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Tolls, Terms and Public Interest in Road Concessions Privatization: A Comparative Analysis of Recent Transactions in the USA and France

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ABSTRACT *Recent concessions in France and in the USA have resulted in a dramatic difference in the valuation placed on the toll roads; the price paid by the investors in France was 12 times current cash flow whereas investors paid 60 times current cash flow for US toll roads. In this paper, we explore two questions: what accounts for the difference in these multiples? and what are the implications with respect to the public interest? Our analysis illustrates how structural and procedural decisions made by the public owner affect the concession price. Further, the terms of the concession have direct consequences that are enjoyed or borne by the various stakeholders of the toll road.*

Introduction

There is growing interest in private toll road concessions all over the world. This interest is particularly intense in the USA, following well-publicized transactions involving the Chicago Skyway and Indiana Toll Road, the recent privatization of the Pennsylvania Turnpike in May 2008 and speculation about possible multi-billion dollar deals involving other US toll roads. As a US concession model evolves, there is increasing scrutiny of the characteristics of toll road concessions in Europe.

As of yet, no study has compared the European experience with recent US activity. This paper will fill that gap. In particular, we analyse the main features of the Chicago Skyway and Indiana Toll Road (ITR) concessions in the USA and the *Autoroutes du Sud de la France* (ASF), *Autoroutes Paris-Rhin-Rhône* (APRR) and *Société des Autoroutes du Nord et de l'Est de la France* (SANEF) concessions in France. All these toll roads were converted from public to private ownership over a span of 18 months from early 2005 to mid-2006. In many respects, these roads and the means (including prospective investors) by which they were privatized are similar.

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Table 1. Comparison of prices paid for toll road concessions in France and the USA (US\$ million^a)

	APRR	SANEF	ASF	Skyway	Indiana Toll Road
Year	2005	2005	2005	2004	2005
Gross revenues	1 854	1 359	2 919	41	99
EBITDA	1 149	873	1 853	29	64
Concession price ^b	14 122	10 645	23 161	1 830	3 850
Price as multiple of EBITDA	12.3×	12.2×	12.5×	63.1×	60.2×
Per cent difference between high and second bid	1.6%	1.7%	n.a. ^c	161.4%	26.2%

^aUsing an exchange rate of US\$1.18 to 1 Euro.

^bIn the case of the French toll concessions, price includes assumed debt.

^cThere was only one bidder for the ASF concession.

The valuations that resulted from privatization were, however, very different. The price paid by the investors for the French toll roads was 12 times current cash flow (earnings before interest, depreciation and amortization, or 'EBITDA') whereas investors paid 60 times current cash flow for the US toll roads, as shown in Table 1. What accounts for the difference in these multiples, and what are the implications with respect to the public interest? This paper does not address the merits of toll road concessions in general, but instead concentrates on the relative outcomes of the US and French approaches in terms of both price and social welfare.

Our analysis of the five US and French concessions allows us to draw several conclusions that are useful in evaluating the consequences for the public interest of the Chicago Skyway and the ITR concessions. For example, we compute what part of the price paid for the Chicago Skyway concession comes from anticipated toll increases. We also compute that part of the concession price derived from efficiency/productivity gains, which, in contrast to the terms of the French concessions, is not shared with the users of the Skyway.

In the next section we will describe how the French and US local/state governments approached the sale of concessions. This is followed by an analysis of the bidding parameters in both approaches and an examination of the spread of bids that resulted. That accomplished, it is possible to look at the relative changes in social welfare resulting from the privatizations and to lay out some general conclusions.

Description of the Two Concession Approaches

The French Toll Road System

In June 2005, the French government declared that it intended "to pursue the sale of the state-owned shares in the motorway companies as a means to finance large public works. The revenues obtained from these sales will go mainly to the Agency for the Finance of Transport Infrastructures, so that it can speed up [its investment programme]" (Portail du Gouvernement, *Déclaration de politique générale: le programme du Gouvernement*, 8 June 2005). One of the expected sources of revenues for the *Agence de financement des infrastructures de transport de France* (AFITF) was the revenue earned by the French state and the public company *Autoroutes de*

France (ADF) from their holdings in the concessions of tolled motorways. In September 2005, the government stressed that the main objective of the privatization of the concession companies was “to obtain financial revenues that will allow payment of a part of the National Debt and financing of new essential infrastructures”¹ (Portail du Government, *La privatisation des sociétés concessionnaires d’autoroutes*, Questions & Réponses, no. 020, 7 September 2005).²

The French government’s 2005 decision was made against the backdrop of a tradition that included both public and private ownership of toll roads. Between the mid-1950s and the late 1960s, toll road concessions were awarded to both state-owned firms and mixed public–private companies in which the public sector had a majority stake. Five mixed companies were created, which were called ‘sociétés d’économie mixte concessionnaires d’autoroutes’ or SEMCAs (Fayard *et al.*, 2005). Throughout the 1960s the SEMCAs were little more than ‘paper organizations’ (Fayard *et al.*, 2005), with no substantive role in the management of concessions. In the late 1960s, reforms were implemented to give the SEMCAs more autonomy and responsibility. These reforms allowed private companies to own motorway concessions, and between 1970 and 1973, four private companies obtained toll road concessions.

In the early 1980s, the French motorway system faced serious financial problems due in part to an increase in gas prices and an economic downturn that retarded the growth of traffic. In 1982, the French government took over three of the four private concessions and a new government agency, ADF, was established. This change allowed the government to cross-subsidize various toll roads.

