

Comparison of Recent Toll Road Concession Transactions in the United States and France

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Abstract:

Recent concessions in France and in the US have resulted in a dramatic difference in the valuation placed on the toll roads; the price paid by the investors in France was twelve times current cash flow whereas investors paid sixty times current cash flow for the U.S. 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.

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1.0 Introduction

There is growing interest in private toll road concessions in the United States following the well publicized transactions involving the Chicago Skyway and Indiana Toll Road 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 European toll road private concessions. Worrall (2006) in a discussion of the evolution of a US concession model notes that typical concession terms for European toll roads are a) between 15 and 30 years (contrasted with 99 years for Skyway and 75 years for the Indiana Toll Road) and b) usually include renegotiation provisions.

No detailed study has been undertaken so far, however, that examines the European experience compared with the recent US experience. The purpose of this paper is to fill this gap in the literature. In particular, this paper analyzes the main features of the Chicago Skyway and Indiana Toll Road concessions in the US 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 five of these toll road entities were converted from public to private ownership in a span of eighteen months in early 2005 to mid 2006. In many respects, these roads and the processes (including the prospective investors) by which they were privatized are similar. There was a dramatic difference, however, in the valuation placed on the US vs. French toll roads; the price paid by the investors for the French toll roads was twelve times current cash flow (earnings before interest, depreciation and amortization, or “EBITDA”) whereas investors paid sixty times current cash flow for the U.S. toll roads, as shown in Table 1.

(Insert table 1 around here)

In this paper we will explore two questions: 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 arrive at several conclusions that are useful in evaluating the Chicago Skyway and the Indiana Toll Road concessions with respect to the public interest. For example, we compute what part of the price paid for the Chicago Skyway concession comes from anticipated toll increases. In addition, we compute what part of the concession price comes from efficiency/productivity gains not shared with the users of the Skyway as is the case in the French concessions.

This paper is organized as follows. In Section II, we describe the two concession approaches. In Section III we analyze the bidding parameters in both approaches. In Section IV we study the spread of bids observed in the US and France. In Section V, we look at the relative changes in social welfare that result from the US and French approaches. Finally, we draw the main conclusions from our analysis.

2.0 Description of the Two Concession Approaches

Before looking at the particular concession approaches used recently in France and the US, it is useful to review the history of modern toll roads in Europe and the US. This review suggests, among other things, that the risks inherent in operating toll roads in the Europe and the United States are not so different as to be a contributing factor in the difference in prices.

2.1. Toll Roads in Europe

After World War II European economies grew rapidly and by the 1960s many European countries were developing plans for networks of motorways. Countries in Northern and Central Europe, as well as the United Kingdom chose to finance new motorways from their general funds. The Southern European countries opted for toll financing since funds from the general budget to finance motorways were scarcer (Bel, 1999), as well as in recognition of the fact that much of the new road infrastructure would be used by non-resident visitors, for example tourists (Gomez-Ibañez and Meyer, 1993). In the case of France and Italy in the 1950's and 1960's, concessions were given to state-owned companies and agencies which were responsible for building and operating the roads. In Spain, private firms were granted concessions to build and operate the toll motorways.¹ This pattern of tax-financed motorways in Northern Europe and toll-financed motorways in Southern Europe persists to this day as shown in Table 2.

(Insert table 2 around here)

As mentioned previously, Spain traditionally had been disposed to privately owned and managed toll concessions. Many of the other countries with toll roads have made a transition from publicly-owned to privately-owned toll concessions. For example, most of the Italian toll motorway network (*Autostrade*, now 2,118 miles) was privatized in 1999 through a public offering of shares that were subject to competitive bidding, and most of the French network was privatized in 2006. Only in Greece are the toll motorways managed by a public agency (the Greek National Road Fund).²

¹ In France, these concessions included strict contractual limits linked to a CPI index. Later, in the early 1970s, some concessions were awarded to private firms, as discussed below. In other Southern countries, such as Portugal and Greece, plans to develop the motorway network were not undertaken until much later. More recently, Ireland has begun to rely on private concessions to extend its tollway network.

