above or below the target APVR, with real effects on profitability, and therefore retains the incentives to make its tollway attractive to use.

The public partner has a better budgetary outlook and significantly less risk than it would building and operating the tollway itself. The risk it retains is pernicious only at extreme lower margins where subsidies might come into play. The net benefit to the public is, ceteris paribus, a healthier public budget, and a consumer surplus if the concession ends and the toll disappears. There is also less risk of private default, where the public must either take over a physical asset when it is least prepared to do so, find a new concession partner,

or risk renegotiation; all of which are financially and politically costly to the public sector. The balance of incentives makes the tollways in Spain a more moderate investment compared to its American counterparts, and possibly its French counterparts as well; this is important for the public partner, as part of what drove the failures of the SR-91 and CCTR were their risky financial structures.

There is also good reason to believe that, even if they proved necessary, this system would dramatically simplify financial negotiations. In the American (and as discussed later, the French) scheme, open-ended revenues for the concessionaire leave great uncertainty about how much should be given in subsidy or paid in a buyout, and therefore about what contract terms need to be modified to achieve the "fair" revenues. With fixed revenue bands, negotiations over "fair" financial terms would be much more straightforward (Vassallo and Gallego 2005, 7). This has the added benefit of being easy to understand by a concerned public demanding accountability.

The public sector's situation vis-a-vis risk management in monitoring the concessionaire is also improved by the APVR system. While the profitability of the concession is most important to the private partner, the choice to use accumulated revenues, rather than profits, is important. With Top and Bottom Bands based on profits, the concessionaire would have incentive to be reckless with costs approaching the top band so as not to go above it and face toll or term reductions, and overestimation of costs near the bottom so as to get favorable changes in contract terms. Furthermore, because the concessionaire always has better access to its finances than does the public side, monitoring profit is difficult. In contrast, APVR is easy to monitor because the toll cap is usually tied to inflation. With tolls known and traffic easily monitored through toll plazas, revenues are straightforward to ascertain (Vassallo and Gallego 2005, 3-4).

While the APVR system should be admired for its elegance, it does have drawbacks. The strongest is that it places great emphasis on the public partner being able to correctly forecast traffic, because this determines the initial APVR band. Bent Flyvbjerg of the Oxford Business School has been a leading figure insisting how prone to error traffic forecasting is.5 A serious overestimation of traffic exposes both parties to financial risk because of the prospects for concession failure and public partner buyout. The variable concession length and the revenue guarantee decrease the financial risk, but it remains that above or below the bidded bands, an "incorrect" APVR has significant financial repercussions for both partners. It is not hard to imagine this being remedied through renegotiations, but such an elegant system was designed precisely to avoid ad-hoc negotiations.

Additionally, because the toll levels on the road itself are geared towards the financial needs of the concessionaire (adjusted with reference to the Bottom and Top Bands), it would be difficult to implement congestion pricing. An adaptation of the APVR system might consider replacing toll adjustment in this manner with simple, direct financial payments from one partner to the other. This would increase the public sector's financial risk, but policymakers can judge the increased risk against the benefits of congestion pricing in their own context.

Finally, the higher the discount rate, the harder it is for a concession term extension to recoup present value revenues. Infrastructure firms, like real estate developers and investors, tend to carry significantly more debt than equity, and this increases their discount rate. While the APVR lowers the risk and thus the discount rate, we can see that all PVR

[5] See especially Chapter 3, "Demand for Megaprojects" in Flyvbjerg, Bent, Bruzelius ,Nils & Rothengatter, Werner. (2003) *Megaprojects and Risk: An Anatomy of Ambition.* Cambridge University Press, Cambridge, UK.

bands level out relatively early in the contract. Although this does make it more difficult to recoup the full present value of revenues bid for a project, the project's debt is in nominal terms, paid off with revenues in nominal terms.

Direct Financial Participation in Spain

In addition to the APVR system, the public sector sometimes directly loans the concessionaire debt capital. These loans, called Subordinated Public Participation Loans (SPPLs), are used to create more favorable financing conditions and attract investment: both where healthy concessions are expected, and also in concessions where the risk of inadequate traffic revenues makes full private market debt too risky. In SPPLs, the government is willing to issue a relatively large amount of riskier junior debt – typically up to 50% of investment costs – to attract safer, more senior private debt. To compensate the government for taking on financial risk at this stage, extra revenue from unexpectedly high demand will be shared with the government via a variable interest rate. The principal is paid back only in the later years of the concession, and sometimes only in the final year. Use of SPPLs is part of the competitive bidding process (Vassallo & Sanchez-Solino 2007, 4).