Extension of the motorway network intensified through the 1990s, and a restructuring of the ownership of toll roads was undertaken to modernize the concession system and to stimulate toll road investment. In order to promote financial viability, the SEMCAs were consolidated into three main groups based on geography: ASF, APRR and SANEF. These toll roads were privatized in 2006 and are the subject of this paper.

ASF was formed in 1957 to operate the Lyon-Orange motorway. ASF’s network gradually developed in southeastern and southwestern France. In 1994 ASF took over ESCOTA, the company operating the Estérel, Côte d’Azur, Provence and Alps autoroutes. The ESCOTA concession was set to expire on 31 December 2026, and the original ASF concession was to expire on 31 December 2032.

By mid-2006, the concession network operated by ASF amounted to 1842 miles of road, which made ASF the largest highway concessionaire in France and the second largest in Europe. The network connects France, Italy and Spain and serves the French cities of Lyon, Marseille, Bordeaux, Toulouse and Nice. Three out of the four busiest motorways in France are in the ASF network: autoroutes A7, A8 and A9. Table 2 presents financial and corporate information on ASF before privatization.

APRR was formed in 1961 to operate the Paris-Lyon motorway A6. APRR’s network expanded over time, with the addition of the A5 and A39 motorways, which provided alternative routes to France’s eastern regions (Toul and Mulhouse) and central regions (Bourges and Clermont-Ferrand). In 1994, as part of the restructuring of the French motorway sector, APRR took over *Autoroutes Rhône-Alpes* (AREA). The APRR and AREA concessions were to expire on 31 December 2032.

By mid-2006, APRR was operating 1371 miles of road. This made APRR the second largest highway concessionaire in France and the fourth largest in

Table 2. Financial and corporate pre-privatization information on APRR, SANEF and ASF (end of 2005)

	APRR	SANEF	ASF
Established in	1961	1963	1957
Network length (miles as of June 2006)	1371	1083	1842
First listed on the Paris Stock Exchange	25 November 2004	24 March 2005	28 March 2002
Initial share price	€40.5	€40.0	€24.0
Share price 7 June 2005 (day before privatization was announced) CAC = 4180.7	€44.5	€41.6	€43.6
Share price 18 July 2005 (day when the privatization process was launched) CAC = 4363.5	€51.8	€48.4	€48.4
Share price 30 December 2005 CAC = 4715.2	€60.4	€57.25	€50.0
Remaining state share	70.2% (via ADF)	75.7% (via ADF)	50.4% (via ADF)
Ownership structure	70.2% State and ADF 0.9% Employees 0.8% Local authorities 24.1% Float shareholders	75.7% State and ADF 0.9% Employees 0.3% Local authorities 23.1% Float shareholders	50.4% State and ADF 1.9% Employees 0.8% Local authorities 23.9% Float shareholders
Workforce	4391	3642	7975
Gross revenue 2005	€1.57 billion	€1.15 billion	€2.47 billion
EBITDA 2005	€0.974 billion	€0.74 billion	€1.57 billion
EBITDA / gross revenue	62.0%	64.5%	63.4%

Note: CAC stands for the selective index in the Paris Stock Exchange.

Sources: Journal Officiel de la République Française (Documents Ref. ECOX0609065V, ECOX0609151V); APRR (Annual Report 2005); SANEF (Rapport Annuel 2005) and ASF (Comptes Consolidés 2005).

Europe. The operations of this group are concentrated in central France. The group's road network mainly covers the Paris-Lyon (A5, A6, A39) motorway, the Bourgogne-Northern Europe (A31–A36) motorway, the Alpine motorways in the Rhone-Alps region (A40, A41, A42, A43, A48) and the motorways in the centre of France (A77, A71). Table 2 presents financial and corporate information on APRR before privatization.

SANEF was formed in 1963 to operate the Paris-Lille motorway (A1). Over time SANEF's network expanded to include a new concession connecting Belgium with the north and east of France (A2) and the takeover of the Paris-Metz motorway (A4) as well as some minor concessions. In 1994, SANEF assumed ownership of the *Société des Autoroutes Paris-Normandie* (SAPN) that operates a network serving the western Ile-de-France and Normandie. The SANEF and SAPN concessions were to expire on 31 December 2028.

By mid-2006, the SANEF network included 1083 miles of roads. This made SANEF the third largest highway concessionaire in France and the fifth in Europe. The operations of this group are concentrated in the northern part of France. SANEF includes the *autoroute du Nord*, the most heavily used French motorway. Table 2 presents financial and corporate information on SANEF before privatization.

Toll Roads in the USA

Most of the interstate highway system in the USA was planned and built as part of the Interstate Highway System (IHS) under the National Interstate and Defense Highways Act of 1956. Today the IHS includes approximately 47 000 miles of roads representing an investment of US\$329 billion in 1996 dollars. In addition, there are around 21 000 miles of other non-interstate roads, which are limited-access divided highways. Eight per cent, or 5300 miles, of the total of 68 000 miles of limited-access roads in the USA are tolled (Cox and Love, 1996).

Most of the roads in the IHS are non-tolled roads that were built and are maintained by gasoline taxes collected by the states and the federal government. However, there are some 3000 miles of toll roads within the IHS that were financed and built by state and municipal governments and agencies. Examples include the Pennsylvania Turnpike, New Jersey Turnpike, ITR and the Chicago Skyway. Only a very small number of toll roads in the USA have been developed, owned or operated by the private sector in the last 100 years.