² Although the Greek toll roads are managed currently by public agencies, there is an expectation that there will be private concessions. Public management of tolls is also important in Norway (non-EU country), where almost 90 per cent of the motorways network is tolled, and all tolls are publicly managed.

Financial motivations have been the primary reason for privatizing motorway concessions in Europe over the last decade.³ In France, the Prime Minister announced in June 2005 that, “I have decided to pursue the sale of the state-owned shares in the motorway companies as a means to finance the 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 program]”.⁴ In September 2005, the Government stressed that the main objective being pursued with the privatization of the state-owned concession companies was “to obtain financial revenues that will allow to pay a part of the National Debt and to finance new essential infrastructures.”⁵

2.2 The French Toll Road System

Prime Minister Villepin’s 2005 pronouncement was made against the backdrop of a tradition in France where public and private ownership of toll roads both have been present. Between the middle 1950s and the late 1960s, toll road concessions were awarded to state-owned firms and to mixed public-private companies in which the public sector had a majority stake. Between 1955 and 1963 five mixed companies were created, which were called “*sociétés d’économie mixte concessionnaires d’autoroutes*”, or SEMCAs (Fayard, Gaeta and Quinet, 2005). Throughout the 1960s the SEMCAs were little more than “paper organizations” (Fayard, Gaeta and Quinet, 2005), with no substantive role in the management of concessions. In the late

³ In Italy, the government launched a wide privatization program in 1997 because of the financial restrictions imposed by the Maastricht Treaty conditions (Baldassarri, Macchiati and Piacentino, 1997). As a part of this program, Autostrade was transferred to the private sector in 1999. Autostrade’s concession was scheduled to expire in 2003. In order to maximize privatization receipts the concession was extended until 2038 and the level of tolls was maintained (and further adjusted for inflation), although most of the investments had been amortized before 1999 (Greco and Ragazzi, 2005).

⁴ Portail du Government, *Déclaration de politique générale: le programme du Gouvernement*. 8 June 2005. By early 2005 it had been created the *Agence de financement des infrastructures de transport de France* (AFITF). One of the expected sources of revenues to fund this Agency was the benefits obtained by the French State and the public company Autoroutes de France as a result of their shareholding in the concessions of tolled motorways (Press release after de French *Conseil des Ministres* of 26 January 2005).

⁵ Portail du Government, *La privatisation des sociétés concessionnaires d’autoroutes*. Questions & Réponses, n. 020, 7 September 2005.

1960's, reforms were implemented in order to give the SEMCAs more autonomy and responsibility. These reforms allowed private companies to own motorway concessions. Between 1970 and 1973 four private companies obtained toll road concessions.

In the early 1980's 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, Autoroutes de France (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 in order 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. These groups were *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). These are the toll roads that were privatized in 2006 and are the subject of this paper.

2.2.1 Autoroutes du Sud de la France (ASF)

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

By mid-2006, the length of the road concession network operated by ASF was 1,842 miles which made ASF the largest highway concessionaire in France and the second largest in

Europe. The network connects France, Italy and Spain and services 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 3 presents financial and corporate information on ASF before privatization.

(Insert table 3 around here)

2.2.2 Autoroutes Paris-Rhin-Rhône (APRR)

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 that provided alternative routes to France's eastern regions (Toul and Mulhouse) and central regions (Bourges and Clermont-Ferrand). In 1994 when the French motorway sector was being restructured, APRR took over Autoroutes Rhône-Alpes (AREA). The APRR and AREA concessions were to expire on 31 December 2032.

By mid-2006, the length of the road network operated by APRR was 1,371 miles. This made APRR the second largest highway concessionaire in France and the fourth largest in Europe. The operations of this group are concentrated at 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 center of France (A77, A71). Table 3 presents financial and corporate information on APRR before privatization.

2.2.3 Société des Autoroutes du Nord et de l'Est de la France (Sanef)

Sanef was formed in 1963 to operate the Paris-Lille motorway (A1). Sanef's network expanded over time; the main extensions were a new concession connecting Belgium with the north and east of France (A2), and the takeover of the Paris-Metz motorway (A4). 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 length of the road concession network operated by Sanef was 1,083 miles. This made Sanef the third largest highway concessionaire in France and the fifth largest in Europe. The operations of this group are concentrated at the northern part of France. Sanef includes the ‘autoroute du Nord’, the most heavily used French motorway. Table 3 presents financial and corporate information on Sanef before privatization.