Before bidding, the public partner sets two reference traffic bands, A and B, in terms of annual average daily traffic. Band A typically begins around 1.1 times the traffic demand estimated by the government, and Band B around 1.25 (Vassallo & Sanchez-Solino 2007, 4). Thus, the effective interest rate varies discretely across 3 categories.

1. If traffic in a given year is lower than the bottom limit of Band A, then the interest owed on the SPPL is 1.75%.

2. If traffic in a given year is within Band A, interest owed will be equal to the larger of 1.75% or 35% of extra revenues obtained over the bottom limit of the band.
3. If traffic within a given year surpasses band A into band B, the interest owed is equal to the larger of whichever method for Band A, plus 15% of revenues over the bottom limit of Band B. Practically, this means for any years in which revenue is in Band B, the concessionaire owes 50% (35% + 15%) of revenues over the bottom limit of Band B.

For larger SPPLs, payments to the public partner will tend to be dependent on the fixed interest rate because 1.75% of the principal will equal a larger dollar amount than 35% of revenues above the bottom of Band A. The figures below, adapted from Vassallo and Sanchez-Soliño, provide further clarification (2007, 5). The solid black line at first parallel to the x-axis shows the effective interest paid. Where the line is parallel to the x-axis, interest owed is based on principal; where it is not, interest owed is based on traffic. The finely dotted lines extending from the solid black line represent the dollar amounts associated with each way of calculating interest. Accordingly, the solid black line representing the effective interest paid is kinked where the finely dotted lines meet, and one way of calculating interest overtakes the other in value.

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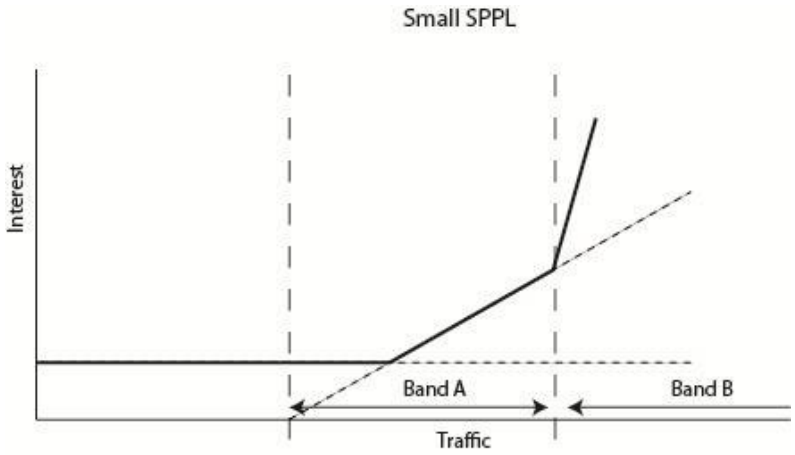