Over the last several years, there has been a movement in the USA towards public-private partnerships in the transportation sector. The impetus behind this movement is the belief that the private sector can bring much needed capital and expertise to address the needs of a growing US transport infrastructure. One area in which the private sector has shown particular interest is existing toll roads, which many believe have attractive investment characteristics. This interest has been matched by the desire of some states and municipalities to monetize the future earnings of these toll roads to fund operating and capital projects. The first two of these 'monetizations' in the USA were the Chicago Skyway and the ITR.

The Chicago Skyway was financed and constructed by the City of Chicago in the mid-1950s and was opened for traffic in 1958. The Skyway is a 7.8-mile long road and bridge facility that connects the western end of the ITR with the Dan Ryan Expressway, a non-tolled road that provides access to downtown Chicago.

In March 2004, the city issued a Request of Concessionaire Qualifications as the initial step in leasing the Skyway to a private operator. The city's motivation was

Table 3. Financial and corporate pre-privatization information on Skyway (2004) and Indiana Toll Road (2005)

	Chicago Skyway	Indiana Toll Road
Established in	1958	1956
Network length (miles)	7.8	157
Ownership structure	100% City of Chicago	100% State of Indiana
Workforce	130	590
Gross revenues	US\$41.1 million	US\$98.6 million
EBITDA	US\$29 million	US\$64 million
EBITDA/gross revenues	70.5%	64.6%

Sources: City of Chicago Financial Reports, Indiana East-West Toll Road Financial Analysis (Crowe Chizek and Company LLC, 7 March 2006) and Indiana Toll Road Request for Toll Road Concessionaire Proposals.

to raise cash (in the form of an upfront concession rent) to be used by the city to fund various municipal needs and, in the process, to eliminate a non-core municipal operation. Bids from pre-qualified bidders were received in October 2004, and a consortium comprising Macquarie Investment Holdings (Macquarie henceforth) and *Cintra Concesiones de Infraestructuras de Transporte S.A.* (Cintra henceforth) was declared the winning bidder. The concession transaction was completed in January 2005. Table 3 presents financial and corporate information on the Chicago Skyway before privatization.

The *Indiana Toll Road* was financed and constructed by the State of Indiana during the 1950s and was opened for traffic in 1956. It is 157 miles in length and runs across the northern part of Indiana from the Illinois to the Ohio border. The Indiana Toll Road Commission was responsible for operating the road from 1956 to 1981 when management passed to the Indiana Department of Transportation.

In September 2005, the State of Indiana issued a Request for Toll Road Concessionaire Proposals. The state sought to generate an upfront concession rent that could be used to partially fund a ten-year statewide transportation improvement programme. After a qualification process, five groups were invited to bid on the concession. The state received four bids in January 2006, and Statewide Mobility Partners (a consortium of Macquarie and Cintra, as in the Chicago Skyway) was the winning bidder. In June 2006, the concession transaction was completed with full operating responsibility for the toll road being transferred to the concessionaire. Table 3 presents financial and corporate information on ITR before privatization.

The Privatization Process

In the five studied toll roads, the privatizations were set up as leases in which the concessionaire has the obligation to operate the road pursuant to an agreement with the public owner in return for the right to collect tolls. Title to the road did not change hands. In both the French and US concessions, companies were invited to bid pursuant to a sealed bid process.

The three French concessions were auctioned separately, but at the same time. The French government invited indicative bids, and these were followed by firm bids. The government then met with the bidders to review their respective offers.

Upon review, the government declared a winner for each concession. The bidding process for Skyway and the ITR also involved a pre-qualification stage and then an invitation to bid. The highest bidder was declared the winner.

The processes followed in the two countries were very similar (detailed information on the steps and timeline for the French and US concessions can be provided upon request). However, there was an important exception: as a bidding requirement, offers for the French concessions had to be accompanied by two pieces of supporting documentation: a business plan and an industrial plan. The business plan detailed assumptions for traffic, revenues, maintenance and capital expenditures, financing structure and expenditures. The industrial plan detailed the strategic, management and operational initiatives to be implemented by the concessionaires and commitments regarding labour issues and the relationship with both regional and local authorities and community interest groups. These plans were subject to review and comment by the French government and evaluated as an integral element of the bids.³

The consequence of this for the French concessions was that price was not the sole bid award criterion, as it was for the US concessions. As discussed below in more detail, this 'best bid', as opposed to 'high bid', approach had the dual consequence of (1) lowering the amount of the winning bid, and (2) narrowing the spread among bids.

Analysis of Bidding Parameters

The underlying basis of the economic value of a toll road concession is the projected annual cash flow generated over the concession period (the cash flow is equal to the gross toll revenue minus operating costs and capital expenditures). The inputs used to develop the projected cash flows are: (1) the term of the concession; (2) a projection of gross toll revenue, which is a function of future traffic and future tolls; (3) operating costs; and (4) capital expenditures. To determine the price an investor would be willing to pay for a given cash flow, we must discount the cash flow over the term of the concession. The appropriate discount rate is the weighted cost of capital used by the concessionaire to finance the concession payment, or rent.