2.3 Toll Roads in the United States

Most of the interstate highway system in the United States was planned and built as part of the Interstate Highway System under the National Interstate and Defense Highways Act of 1956. Today the Interstate System includes approximately 47,000 miles of roads representing an investment of \$329 billion in 1996 dollars. In addition, there are approximately 21,000 miles of other non-Interstate roads that are limited access, divided highways. Eight percent, or 5,300 miles, of the total of 68,000 miles of limited access roads in the United States are tolled (Cox and Love, 1996).

Most of the roads that constitute the Interstate Highway System are non-tolled roads that were built and are maintained by gasoline taxes collected by state governments and the Federal government. There are, however, approximately 3,000 miles of toll roads that are also a part of the Interstate System that were financed and built by state and municipal governments and agencies. Examples include the Pennsylvania Turnpike, New Jersey Turnpike, Indiana Toll Road and the Chicago Skyway. There are only a very small number of toll roads in the US that have been developed, owned or operated by the private sector in the last hundred years.

Over the last several years there has been a movement in the US toward 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 US growing transport infrastructure needs. One area in which the private sector has shown particular interest is existing toll roads, given what many believe are their 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 various operating and capital projects. The first two of these “monetizations” in the US were the Chicago Skyway and the Indiana Toll Road.

2.3.1 The Chicago Skyway

The Chicago Skyway was financed and constructed by the City of Chicago in the mid-1950’s 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 Indiana Toll Road 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 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 qualified bidders were received by the City in October, 2004 and a consortium comprised of Macquarie Investment Holdings and Cintra Concesiones de Infraestructuras de Transporte S.A. was declared the winning bidder. The concession transaction was completed in January 2005. Table 4 presents financial and corporate information on Chicago Skyway before privatization.

(Insert table 4 around here)

2.3.2 The Indiana Toll Road

The Indiana Toll Road was financed and constructed by the State of Indiana during the 1950's 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 during the period 1956 to 1981 when management passed to the Indiana Department of Transportation.

In September of 2005 the State of Indiana issued a Request for Toll Road Concessionaire Proposals. The motivation of the State for taking this action was to generate an upfront concession rent that could be used to partially fund a ten year statewide transportation improvement program. After a qualification process, five groups were invited to bid on the concession. Four bids were received by the State in January, 2006, and Statewide Mobility Partners (a consortium consisting of Macquarie Infrastructure Group and Cintra Concesiones de Infraestructuras de Transporte S.A.) was declared 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 4 presents financial and corporate information on Indiana Toll Road before privatization.

2.4 The Privatization Process

In the five subject 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 on the road. Title to the road does not change hands. Also in both the French and US cases, prospective concessionaires were invited to bid pursuant to a sealed bid process.

The three French concessions were auctioned separately, but at the same time. The process used was indicative bids were invited by the French government, followed by firm bids.

The French government then met with the bidders to review the respective offers. Upon review, the French government declared a winner for each of the three concessions. The bidding process for Skyway and the Indiana Toll Road also involved a prequalification stage and then an invitation to bid. The highest bidder was declared the winner. The particular steps and timeline for the French and US concessions are included in table A-1 in the appendix.

The processes followed in the two countries were very similar (see table A-1 in appendix) with one 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 the 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 labor issues and the relationship with 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. The consequence of this for the French concessions was that price was not the sole bid award criterion as it was for the U.S. concessions. As will be discussed in more detail, this “best bid”, as opposed to “high bid”, approach used for the French concessions had the dual consequence of a) lowering the amount of the winning bid, and b) narrowing the spread among bids.

3. Analysis of Bidding Parameters

The underlying basis of the economic value of a toll road concession, regardless of venue, is the projected annual cash flow generated by the road over the concession period. (The cash flow in a particular year 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 this cash flow, we need to 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 U.S. cases, each bidder was provided certain bid parameters; the term of the concession, the toll regulation (for example, 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 forth operating and legal requirements, established minimum standards for the physical upkeep of the roads. It was left to each bidder, however, to determine the level of investment to maintain these standards. This is contrasted with the French concessions where the actual investments are monitored by the government.