Figure 5: Small SPPL
Source: Vassallo and Sanchez-Soliño 2007, 5

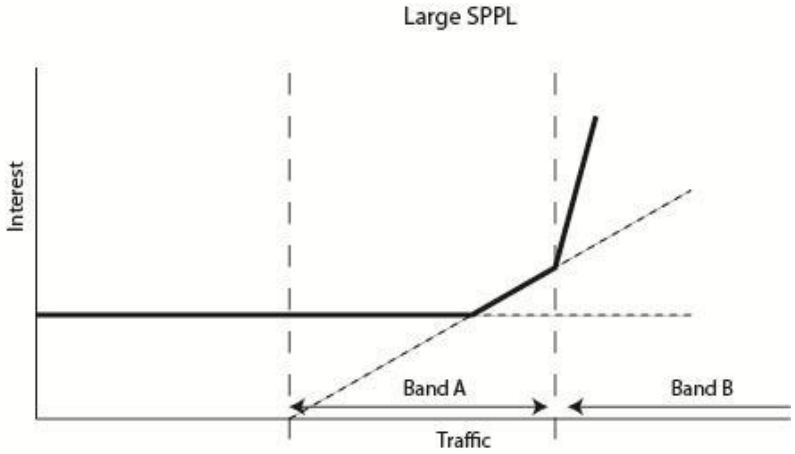

Figure 6: Large SPPL
Source: Vassallo and Sanchez-Soliño 2007, 5

The percent principal/percent above earnings interest system in combination with the low-loan bidding favorability encourage either very large loans or none at all. The infrastructure industry complains that this creates an unnecessarily risky investment environment, because the bidding system discourages concessionaires with expectations of adequate traffic from asking for an SPPL (Vassallo and Sanchez-Solino 2007, 7). The system also exposes the public sector to too much risk because payments on the SPPL principal are only paid back towards the end of the concession. If the private partner goes into bankruptcy before the end of the contract, then this money is lost (Vassallo and Sanchez-Solino 2007, 7-8).

The suggested fix for both of these issues is adjusting the interest rate mechanism so that interest payments are more cleanly related to the principal, and include some portion of principal in every payment. The difficulty with this fix is that interest-only payments are obviously cheaper than principal-and-interest payments, and therefore a key part of why SPPLs help weaker concessionaires remain solvent. One way to restructure the payment system would be to model them after balloon payment mortgages, where the principal and interest are only partially amortized over the entire loan period, with a balloon payment of the remaining principal due at the end of the loan term. Concessionaires expecting weaker traffic revenues could bid on SPPLs that had lower amortization rates, and concessionaires expecting good traffic revenues could bid on higher amortization rates. Still, whatever faults it has, the SPPL has been an extraordinarily successful budgetary mechanism: only € 100 million in public sector money was needed to leverage € 1.8 billion from the private sector between 2004 and 2006 (Vassallo and Sanchez-Solino 2007, 7-8). No additional sources have been found to gauge the success of these mechanisms during the ongoing financial crisis in

Spain, but looking at Chile, the next case, we can be optimistic, because Chile adopted similar mechanisms *in response to* their own crisis.

The Case of Chile

Chile's involvement in toll road concessions is more recent than France or Spain, dating back only to the mid-1990s. During this period Chile was undergoing transformational economic growth, and needed roads and, as well highways, bridges, tunnels, and airports to cope with newfound mobility and transportation needs. The Chilean national government knew that it didn't have enough money to pay for both new infrastructure and social welfare spending, so it was necessary to seek private investment. With technical assistance from the World Bank, it began drawing up a legal and regulatory framework. Unlike Spain and France (as well as the US) Chile did not have to learn from its own mistakes, but could draw on the experience of other countries. Indeed the leading policy architects were a trio of Chilean economists named Eduardo Engel, Ronald Fischer and Alexander Galetovic (Engel et al 1998). Their most innovative contribution is the LPVR, a flexible-term contract that manages downside traffic risks and promotes cost efficiency, but Chile also makes available a minimum income guarantee that shields the concessionaire from risk but also protects the public partner, and more recently, has introduced another mechanism to help concessionaires cope with traffic risk.

Minimum Income Guarantees

The Minimum Income Guarantee (MIG) is an optional mechanism concessionaires may use to mitigate their traffic risks. During the bidding period, the Chilean government defines a range in which each bidder can choose a lower band for revenues; if the project performs under the lower band in any given year, the public partner will have to compensate for the difference. The guarantee is valued at up to 70% of the investment, maintenance and

operations costs over the lifetime of the concession, and concessionaires may choose to weight the guarantee more strongly in some years rather than others, up to 85% of a single year's revenues (Gomez-Lobo and Hinojosa 2000, 30). If the project performs better than expected, revenue sharing is triggered in one of two ways. One trigger occurs, when accumulated revenues surpass a 15% rate of return, estimated by the public partner according to actual revenues minus the concessionaire's initially estimated investment and operations costs, 50% of all further revenues must be split. In the other, revenue sharing is triggered when real traffic levels surpass a mirror revenue band, above which 50% of revenues are split (Vassallo 2006, 367-68). So far, the MIG system has actually been revenue-positive for Chile, with revenues put into an investment fund for future income guarantees (Gomez-Lobo and Hinojosa 2000, 37).