In both the French and US cases, each bidder was provided with certain bid parameters: the term of the concession, the toll regulation (e.g. the formula by which tolls can be adjusted annually) and the minimum capital investments to be made over the term of the concession. The Chicago and Indiana concession agreements, in addition to setting down operating and legal requirements, established minimum standards for the physical upkeep of the roads. However, it was left to each bidder to determine the level of investment needed to maintain those standards. In the French concessions, on the contrary, the government monitors the actual investments.

Armed with the bidding parameters, the bidders could construct financial models of the toll roads' future cash flows. These models require making assumptions about (1) the relevant economic indices (e.g. CPI, GDP) that form the basis of the toll setting formula; (2) traffic growth that reflects the elasticity of demand as a function of toll increases, among other factors; (3) operating costs (reflecting usage, efficiencies and inflation); and (4) capital expenditures.

To understand the differences in the multiples paid for the US and French concessions, it is useful to determine the sensitivity of the discounted cash flows

to each of the bid parameters and assumptions. To do this, we use the Chicago Skyway as the example. We choose the Skyway because we have access to the assumptions made by the winning bidder through the Preliminary Offering Memorandum (28 July 2005) for bonds issued by the Skyway Concession Company LLC. These bonds refinanced the bank loans used to fund the upfront concession payment.

The parameters and assumptions used by the winning bidder to arrive at the US\$1.83 billion concession price for Skyway were: concession term (99 years); toll increases (stated increases through 2017 and 3.6% per annum thereafter); compound annual growth in traffic (1.23%); and annual net growth in operating expenses (3.45%). These parameters and assumptions constitute the base case (Case 1) in Table 4. Cases 2, 3, 4 and 5 each show a change in a single variable to illustrate the effect of each variable on the size of the concession price.

Changes in the length of the concession term (Case 2), toll rates (Case 3) and traffic growth (Case 4) all have significant impacts on the discounted value of the resulting cash flows. Case 5 shows that the discounted value is less sensitive to operating costs. Regarding the relative importance of these variables on the discounted value, Enright (2006) found that the toll schedule was the main driver in establishing the value of the Skyway concession.

Case 6 shows the effect of shortening the length of the concession term and moderating the annual increases in the toll rate, both consistent with the French concession agreements, and moderating the assumed growth in traffic (with respect to the last, see text associated with Table 7). The resulting discounted value, expressed as a multiple of EBITDA, is close to the multiples of the French concessions (15 versus 12). That is, if the French concession parameters regarding term and toll regulation were applied to the Skyway, its price, expressed as a multiple of EBITDA, would have been similar to the prices paid for the French concessions.

There were certain other parameters included in the French concession documents that were absent in the US concession agreements. These parameters do not affect the projected cash flows, but affect the cost of capital and therefore the discount rate, which in turn affects price. One of these parameters was an upper bound placed by the French government on the amount of leverage the concessionaire could use to finance the concession payment; it was mandated that the concessionaire comply with two leverage ratios: (1) Net debt/EBITDA \leq 7.0, and (2) EBITDA/Financial charges $>$ 2.2. These constraints have the effect of

Table 4. Sensitivity of concession price to certain parameters (US\$ 000)

	Base Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Concession term	99 years	23 years	99 years	99 years	99 years	23 years
Compound annual growth in tolls	3.78%	3.78%	2.08%	3.78%	3.78%	2.08%
Annual growth in traffic	1.23%	1.23%	1.23%	0.23%	1.23%	0.23%
Annual growth in operating expenses	3.45%	3.45%	3.45%	3.45%	2.20%	3.45%
Discounted value of cash flows ^a	US\$ 1 881 815	US\$ 1 060 359	US\$ 1 088 477	US\$ 951 773	US\$ 1 900 493	US\$ 446 281
Discounted value as multiple of EBITDA	65×	37×	38×	33×	66×	15×

^aDiscounted at a 9.38%. The discounted value equals the concession price + transaction fees.

Table 5. Effect on Chicago Skyway of imposing leverage ratios similar to those imposed by French Government (US\$ 000)

	Cost of capital ^a	Base case	Case 6a
Equity	12.30%	US\$661 061	US\$1 777 393
Net debt	8.00%	US\$1 400 000	US\$283 668
EBITDA-2006		US\$40 524	US\$40 524
Net debt divided by EBITDA		35	7
Total capitalization		US\$2 061 061	US\$2 061 061
Weighted cost of capital		9.38%	11.71%
Discounted value of cash flows		US\$1 881 815	US\$371 421
Concession price as multiple of EBITDA ^b		64.9×	12.8×

^aRepresents the imputed cost of equity and debt for Skyway concession.

^bConcession price equals the discounted cash flow value minus transaction fees.

increasing the amount of equity relative to debt the concessionaire must use to finance the concession rent. Since equity has higher cost than debt, the overall (weighted) cost of capital will be higher. *Ceteris paribus*, the consequence of a higher cost of capital is a higher discount rate and a lower valuation.

To illustrate the magnitude of the effect of the cost of capital on valuation, we can apply one of the leverage constraints imposed by the French government to the Skyway transaction. This constraint is $\text{Net debt}/\text{EBITDA} \leq 7.0$. Immediately following the refinancing of the Skyway concession (approximately six months after the closing of the original transaction), the ratio of Net debt to EBITDA was 35 (US\$1.4 billion divided by US\$40 million). Reducing the amount of debt (by increasing the amount of invested equity) in order to be in compliance with the French leverage ratio would have caused the Skyway's concessionaire's cost of capital to increase by approximately 2.3 percentage points, as illustrated in Table 5. The impact of this increase on the Skyway valuation using the Case 1 and Case 6 assumptions (see Table 4) is shown ahead. The concession price in Case 6a, expressed as a multiple of EBITDA, is virtually the same as the multiples realized for the French concessions as shown in Table 1.