The bidders, armed with the bidding parameters, were then in a position to construct financial models of the toll roads' future cash flows. These models require making assumptions about (a) the relevant economic indices (for example CPI, GDP) that form the basis of the toll setting formula; (b) traffic (for example, usage) growth that reflects the elasticity of demand as a function of increases in tolls, among other factors; (c) operating costs (reflecting usage, efficiencies and inflation; and (d) 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 have used the Chicago Skyway as the example.⁶ The parameters and assumptions used by the winning bidder to arrive at the \$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 5. 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.

(Insert table 5 around here)

Changes in the length of the concession term (Case 2), toll rates (Case 3) and growth in traffic (Case 4) have a significant impact on the discounted value of the resulting cash flows. Case 5 indicates that the discounted value is less insensitive to operating (and capital) costs. With respect to the relative importance of these variables on the discounted value, Enright (2006) found that the toll schedule was the primary 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 10.) The resulting discounted value, expressed as a multiple of EBITDA, is close to the multiples of the French concessions (15 vs. 12). In other words, if the French concession parameters with respect to term and toll regulation were applied to the Skyway, the concession price for the

⁶ The reason for choosing the Skyway is that we have access to the assumptions made by the winning bidder through the Preliminary Offering Memorandum dated July 28, 2005 for bonds issued by the Skyway Concession Company LLC. These bonds refinanced the bank loans used to fund the upfront concession payment.

Skyway, 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 impact 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. The French government mandated that the concessionaire comply with two leverage ratios; $\text{Net Debt/EBITDA} \leq 7.0$, and $\text{EBITDA/Financial charges} > 2.2$. These constraints have the effect of increasing the amount of equity relative to debt the concessionaire must use to finance the concession rent. Given equity has a higher cost than debt, the overall (weighted) cost of capital will be higher. The consequence of a higher cost of capital, all other things being equal, is a higher discount rate that results in 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 $\text{Net Debt/EBITDA} \leq 7.0$. 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 (\$1.4 billion divided by \$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 6. The impact of this increase on the Skyway valuation using the Case 1 and Case 6 assumptions (see Table 5) is shown below. 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.

(Insert table 6 around here)

To summarize, the lower price-earnings multiples observed in the French concessions are due in large part to the shorter terms of the concessions and the more moderate toll increases allowed under the French concession agreements, as well as the less aggressive assumptions regarding growth in traffic. Further, the more conservative capital structure imposed by the French Government has the effect of lowering the price a concessionaire is willing to pay.

4. 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 U.S. concessions, but also the spread of the bids received for each of the French roads was much narrower than the bids received for the US roads. One fact that makes this outcome particularly interesting is that there was significant overlap among the bidders for the French concessions and the US concessions as shown in table 7.

(Insert table 7 around here)

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: (a) Traffic growth; (b) Toll schedule (c) Operating costs; (d) Discount Rate.⁷ 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 why there were different distributions of assumptions in the French vs. the U.S. concessions. First with respect tolls, the toll setting formula for the French

⁷ As discussed previously, the appropriate discount rate is the weighted cost of capital that is used to finance 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 the capital markets.

concessions is based on a fixed percentage (70%) of CPI after an initial period of years during which the actual tolls were established by the French government. Given the fact that 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 Skyway and the Indiana Toll Road, tolls can be adjusted annually by the greater of 2%, change in CPI or change in nominal GDP per capita. Further, there is significantly more volatility in the US indices as shown in the graph 1, below. A likely consequence of the resulting uncertainty is 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.

(Insert graph 1 around here)

With respect to traffic projections, the bidders had access to historic and projected traffic data prepared by or for the public owner. It was at the discretion of each of the bidders to adopt the projections or to prepare revised projections. In the case of the Skyway it is known that the winning bidder commissioned its own traffic study that projected dramatically higher usage of the road, as shown in table 8.

(Insert table 8 around here)

Using Skyway again as an illustration, the winning and second place bids were \$1.83 billion and \$700 million, respectively. The \$1.1 billion difference can be explained by the winning bidder using more aggressive traffic projections, higher toll rates or a lower cost of capital, or a combination of these.