Several factors are at work in making it a successful mechanism. First, the 70% guarantee works because it represents the typical debt side of the debt/equity ratio in such projects, and as such it provides no guarantee to the equity investors. With projects valued in the equivalent of hundreds of millions of euros, equity investors face tremendous risk. It is therefore an incentive for careful bidding as well as careful management and investor monitoring. In terms of fair risk allocation, it also does double work, protecting against the debt-based default risks which threaten the concessionaire's ability to operate. Most concessionaires have chosen to weight their guarantee towards the early years of the concession, likely because traffic uncertainty is greatest in these years, and the concession is therefore the most financially vulnerable (Gomez-Lobo and Hinojosa 2000, 30-31). So far, all but one concession has utilized the guarantee (Gomez-Lobo and Hinojosa 2000, 16).

In terms of the performance-based revenue sharing component, the MIG dramatically lowers the public partner's monitoring costs by using the concessionaire's

initially bid investment and operations costs as the basis for revenue sharing. For concessionaires, the knowledge that any future sharing will be based on initial costs creates an incentive to strive for realism with respect to those costs in the bidding period, an incentive amplified by competition from other potential concessionaires in that period. If the basis for revenue sharing was real costs, it would give the concessionaire the incentive to report higher than actual costs to achieve higher real returns. As in the Spanish case, the public partner retains significant control over the levels of tolling, in large part based on the traffic economics regarding how much incremental toll increases decrease driving. Therefore revenue is also easy to calculate as a check against reporting.

The over-reporting of costs is unlikely, given that a 15% rate of return has been extremely infrequent, and because 50% revenue sharing is undesirable for the concessionaire. What it does is provide a further check on management, giving incentive to keep traffic flows (remembering that toll levels are tightly controlled) within a range close to what the public partner estimated during the bidding period. With the range between the income guarantee and <15% rate of return still substantially large, the concessionaire retains the incentive for cost-effective management in pursuit of good returns.

From a system level perspective, these closely interlocking financial incentives create two benefits. First, financial monitoring becomes relatively automatic because investment and operating costs can be easily known with a good degree of accuracy, as can revenues. This significantly decreases monitoring cost for the public partner. Second, and more importantly, given the concessionaire's incentives to keep traffic within a tight range, it should become relatively easy to monitor and balance traffic across the entire network of toll roads to make sure it is moving optimally, especially given the scope of the toll road network and relative lack of parallel free roads. This is a huge gain in a public good. Given the success

of the MIG mechanism during Chile's recession – only 4 out 29 concessions needed the guarantee, valued at less than $7 million in public payments – it does seem to be the case that traffic is extremely well balanced (Vassallo and Sanchez-Soliño 2006, 19).

Revenue Distribution Mechanism

Chile also employs a sophisticated mechanism to manage traffic risk between the public and private partners called the Revenue Distribution Mechanism (RDM). The RDM was introduced in the aftermath of the severe recession of 1998-2002, which drove down traffic demand, and led concessionaires to ask the government for financial assistance. The government initially balked because traffic risk was, in principle, to be held entirely by the private partner. The Chilean government reversed course upon realizing that it could seize the opportunity to gain infrastructure improvements from the concessionaires outside the normal contract terms in exchange for financial assistance. To aid ailing concessionaires, the government gave them the opportunity to effectively purchase the RDM mid-contract as a revenue guarantee. It offers the concessionaires a present value of revenue guarantee calculated at traffic growth based on 4%, 4.5% or 5% growth, above real expected growth levels of 3.5%. In exchange for revenue guarantees above expectations, the concessionaire must make upfront investments in their roads equal to the difference between expected revenues and the amount guaranteed, typically by issuing a bond against the revenue guarantee. Furthermore, it changes the concession from fixed to variable term, ending when the guaranteed revenues are achieved (Vassallo 2006, 373-77).

In terms of risk-sharing incentives, the RDM sets three possibilities; one in which upside potential is decreased, one risk-neutral, and one that decreases downside risk. If real

revenues are above expected base revenues, the concessionaire is financially worse off than it would have been had it not opted into the RDM mechanism; having shifted to a variable contract, the concession stops collecting revenues when they are equal to the revenue guarantee. Had they not opted into the RDM mechanism, they would be collecting much greater revenues from the unexpectedly high traffic levels for the remaining years of the original concession term. If real revenues are equal to expected base revenues, the concessionaire is in the same financial position as it was because the upfront investment actually equals the difference between expected and guaranteed revenues. If real revenues are below expected base revenues, the concessionaire is financially better than it would have been because the now-flexible length of the contract permits them more time to achieve the guaranteed revenue level. At least 6 of 14 concessionaires bought into the RDM; with updated information this number would likely be higher (Vassallo 2006, 377). Unfortunately no updated data is available as to how many in the end successfully procured the RDM.