To summarize, the lower price-earnings multiples observed in the French concessions are due in large part to: (1) shorter terms of the concessions; (2) more restricted toll increases allowed; and (3) less aggressive assumptions regarding growth in traffic.⁴ In addition to this, the more conservative capital structure imposed by the French government has the effect of lowering the price a concessionaire would be willing to pay.⁵

Analysis of the Spread of Bids Observed in the Two Approaches

Not only were the prices paid for the French concessions significantly lower (on a price-earnings basis) than the prices for the US concessions, but also the spread of the bids received for each of the French roads was much narrower than that for the bids received for the US roads. One fact that makes this outcome particularly interesting is the significant overlap among the bidders for the French and US concessions as shown in Table 6.

To explain the large variation in the bids for the US concessions, one needs to look at the key assumptions that the bidders made in order to construct their respective valuation models. These assumptions are: (1) traffic growth, (2) toll schedule, (3)

Table 6. Bidders for the respective concessions (first row bidders are the winning ones)

APRR	SANEF	ASF	Skyway	Indiana Toll Road
Eiffage/Macquarie	Abertis	Vinci	Macquarie/Cintra	Macquarie/Cintra
Abertis	Cintra		Vinci, <i>et al.</i>	Itinere
Autostrade	Eiffage		Abertis	Babcock & Brown/ Challenger-Transfield
Cintra	Sacyr/Itinere			Morgan Stanley/Autostrade

operating costs, and (4) discount rate.⁶ It is reasonable to conclude by observing the very small spread between the winning and second-place bids in the French auctions that the assumptions used by the bidders were similar. Conversely, the large spreads in the US auctions were likely caused by disparate assumptions.

There are several reasons for the existence of different distributions of assumptions in the French and US concessions. First, the toll setting formula for the French concessions is based on a fixed percentage (70%) of CPI after an initial period of years, during which the actual tolls were set in the management contracts. Since the European Central Bank has an established policy of maintaining CPI at 2%, there is very little opportunity for the bidders to have different projections of the tolls that can be charged.

In both the Skyway and the ITR, tolls can be adjusted annually by the greater of 2%, the change in the CPI or the change in nominal GDP per capita. Further, there is significantly more volatility in the US CPI index than in the French. A likely consequence of the resulting uncertainty is the existence of widely divergent views on the part of bidders with regard to the future levels of these indices and, in turn, the projection of toll rates they make.

Regarding traffic projections, the bidders had access to historic and projected traffic data prepared by (or for) the public owner. Each bidder could either adopt these projections or prepare revised projections. In the case of the Skyway, the winning bidder commissioned its own traffic study that projected dramatically higher usage of the road, as shown in Table 7.⁷

In the contest for the Skyway, the winning and second-place bids were US\$1.83 billion and US\$700 million, respectively. That the winning bidder used more aggressive traffic projections, higher toll rates or a lower cost of capital, or

Table 7. Projection of average daily traffic on Skyway

	Wilbur Smith Study ^a		Halcrow Report ^d
	Case X ^b	Case Y ^c	
2004 actual	47 658	47 658	47 658
2010	64 100	50 300	67 029
2020	77 600	50 100	101 052

^aFrom Wilbur Smith traffic report dated 21 April 2004, prepared on behalf of the City of Chicago.

^bAssumed tolls remain the same (for example US\$2.00 for cars) over the projection period.

^cAssumed tolls increase according to the toll regulation included in the proposed concession agreement.

^dFrom Halcrow traffic report dated July 2005 prepared on behalf of the winning bidder, Skyway Concession Company LLC.

some combination of all three can explain the US\$1.1 billion difference. Although we do not have inside information about the assumptions that underpin the respective bidders' valuation of the concessions or the rationale used by each bidder to make their assumptions, there are two plausible explanations for the winning bid of the US concessions being an apparent outlier. The first is the Winner's Curse,⁸ which holds that there is a tendency for one or more bidders in an auction to overestimate the value of the asset being auctioned. Analyses of the Winner's Curse suggest that there are a number of possible reasons, conscious and unconscious, rational and irrational, for this overestimation.

The second possible explanation is that in a market at the early stages of privatization, bidders are willing to make abnormally high bids to achieve a leading position in subsequent privatizations (Miralles, forthcoming). Indeed, the privatization markets in France and the USA are in very different stages. Private tollways in France are well-established and represent a mature investment opportunity. In fact, no significant privatizations are expected in the near future. In contrast, privatization of toll roads is an emerging market in the USA, and most observers expect that there will be significant privatization activity over the next few years. Skyway and the ITR have played the role of 'opening' the US market, and winning these concessions has given Macquarie and Cintra visibility, and positioned them as leading firms in this new area.⁹

In addition to differences between the two markets, the procedure made bidders for the French concessions less susceptible, at least in degree, to the Winner's Curse. In the French process, the bidders had to disclose their assumptions to the government as part of the bidding process. Bidders knew that the auction's referee would review and evaluate the reasonableness of their financial and operating models as part of its decision-making process. Thus, we can expect bidders to have been more circumspect regarding their assumptions and less prone to overestimation.