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 and complimentary explanations for the winning bidder of

the US concessions to be an outlier. The first of these theories is the Winner's Curse,⁸ which observes there is a tendency for one or more bidders in an auction to overestimate the value of the asset being auctioned. The Winner's Curse suggests that there are a number of possible reasons for this overestimation—both conscious and unconscious, rational and irrational.

The second possible explanation is that in a market that is the early stages of privatization, bidders are willing to make abnormally high bids in order to achieve a leading position for subsequent privatizations (Miralles, 2006). Certainly, the privatization markets in France and the US 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 foreseeable future. In contrast, privatization of toll roads is an emerging market in the US, and most industry observers expect that there will be significant privatization activity over the next several years. Skyway and the Indiana Toll Road have played the role of 'opening' the US market, and winning these concessions has given Macquaire and Cintra visibility, and positioned them as leading firms in this new area.⁹

In addition to the different nature of the two markets, there is a procedural reason why the bidders for the French concessions were not as susceptible to the Winner's Curse (or at least to the same degree as the bidders for the US concessions). In the French process there is the requirement for the bidders to disclose their assumptions to the government as part of the bidding process. We expect if bidders know that the referee of the auction will review and evaluate the

⁸ The concept of the Winner's Course was first discussed in Capen, Clapp and Campbell (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, from a corporate perspective, is minimal. 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 of the enterprise to the lenders through the use of leverage, bond insurance, and liberal dividend provisions.

reasonableness of the financial and operating models as part of its decision-making process, bidders will be more circumspect with respect their assumptions and less prone to overestimation.

There is an additional observation that can be made about respective outcomes of the French and US privatization approaches. The Skyway and Indiana 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. With respect to the latter, this “high bid” protocol provides the opportunity for the Winner’s Curse phenomenon to play out with the consequence of a possible over-valuation. The French approach, on the other hand, is not structured to maximize the concession price.

5. Impact on Social Welfare 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 not maximize the concession price, or in other words, to leave money on the table. The answer to this question 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 or situation; consumers (users), producers, workers, and taxpayers. There is a fifth party if the policy has relevant external effects (for instance congestion, pollution, etc.). This social welfare concept can be expressed by the following function:

$$PI \approx SW = CS + \beta PS + \gamma WS + \delta TS + EE ,$$

where SW stands for Social Welfare, CS stands for Consumers' Surplus, PS stands for Producer Surplus, WS stands for Workers' Surplus, TS stands for Taxpayers' Surplus,¹⁰ and EE stands for External Effects. α , β , γ , and δ are the different weights given to the welfare of each of these groups. When policymakers make decisions with redistributive implications, they are implicitly weighting each of the categories. If one does not want to consider distributional considerations, we can assume that $\alpha = \beta = \gamma = \delta$. In this way, transfers between groups do not change aggregated social welfare. It is worth noting that even in this trivial case transfers tell interesting stories about winners and losers.

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

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

Merely transferring cash from consumers to taxpayers does not increase overall social welfare. In the cases of the Chicago Skyway and the Indiana Toll Road it is clear that the city and state, respectively, gave more importance to taxpayers' welfare than to consumers' welfare. It is easy to explain how this occurred given the fact that all local taxpayers are voters in local

¹⁰ The definitions of the various surpluses are:

- 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.
- Workers' surplus is the difference between what workers receive from working and the wage that workers would be willing to accept in order to keep the job.
- Taxpayers' surplus is the difference between the utility derived from public services and the costs implied by taxation to pay for the services.

elections (regional taxpayers are voters in regional election), whereas only a fraction of Skyway users vote in Chicago, and many users of the Indiana Toll Road are from out of state.

Using this framework, we can identify some tangible measures to contrast the two approaches.¹¹ From the perspective of the public owner (e.g. the French Government, the City of Chicago, the State of Indiana) and with respect to taxpayers' surplus:

- a) A larger vs. smaller concession price is better, regardless of the use of the sale proceeds.¹²
- b) 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.
- c) A shorter concession term vs. a longer 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) vs. the value of future operational flexibility.