While the decreased upside for the concessionaire is obviously unattractive, the RDM as a whole is a very favorable deal. Healthy profit margins are built into concessionaire's base revenue expectations, so that even an early finish means that profits are simply what they always were, just not as high as they potentially could have been. With the elimination of all downside risk, the RDM essentially guarantees them some level profitability in exchange for eliminating the possibility of an extravagant upside. For most concessionaires, this is an easy choice. For the public partner, the greater financial risk profile taken on is balanced by not having to pay for the cost of infrastructure improvements.

Least Present Value of Revenue Contracts

The APVR mechanism in Spain and the RDM mechanism in Chile are both examples of variable length concession contracts that minimize the concessionaire's downside risk. Both of these, however, incorporate some form of guarantee or intervention. Chile has also attempted to bid infrastructure projects with a mechanism called the Least Present Value of Revenue (LPVR). Developed by aforementioned trio of Chilean economists (Engel et al 1998), it can be usefully thought of us a "naked" APVR mechanism: simply the revenue band, with no Top or Bottom Bands. Rather than being defined by the public partner, the revenue band here is set by the bidder offering to operate the concession for the least present value of revenues. Once awarded to the lowest qualified bidder, the contract is wholly flexible, ending exactly when the concessionaire achieves its PVR target (Gomez-Lobo and Hinojosa 2000, 37-9). The graphic below demonstrates the mechanism. The three curved lines each represent bids for the concession. Each bid for the concession varies by the expected length in years and present value of revenues. The thicker curved line, shown below the other two, is the winning bid because it is least present value of revenue (LPVR) Bid.

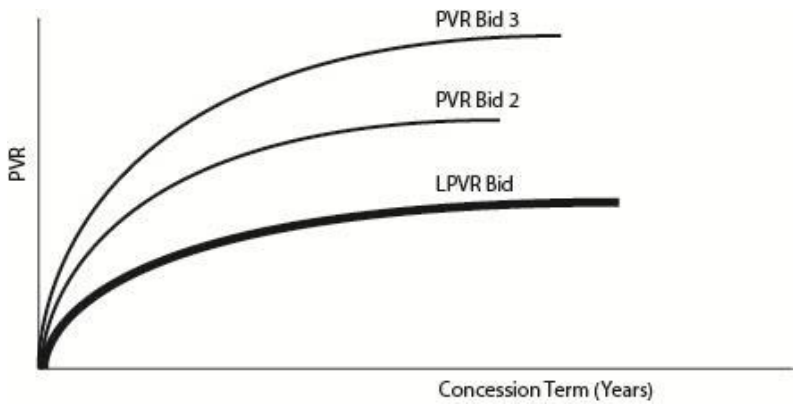

Figure 7: LPVR Mechanism
Source: Gomez-Lobo and Hinojosa 2000

The LPVR mechanism is theoretically attractive for the common issues it solves: downside risk is hedged for the concessionaire, and the finance is simple in ways that guard against costly and complicated negotiations for the Chilean government. The first concession implemented under this mechanism, the Santiago-Valparaiso Highway, fared the best of any in Chile during the 1998-2002 recession, but only four road concessions out of the 28 presently granted were successfully awarded under the LPVR since its introduction, despite broader interest (Vassallo 2010, 809).

Two significant problems limit its further uptake. The primary reason that uptake has been limited is that LPVR projects have no potential for greater-than-expected upside. Because the contract is based on achieving a single set present value of revenues, rather than a range (a la Spain) or for a fixed period of time, there is no reward for an early finish. Competitive bidding based on LPVR would make it likely for the revenue target to be relatively smaller, and thus the rate of return as well. While a moderate or low rate of return is acceptable for low-risk seeking investors, heavy debt investors like those involved in infrastructure projects tend to look for greater returns.