There is an additional observation to make about the respective outcomes of the French and US privatization approaches. The Skyway and ITR concessions were structured to maximize the concession price. This was done by establishing the bid parameters with the objective of generating the highest possible discounted cash flow and by deciding the auction only on the basis of price. Regarding the latter, this 'high bid' protocol provides the opportunity for the Winner's Curse phenomenon to play out, with the consequence of a possible overvaluation. The French approach, on the other hand, is not structured to maximize concession price.

Table 8 summarizes these structural and procedural drivers illustrating in a step-wise fashion how the Skyway price would converge to the French concession prices if the structural and procedural differences were removed.

Analysis of Winners and Losers of the US Approach as Compared with the French Approach

The above discussion leads to the obvious question of why the French government would structure its concession process and agreements in such a way as to limit the concession price, or in other words, to leave money on the table. The answer lies in the concept of the 'public interest', which, for the purposes of this paper, we define as being equivalent to the economist's concept of social welfare. Social welfare includes the welfare of all agents involved in or affected by a policy

Table 8. Summary of price drivers (US\$ 000)

	Concession price ^a	Multiple EBITDA	
Skyway concession—actual	US\$1 830 000	63.1×	
Adjusted for shorter concession term—23 years	1 031 388	35.6×	Structural
Adjusted for lower allowable tolls—70% of CPI	724 586	25.0×	Structural
Adjusted for more modest traffic growth	434 087	15.0×	Procedural
Adjusted for less leverage	361 272	12.5×	Structural
Average for French concessions		12.3×	

^aExcludes transaction fees which, for the purpose of this table, are assumed to be a constant 2.7% of the actual and adjusted concession prices.

or situation. In this way, standard social welfare analysis usually considers consumer and producer surpluses.¹⁰ It is usually also understood that consumers are workers and that both are taxpayers.

In the case of the US concessions, and especially regarding the Chicago Skyway, it is worth recalling that there is little overlap between consumers and taxpayers.¹¹ Most users of the Skyway are out-of-city residents who commute to Chicago to work or shop. Hence, while they pay for the concession, the proceeds from privatization benefit Chicago taxpayers. We consider that division when we analyse the effect of a change in the concession conditions on consumers and taxpayers, since in this case, they are, to a large extent, independent groups.

With respect to toll road concessions, the following social welfare relationships hold:

- (1) If lengthening the concession period results in a higher concession price, then local taxpayer surplus increases.
- (2) Higher tolls paid by consumers result in extra profits for the producer—the concessionaire—and this, in turn, increases taxpayer surplus through a resulting higher concession price.

Merely transferring cash from consumers to taxpayers does not increase overall social welfare.¹² In the cases of the Chicago Skyway and the ITR it is clear that the city and the state, respectively, placed more importance on the welfare of taxpayers than that of consumers. It is easy to explain how this occurred given the fact that all local taxpayers are voters in local elections (regional taxpayers are voters in regional election), whereas only a small fraction of Skyway users vote in Chicago, and many users of the ITR are from out of state.

Using this framework, we can evaluate the two approaches from the perspectives of the public owner (e.g. the French government, the City of Chicago, the State of Indiana) and the taxpayers:

- (1) A larger concession price is better, regardless of the use of the sale proceeds.¹³
- (2) A large concession price that is financially unsustainable ('the deal goes south') may or may not be a bad thing depending on the 'take back' provisions.
- (3) A shorter concession term may or may not be better depending on how the public owner assesses risks of ownership (e.g. the contingent liabilities of on-going maintenance, bond payments) versus the value of future operational flexibility.

From the perspective of the public owner and the taxpayers, the much higher prices paid for the Skyway and ITR concessions give Chicago and Indiana taxpayers much more than the French concessions give French taxpayers.¹⁴ With respect to consumers' (toll payers') surplus: (1) lower tolls are better than higher tolls, and (2) better maintained and operated (efficient, safe, service-oriented) roads are good.

The most striking difference between the French and the US approaches relates to the toll setting formulas imposed on the concessionaires over the term of the concessions. Toll increases in the French concessions are limited to 70% of CPI after an initial period of pre-agreed hikes. The toll setting formulas for the Skyway and ITR also establish tolls over an initial period but then allow tolls to increase annually by the greater of 2%, the change in the CPI, or the change in nominal GDP per capita.

In the case of the French concessions, the projected toll increases are smaller than the change in the CPI. In the case of SANEF, for example, after 2009, when the 70% of CPI formula becomes applicable, there will be a continuous decrease of tolls in real terms (adjusted for inflation). At the end of the concession, tolls will have decreased by more than 10% in real terms. As a consequence, toll road users will have won purchasing power (or an increase in consumers' surplus). In the case of the SAPN concession, real tolls exhibit a similar pattern, although it takes longer for consumers to win purchasing power, since the real decrease of tolls begins only in 2014.

The situation is very different in the Skyway contract. Initially, tolls on the Skyway increase faster than CPI because of the pre-agreed increases. After 2017, the pre-established toll schedule ends, and the real increase of tolls continues because of the nominal GDP per capita factor of the formula.¹⁵ A similar story can be told for the ITR. Figure 1 shows the toll schedule throughout the full term (99 years) of the Skyway concession. The difference between the increase in tolls based on the concessionaire's projection and the increase that would have resulted from using only CPI in the toll formula is large. By the end of the concession, real tolls have more than doubled, assuming an average annual increase in CPI of 3%, and more than tripled assuming an annual average increase of 2.5%.