The much higher prices paid for the Skyway and Indiana Toll Road concessions result in the taxpayers in Chicago and Indiana being winners, as contrasted with the French concessions and taxpayers.¹³

With respect to consumers' (toll payers') surplus: (a) Lower tolls vs. higher tolls are better (b) 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 to be followed by the concessionaires over the term of the concessions. It is

¹¹ We do not go deeper into the workers perspective, which relates to workers surplus. Given the relatively small work force associated with tollways (and therefore the small impact on the overall welfare equation), we believe we can safely disregard this variable.

¹² 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.

¹³ Theoretically, this taxpayer "windfall" is not a risk even if the price is not financially sustainable, but practically there are likely to be costs borne by the taxpayers in the case of a default by the concessionaire. Also, there is a situation in which a higher price and greater leverage could have a long-term detrimental effect on taxpayers; in the case of the 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.

worth recalling that toll increases in the French concessions are limited to 70% of CPI after an initial period when tolls increases are pre-agreed. The toll setting formulas for the Skyway and Indiana Toll Road also have pre-established tolls for an initial period and then allow tolls to increase annually by the greater of 2%, change in CPI, or change in nominal GDP per capita.

The following graphs compare the actual toll schedule versus the CPI in the case of the Sanef concessions (Sanef and SAPN), and the Chicago Skyway and the ITR concessions. To make comparisons possible these graphs show toll rates only until 2028, which is the year when the Sanef concessions end.

(Insert graph 2 around here)
(Insert graph 3 around here)
(Insert graph 4 around here)
(Insert graph 5 around here)

From the graphs it is readily seen that the projected toll increases for the Sanef concession are smaller than the change in CPI. After 2009, when the 70% of CPI formula becomes applicable, there is a continuous decrease of tolls in real terms (adjusted for inflation). At the end of the concession, tolls have decreased by more than 10% in real terms. As a consequence, toll road users 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 in 2014.

This situation is very different in the cases of Skyway and ITR. Graph 4 shows that actual tolls on the Skyway increase faster than CPI because of the pre-agreed increases. After 2017, when the pre-established toll schedule ends, the real increase of tolls continues because of the

nominal GDP per capita factor of the formula.¹⁴ Graph 5 tells a similar story for the Indiana Toll Road.

Finally, Graph 6 shows the toll schedule throughout the full term (99 years) of the Chicago Skyway concession. The difference between the increase in tolls, based on the projection of the concessionaire and the increase that would result from using only CPI in the toll formula is significant. By the end of the concession term 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 3.5%.

(Insert graph 6 here)

As previously observed, the concession model used by the City of Chicago and the Indiana Toll Road resulted in maximizing the concession price at the expense of consumers' surplus. In order to quantify the effect on consumers, we calculated the concession price for Skyway using the "French" toll regulation of 70% of CPI, while maintaining all of the Skyway concessionaire's other assumptions, for example 99 year term, Halcrow traffic projections. (See Case 3 in Table 5.) 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 tied to 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 resulting from the 70% of CPI toll regulation is made up of two pieces:

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

¹⁴ History of macroeconomic indicators in the US shows that increases of CPI are lower than changes of nominal GDP/capita. Table A-2 in the appendix displays the recent history of CPI and nominal GDP/capita in the US in the 10 years before Chicago Skyway was privatized.

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

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

From the perspective of the region (the locale served by the road) and with respect to external effects:

- (a) Pricing strategies (for example, 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.
- (b) Tolls that reflect externalities and compensate the parties that pay for these externalities are good.

Both the Skyway and the Indiana Toll Road have strong monopolistic characteristics which give the concessionaires significant latitude to set tolls so as to maximize profits. There is no motivation for these concessionaires to set tolls to optimize regional mobility or to internalize external effects unless these activities enhance their bottom line. As a consequence, residents in the regions served by the road are likely losers from this concessions approach.¹⁵

6. Conclusions

This paper analyzes the large difference in the prices paid by investors for US concessions relative to the prices paid for French concessions using the Chicago Skyway and Indiana Toll

¹⁵ It is worthwhile noting that traffic conditions in the corridor make this problem more important in the case of the Chicago Skyway concession than in the ITR concession.

Road in the US and Sanef, APRR and ASF in France as the sample. 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.