The second reason is that the public partner does not guarantee any downside risk (Vassallo 2006, 377-80). The concessionaire sheds some downside risk if traffic is lower than expected because of the possible concession extension, but Chile limits concessions to 50 years. If the target revenues are not achieved in 50 years, the project is simply unsuccessful for the concessionaire. Further, at 50 years out, the revenue discount factor will be so high that additional, even very large revenues will contribute almost nothing: $1 million discounted at 10% at 50 years is worth only $8,500. Given that most concessions have had a lifetime of 20 to 30 years, this problem still exists, though not to the same degree. While Chile's contiguous network of toll roads make it adept at planning traffic – which should give concessionaires more confidence that they will not suffer from dramatic traffic shortfalls – the downside risks are not limited enough to engage in a project with no potential for exemplary performance. Mending this imbalance for future concessions may be as simple as instituting a minimum concession period, during which a concessionaire could gain extra revenue if they met their PVR target early.

The Case of France

The French history with concessions begins in the period lasting from the mid-1950s through the mid-1960s, when there was a move to award concessions to state-owned companies or mixed public-private companies. During this early period, five mixed companies were created, but had little actual role to play in managing the concessions until the late-1960s and early-1970s, when reforms regarding the mixed companies enabled four private companies to obtain toll road concessions. When rising gas prices and a poor economy contributed to a sharp fall in traffic in the early 1980s, the French government took over three of the concessions. This structure was maintained into the 1990s during an intense period of roadway expansion. To help the financing associated with this expansion, the companies were consolidated into three regional entities (Bel and Foote 2009, 399-401). In 2006, the French government sold these regional entities to private bidders, with proceeds going primarily to the Agency for the Finance of Transport Infrastructure, in order to accelerate its planned investments, and with the remainder of proceeds going towards paying down the national debt (Bel and Foote 2009, 398-99). For the purposes of the sale, France updated its concession system with lessons adapted from its past, including more stringent procurement and financial standards to assure planning quality and mitigate traffic risk.

Contract Procurement

While the French join the Spanish and Chileans in attempting to control risk, they do not do so by any special contract or risk sharing mechanism. Rather, the French employ American-style contracts with fixed terms and open ended-revenues. Unlike the Americans,

they seek to control risk through a highly specified procurement system. Within the bidding process, there are three stages: pre-qualification, the invitation for firms to bid, followed by government meetings with firms to review bids. In the pre-qualification stage, the government defines certain parameters that all bids have to meet, including the concession length, toll rate regulation, and minimum capital investments over the term of the concession. Here, firms expressing interest are reviewed for their technical and operational qualifications to run the planned concession. In the next stage, qualified firms are invited to bid, and must supply both a business plan and an industrial plan. The business plan supplies detailed assumptions regarding traffic growth, revenues, maintenance, capital expenditures, and financial structure; the industrial plan supplies detailed plans regarding the strategic, management and operational initiatives to be implemented over the concession length, as well as the concessionaire's commitments to labor issues, regional and local authorities, as well as community groups. In the third stage the government meets with each bidder, discussing and reviewing the business and industrial plans, paying attention both to the anticipated financial performance as well as the labor and social provisions.

The extent of the criteria and review has the effect of narrowing the bids. Special attention in the bidding parameters is given to growth in toll rates. They are linked to .7 of the consumer price index, or CPI, which the European Central Bank limits to a maximum of 2% each year. There is therefore little room for variation among competitors for setting toll rates in the future, and given a relatively small possible range of tolls, and that tolls influence driving behavior in somewhat predictable ways, a rough range of realistic revenue levels can also be known. With regards to other truly competitive parameters, knowing that other firms are bidding and that the government is conducting a careful and detailed review, firms cannot bid too optimistically. These checks not only serve to mitigate risks in the

procurement stage, but also monitoring during the concessionary period because contractual terms are not only specified but quite realistic.

This mode of contracting supplements a 1995 innovation, concession agreements have been subject to 5-year adjustment plans that allow for fine tuning with respect to prevailing legal and economic conditions. The plans, signed by both the concessionaire and the government, cover the evolution of toll levels, maintenance standards with respect to the physical infrastructure and associated services, as well as social policy, safety, and environmental goals (Fayard, et al 2005, 96). Negotiating over a defined number of variables on a regular basis is an alternative way of protecting against the risk of opportunistic renegotiation, by accounting for mid- and long-term technical, demographic and legislative changes. The weakness of this bidding process as a check on risks is that monitoring is not as automatically enforcing as in the Spanish and Chilean mechanisms. It requires an impartial, highly competent, well-staffed bureaucracy, a setup that is costly and more subject to mundane, or perhaps political, error. However, this weakness is partially checked by the other mechanism, namely high equity requirements for the concessionaire.