As observed, the concession model used by the City of Chicago and the State of Indiana maximized the concession price at the expense of consumer surpluses. To quantify the effect on consumers, we calculated the concession price for Skyway using the 'French' toll regulation of 70% CPI, while maintaining all other Skyway concessionaire's assumptions, including the 99-year term and Halcrow traffic projections (Case 3 in Table 4). The total price paid would have been US\$1.088 billion (or US\$742 million less than the actual concession price). Alternatively, if we calculated the price using toll increases set at 100% of CPI, the concession rent would have been US\$1.330 billion (or US\$500 million less than the actual concession price).

The US\$742 million difference between the actual concession price and the hypothetical concession price derived from a 70% of CPI toll regulation is made up of two components:

- (1) US\$500 million of loss of purchasing power for consumers (the effect of the difference between greater than CPI increases and increases limited to CPI);¹⁶ and

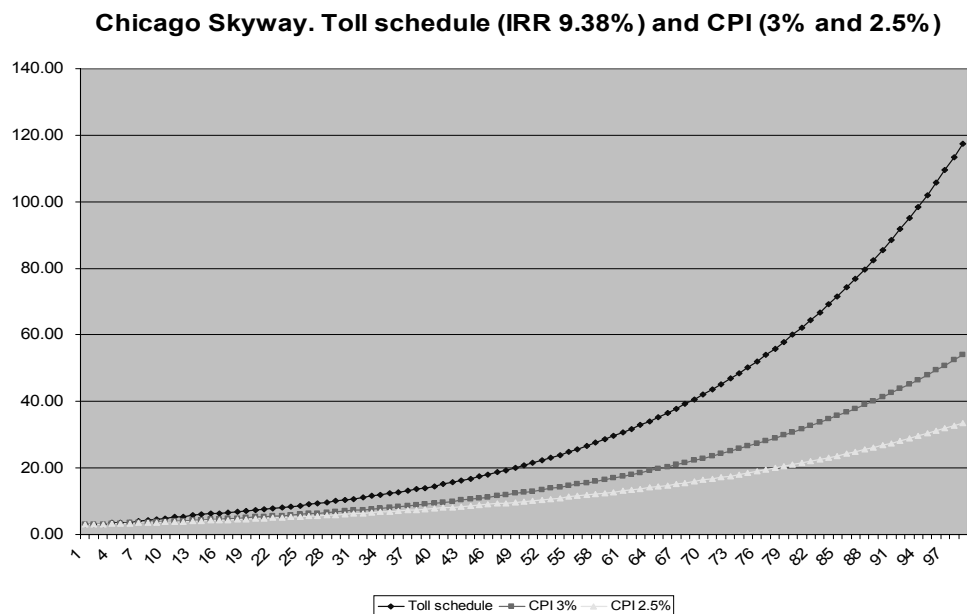


Figure 1. Actual toll increase versus CPI toll increase in Chicago Skyway (total toll US\$). Total length of concession

- (2) US\$242 million of opportunity cost resulting from consumers not sharing in the productivity gains (the difference of tolls beginning indexed to 100% of CPI versus 70% of CPI).

Hence, consumers are losers in the Skyway (and ITR) concessions relative to consumers in France; the Skyway users not only lose purchasing power because tolls increase faster than CPI, but they also do not share in efficiency/productivity gains, as is the case with the French concessions.

An additional story can be told from the regional perspective (the locale served by the road) with regard to positive and negative external effects:

- (1) Pricing strategies (e.g. toll setting, variable pricing, etc.) that optimize regional mobility (measured either in terms of aggregate traffic moved and/or in terms of level of regional congestion) are good.
- (2) Tolls that reflect externalities and compensate the parties that pay for these externalities are good.

Both the Skyway and the ITR have strong monopolistic characteristics, giving the concessionaires' significant latitude to set tolls to maximize profits. There is no incentive to set tolls to optimize regional mobility or to internalize external effects except where these activities enhance the bottom line. Consequently, residents in the regions served by the road are likely losers from this approach to selling concessions.

Conclusions

This paper analyses the large difference in the prices paid by investors for US concessions (Chicago Skyway and ITR) relative to the prices paid for French

concessions (SANEF, APRR and ASF). The significantly higher price-earnings multiples paid for the US concessions can be explained by two primary factors: structural differences between the US and French concessions, and procedural differences in the processes used by the City of Chicago and the State of Indiana and the French government to privatize their respective toll roads.

Regarding the structure of the concessions, both Skyway's and the ITR's longer lease terms, higher allowable toll rates and absence of capitalization restriction were major drivers of the higher prices paid. The procedural difference with the greatest impact on price was the auction award criteria. In the USA, 'high bid wins' was the sole award criterion. This bidding protocol allows the bidders to make financial modelling assumptions that are opaque to the public owner (and therefore not subject to review and evaluation) and can lead some bidders to overestimate the value of the concession.

Chicago and Indiana maximized their concession prices, while the French concessions were structured to balance consumer and taxpayer welfare. Certainly, the much higher prices paid for the US concessions benefit taxpayers more than does the French approach. However, this gain is won at the expense of the toll payers. According to our calculations, the Skyway (and the ITR) users not only lose purchasing power, because tolls increase faster than CPI, but also do not share in efficiency/productivity gains.

The recent transactions in the USA and France illustrate how decisions made by the public owner affect the concession price. Concessions can serve the public interest, but the decisions about how a concession is to be organized, both structurally and procedurally, should be made explicit and the tradeoffs inherent in these decisions belong as part of the public debate.