With respect to the structure of the concessions, both Skyway's and the Indiana Toll Road's longer lease terms, higher allowable toll rates and absence of capitalization restriction are major drivers of the higher prices paid by investors for those roads.

The procedural difference that had a significant impact on price was the auction award criteria. In the US concessions, "high bid wins" was the sole award criterion, The bidding protocol gives the bidders the ability to make financial modeling assumptions that are not transparent to the public owner (and therefore not subject to review and evaluation). The lack of visibility into the bidding assumptions presents the opportunity for some bidders to overestimate the value of the concession, as is evidenced by the wide spread between the winning and second place bids in the US auctions.

Table 9 summarizes these structural and procedural drivers illustrating in a step-wise fashion how the Skyway concession price would converge to the French concession prices if the structural and procedural differences are removed.

(Insert table 9 around here)

The City of Chicago and the State of Indiana maximized the concession prices each received through the way they organized their respective bid process and the concession structure. In contrast, the French transactions were organized not with the objective (or the result) of maximizing the concession prices. Instead the French concessions were structured to balance consumer welfare and taxpayer welfare.

Certainly the much higher prices paid for the US concessions result in taxpayers being winners when compared to taxpayers in the French approach. This gain, however, is at the expense of the consumers, the toll payers. According to our calculations, the Skyway users (and the Indiana Toll Road users) not only lose purchasing power because tolls increase faster than CPI, but also do not share efficiency/productivity gains one might expect from placing the public toll roads under private control.

The higher prices paid for the US concessions also has the effect of placing more financial pressure on the concessionaire to maximize the net income that can be generated, not only to service debt, but also provide a satisfactory return to the equity investors. Although it is speculative at this point to identify the actual consequences of this, it is reasonable to expect that the Skyway and Indiana Toll Road concessionaires will operate their roads with the singular focus of maximizing profit, regardless of any external objectives or costs.

The recent transactions in the US and France illustrate how structural and procedural decisions made by the public owner affect the concession price. There is no intrinsic value that can be assigned to a particular toll road; the value, or more accurately the price, is largely a function of the characteristics of the concession and not the road itself. Further, the terms of the concession have direct consequences that are enjoyed or borne by the various stakeholders of the toll road.

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 made part of the public debate.

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Tables

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

	APRR	Sanef	ASF	Skyway	Indiana Toll Road
<i>Year</i>	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 (2)	14,122	10,645	23,161	1,830	3,850
Price as Multiple of EBITDA	12.3x	12.2x	12.5x	63.1x	60.2x
Percent Difference Between High and Second Bid	1.6%	1.7%	n.a.(3)	161.4%	26.2%

(1) Using an exchange rate of \$1.18 to 1 Euro.

(2) In the case of the French toll concessions, price includes assumed debt.

(3) There was only one bidder for the ASF concession.

Source: Author's

Table 2. Motorway network and toll motorways at the beginning of 2004 in the EU-15 (miles)

	Motorway Network	Toll Motorways	%
Greece	569	569	100%
Italy	4,250	3,476	82%
Portugal	1,411	1,100	78%
France	6,452	4,872	76%
Spain	6,524	1,622	25%
Finland	375	43	11%
Austria	1,243	87	7%
Denmark	605	21	3%
Sweden	901	10	1%
United Kingdom	2,160	27	1%
Belgium	1,074	1	0%
Germany	7,456	2	0%
Ireland	176	0	0%
Luxembourg	81	0	0%
Netherlands	1,429	0	0%
Total	34,706	11,830	34%

Notes: Toll motorways for non-commercial vehicles. The tolled facility in Germany is the Rostock Tunnel. The tolled facility in Belgium is the Liefkenshoek tunnel. The amount of 140 kms of tolled motorways in Austria is approximate.

Source: Motorway network from Fayard (2005). General information on toll motorways from ASECAP web page. Information on Ireland obtained from the National Roads Authority. Information on Austria obtained from *Autobahnen-und Schnellstrassen-Finanzierungs Aktiengesellschaft* (ASFINAG).