Equity Requirements

The French concession system indirectly controls traffic risk by requiring the private partner to carry significant amounts of equity in its capital structure. Unlike the direct systems in Spain and Chile where the public partner actively changes key contract terms or guarantees some amount of traffic risk in order to lower the concessionaire's downside risk, the French equity requirements only seek to lessen the relevance of traffic risk to the concessionaire.

These equity requirements are enforced through two financial ratios: Net Debt/EBITDA ≤ 7and EBITDA/finance charges > 2.2. EBITDA, an acronym meaning Earnings Before Taxes, Interest, Depreciation and Amortization, is essentially a measure of cash revenues. Therefore, France's requirement that Net Debt/EBITDA be less than 7 is a requirement that all debt can be paid off in 7 years. EBITDA/finance charges is a measure of how well revenues cover interest and other financing fees, where a ratio of 1 means that revenues cover finance charges; so a ratio of 2.2 means that revenues cover more than 2 years' finance charges (Bel and Foote 2009, 403-4). Simply put, a concessionaire with less debt can more easily handle unexpected drops in traffic revenue because its debt payments are smaller. This decreases the risk of financial default for the private partner, and as a corollary, decreases the risk for the public partner that it will have to buy or subsidize an asset when it is least prepared to do so, which avoids the associated negotiations and financial engineering as well.

A concessionaire with less debt will also be a more conservative operator. While the concession overall has become financially safer, the concessionaire itself would typically be the major equity investor, and there is more to lose, and less to gain than with higher debt levels, where the same change in revenue would lead to a proportionally much greater return to the equity investment. This risk profile would also tend to attract better business partners – large, specialized infrastructure operators rather than investment groups with a minor specialized partner. For the public partner, more conservative behavior makes monitoring easier, and mitigates against extravagant private returns that could make it politically unpopular and even force action against it.

Although with Spain the global economic crisis makes its reforms hard to fully evaluate, the French reforms presented here are somewhat easier to evaluate: when the

same concession sales are modeled without the equity requirements, their value skyrockets (Bel and Foote 2009, 404-5). While this would be better for the French government with respect to the portion of proceeds going towards the national debt, consumers would lose out because of the longer repayment period and likely higher tolls needed to pay off the greater value of the concession. More to the point, the French government and citizens are better off because prospects of highly-leveraged financial maneuvering are greatly reduced.

Conclusion

The current practice in American infrastructure public-private partnerships reflects a commitment to strictly separating the public sector from the private, and faith in a less-regulated private sector. Concessionaires, it is assumed, will be led by their own financial interests to make sensible planning and investment decisions. Public partners will set forth various quality and safety criteria that must be adhered to, but other than this, the attitude is that the public partner should largely step aside. This sounds justifiable, but deep problems with this approach become evident in concessions at or near financial failure. A concession that cannot be flexible with regard to traffic risk will be more prone to failure; a concession that is financially overleveraged will be more likely to fail when traffic falls; and markets have not been competitive enough to provide ready buyers for a concession in or near failure. With no other prospective buyer, the public partner must deal with a piece of infrastructure that potentially has no operator or maintainer. It therefore becomes highly exposed to the risk of opportunistic contract renegotiation, or buyout. In hindsight, it becomes apparent that these situations are largely brought on as much by poor planning and oversight as they are by a model that is too fragile to withstand expected real-world shocks.

Spain, Chile and France, in contrast, have developed a number of regulatory tools to assure good planning, provide sensible levels of public financing, and mitigate traffic risk. These mechanisms vary by their complexity and the amount of activity the public partner undertakes directly in the mechanism, but they all provide incentives designed to overcome

common risks in public-private partnership. The chart below summarizes them.