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Notes

1. Financial factors have been the primary reason for privatizing motorway concessions over the last decade. In Italy, Autostrade was transferred to the private sector in 1999. Autostrade's concession was scheduled to expire in 2003. To maximize privatization proceeds the concession was extended until 2038 and the level of tolls was maintained (and further adjusted for inflation), although most investments had been amortized before 1999 (Greco and Ragazzi, 2005). Financial engineering motivations have also been responsible for the use of payment schemes like shadow tolls (Shaoul *et al.*, 2006).
2. It is worth noting that only 4 billion obtained from the sale of the French concessions have gone to the agency of infrastructures—AFITF. The last year when these funds are available is 2008, and AFITF funds after 2008 are expected to decrease (SÉNAT, 2008, pp. 15–16). Overall, only 27% of total revenues from privatization (14.8 billion) have been allocated to AFITF; the rest went to the state budget.

3. The industrial plans laid out the operating strategy and assumptions that underpin the bid. The French government has a representative in the board of directors of each concession (without voting rights), whose function is to assure that the industrial plan is effectively implemented.
4. Uncertainty about the cash flow may differ between projects because of inherent differences in the projects, as pointed out by a referee. However, we think this does not affect our study, since all the roads we analyse are mature facilities and therefore have similar operating and capital requirements. And, more importantly, they have similar 'risk' profiles. In fact, our analysis is based on price expressed as multiple of EBITDA.
5. Instead, we do not see any influence of differences in tax regimes on the bids. First, US Federal Corporate taxes and French corporate taxes are the same (35%). There is a small state tax in the USA (around 5%), but the effect is small. Second, due to the ability of the US concessionaires to depreciate the leased assets, all income is effectively sheltered. Hence, taxes for the US deals are irrelevant. If there is a tax income liability associated with the French concessions, this may have some small impact on price. That said, it is worth noting that all valuations were done on earnings before taxes and depreciation basis.
6. As discussed previously, the appropriate discount rate is the weighted cost of capital that is used to finance the concession price. In the absence of leverage constraints, this cost of capital is a function of the bidders' perception of the risk of the project; the higher the risk, the higher the cost of capital. This assumes that all of the bidders have essentially the same access to capital markets.
7. Differences in availability of alternative free roads might contribute to the less optimistic forecasts for tolls and traffic in France, particularly as compared with the Chicago Skyway.
8. The concept of the Winner's Curse was first discussed in Capen *et al.* (1971). Thaler (1988) contains a useful explanation of this concept and its applications.
9. Even if Macquarie and Cintra 'over paid' for these concessions, their downside risk is minimal, from a corporate perspective. This is due to the relatively small size of the deals, and the fact that, in the case of Skyway, they were able to structure the financing so that it shifted much of the financial risk to the lenders using leverage, bond insurance and liberal dividend provisions. This, together with the winning bidders' desire to acquire good reputations and leading positions as industrial players, makes us believe that expectations of renegotiation did not play a significant role in the Skyway and ITR cases. In this sense, those operations are not comparable to those in Latin American that have caused renegotiation to strongly emerge in the literature (Guasch, 2004; Guasch *et al.*, 2007, 2008).
10. Consumers' surplus is the difference between what a consumer is willing to pay for a good and the actual price of the good. Producer surplus is the difference between what a producer obtains from selling a good and the cost involved in producing it.
11. Taxpayers' surplus is the difference between the utility derived from public services and the costs implied by taxation to pay for the services. It is worth recalling that setting tolls is not a 'zero sum game' between taxpayers' surplus and consumers' surplus. We do not go deeper into the workers' perspective. The work force in tollways is relatively small (and therefore has small impact on the overall welfare), so we believe we can safely disregard this variable.
12. An optimal toll should be set at the level that equals the social marginal cost (e.g. congestion costs, apart from externalities). However, toll setting procedures in France and the USA have no relationship to social marginal cost. As happens in natural monopoly pricing, higher tolls do not simply shift benefits from consumers to producers: they also reduce total social welfare. This being said, we recall that the economic basis of toll setting, even if a very relevant issue, is not the central focus of our paper.
13. The use of the proceeds is a factor in whether these sales are 'good public policy', but it is not a differentiator between the two approaches.
14. Theoretically, the taxpayer 'windfall' is not a risk even if the deal is not financially sustainable. But, in practice, costs are likely to be borne by taxpayers if the concessionaire defaults. Also, there is a situation in which a higher price and greater leverage could have a long-term detrimental effect on taxpayers; in Skyway, the City can terminate the concession early, but only upon payment to concessionaire of the fair market value of the concession (but not less than the value of the debt outstanding). To the extent that concessionaire keeps the asset fully leveraged, this termination option will be expensive for taxpayers.
15. Macroeconomic indicators in the USA show that CPI growth is lower than nominal GDP per capita growth. In the ten years before Skyway privatization, only in 2002 was the CPI higher than nominal GDP per capita.
16. It could be argued that purchasing power by users is better measured by the change in nominal GDP per capita than by CPI. In our context, it must be recognized that traffic on the Chicago

Skyway is used for commuting purposes disproportionately by people who live outside Chicago and work in the city. In this context, it is important to recall that real wages in the USA have not grown in the last three decades, and by the middle of the present decade they were lower in real terms than those in the 1970s. At present, real wages stand at the same level as those of the middle 1980s (source: U.S. Bureau of Labor Statistics).

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