Risk Management Mechanisms		Common Risks: Dealing with Traffic Shortfalls	Excessive Debt Levels	Planning Quality	Effective Contracts	Excessive Private Profit	Monitoring	Ad-hoc Negotiation	Private Bankruptcy
Spain	Flexible Contracts	X				X	X	X	X
	Performance-sensitive Public Loans (SPPL)	X	X			X			X
	Legal Risk Mgmt Framework				X			X	
Chile	Flexible Contracts	X				X	X	X	X
	Limited Income Guarantees (MIG)	X						X	X
	Competitive Bidding		X	X	X		X		X
France	Fine-grained Regulation			X	X		X	X	
	Competitive Bidding			X	X		X		
	Strict Debt/Earning Requirements	X	X	X	X				X
	Planned Contract Maintenance	X		X	X	X	X	X	X

Figure 8: Risk Management Mechanisms by County

The functionality of these mechanisms should be broadly familiar following their analysis in the case studies, but some of the common risks have been made generic. For instance, while it is clear that France's strict Debt/Earning Requirements and Spain's SPPL prevent private partners from taking on too much debt, Chile's competitive bidding also favors partners with responsible debt levels. Chile's competitive bidding works for the system in multiple ways by making potential private partners compete over contract provisions, leading to better

quality, more effective contracts that need less monitoring, and so have a lower risk of bankruptcy. Many of the mechanisms are multi-functional in this way: Chile's income guarantee helps private partners deal with the main cause of failure, traffic shortfalls, so it also decreases the chances of opportunistic negotiation and private partner bankruptcy. It is trusted that by reasoning this way, the reader will see how one kind of risk alleviated by the mechanism can actually decrease other risks, and how different mechanisms from the countries address the same common risks.

What the mechanisms also have in common is a commitment by the public partner to better coordination and oversight of particular partnerships and their infrastructure networks as a whole. This is actually a second core argument running through the entirety of the paper: a successful concession model relies as much on an intelligent incentives structure as it does on a competent and willing public agency. An active and knowledgeable agency is a prerequisite to developing, tendering, and regulating any effective model. Contract and market incentives alone do not suffice – though they certainly help.

The drawback of public-private partnerships, beyond the very real and very large risks of poor contracting, private partner failure, and resultant public financial burden, is that even when successful they limit the future flexibility of the public partner. Concessions are awarded for decades at a time, during which time the private partner has the right to manage the asset in a way that maximizes their revenue so long as it is consistent with contractual standards. Contractual standards may become outdated, and then the public partner is left with either renegotiation, or an infrastructure asset that is in some way deficient. The 5-year contract planning iterations conducted by the French are a partial solution.

Non-compete clauses, like the one employed by the SR-91, have been utilized in other countries as well, including Spain. As private infrastructure markets mature, non-compete agreements have been falling out of practice, with the private sector more willing to take on this risk, or evolving into something less onerous. In the US, for instance on the Indiana Toll Road, they have appeared in modified form as compensation agreements (Indiana Toll Road Concession and Lease Agreement, 12). In a compensation agreement, terms are specified under which the public partner must monetarily compensate the private partner for new infrastructure improvements that detract from the concession's profitability. This is an improvement because the public sector can make up for infrastructure deficiencies without fear of being legally blocked. However, if the public partner procured infrastructure through private finance because of budgetary restrictions, paying for new infrastructure while having to compensate the private sector can be as restricting as an explicit non-compete agreement.

In the final consideration, public-private partnerships should not be thought of as schemes to free the public sector from infrastructure expenditure. In practice, they are schemes that lessen the government's financial commitment, not eliminate it. Any public agency looking to undertake an infrastructure project must be able and willing to pay for a significant portion of it because private concessionaires often run into financial situations requiring deep public subsidy or even full buyout. This is true even with the best planning, policy, and contracting. There is no reason to think that the concession business is different from any other and somehow immune to radical economic, demographic and policy shifts that periodically happen. Furthermore, the better practices of Spain, Chile and France demonstrate that a good public partner is an engaged one. Staffing, establishing regulatory compliance, and maintaining contracts take time and money. To negotiate a concession deal

in the US is on the order of several million dollars, and staffing needs will depend on the project's complexity and the place of the regulating agency in the government structure.

For those large non-transactional costs, the best course of action for agencies to undertake public-private projects may be to set up a rainy day fund equivalent to some significant percentage of the project's total cost. This would put a public partner on stronger terms in a renegotiation if the need to step in arose at some point during the life of the concession. When the concession ends (by natural life of the contract or otherwise), the remainder of the rainy day account would become available to be spent elsewhere. To be sure, having to set aside funds will make such partnerships less attractive to the public sector because it eliminates the perceived "free lunch" aspect of private infrastructure finance. This is in fact a plus because it would encourage more discretion at the planning level, and more discretion and intelligence are exactly what is needed for good concession policy.

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