Table 3: Financial and Corporate pre-privatization information on APRR, Sanef & ASF (end of 2005)

	APRR	SANEF	ASF
Established in	1961	1963	1957
Network length (miles as of June 2006)	1,370	1,083	1,841
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 06/07/2005 (day before privatization was announced) CAC= 4,180.7	€ 44.5	€ 41.6	€ 43.6
Share price 07/18/2005 (day when the privatization process was launched) CAC= 4,363.5	€ 51.8	€ 48.4	€ 48.4
Share price 12/30/2005 CAC= 4,715.2	€ 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 & ADF 0.9% Employees 0.8% Local authorities 24.1% Float Shareholders 4.0% Eiffage Group	75.7% State & ADF 0.9% Employees 0.3% Local authorities 23.1% Float Shareholders	50.4% State & ADF 1.9% Employees 0.8% Local authorities 23.9% Float Shareholders 23.0% Vinci Group
Workforce	4,391	3,642	7,975
Gross Revenue 2005	€ 1.57 Billion	€ 1.15 Billion	€ 2.47 Billion
EBITDA 2005	€ 0.974 Million	€ 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. *ECOX0609092V*, *ECOX0609065V*, *ECOX0609151V*). *Annual Report 2005 APRR*, *Rapport Annuel 2005 SANEF*, and *Comptes Consolidés 2005 ASF*.

Table 4: 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	USD 41.1 million	USD 98.6 million
EBITDA	USD 29 million	USD 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, March 7, 2006), and Indiana Toll Road Request for Toll Road Concessionaire Proposals.

Table 5. Sensitivity of Concession Price to Certain Parameters

	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)	\$1,881,815	\$1,060,359	\$1,088,477	\$951,773	\$1,900,493	\$446,281
Discounted Value as Multiple of EBITDA	65x	37x	38x	33x	55x	15x

(a) US\$000; discounted at a 9.38%. The discounted value equals the concession price plus transaction fees.

Source: Authors' calculations.

Table 6. Effect on Chicago Skyway of imposing leverage ratios similar to those imposed by French Government (US\$ million)

	Cost of Capital (a)	Base Case	Case 6a
Equity	12.30%	\$661,061	\$1,777,393
Net Debt	8.00%	\$1,400,000	\$283,668
EBITDA-2006		\$40,524	\$40,524
Net Debt divided by EBITDA		35	7
Total Capitalization		\$2,061,061	\$2,061,061
Weighted Cost of Capital		9.38%	11.71%
Discounted Value of Cash Flows		\$1,881,815	\$371,421
Concession Price as Multiple of EBITDA (b)		63.1x	12.5x

(a) Represents the imputed cost of equity and debt for Skyway concession.

(b) Concession price equals the discounted cash flow value minus transaction fees.

Source: Authors' calculations.

Table 7. Bidders for the Respective Concessions

APRR	SANEF	ASF	Skyway	Indiana TollRoad
Eiffage/Macquarie	Abertis	Vinci	Macquarie/Cintra	Macquarie/Cintra
Abertis	Cintra		Vinci, etal	Itinere Babcock & Brown/Challenger- Transfield. Morgan Stanley/Autostrade
Autostrade	Eiffage		Abertis	
Cintra	Sacyr/Itinere			

Note: First row (bold) are the winning bidders.

Table 10. Projection of Average Daily Traffic on Skyway

	<u>Wilbur Smith Study (a)</u>		
	Case X (b)	Case Y (c)	Halcrow Report (d)
2004 actual	47,658	47,658	47,658
2010	64,100	50,300	67,029
2020	77,600	50,100	101,052

Footnotes:

- (a) From Wilbur Smith traffic report dated April 21, 2004 prepared on behalf of the City of Chicago.
- (a) Assumed tolls remain the same (for example \$2.00 for cars) over the projection period.
- (b) Assumed tolls increase according to the toll regulation that was included in the proposed concession agreement.
- (c) From Halcrow traffic report dated July 2005 prepared on behalf of the winning bidder, Skyway Concession Company LLC.

Table 11. Summary of Price Drivers

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

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

Source: Authors' calculations.

Appendix

Table A-1: Concession Process and Timeline

France	US-Chicago Skyway	US- Indiana Toll Road
<p>June 8, 2005: The French prime minister announces the sale of the State's majority shareholdings in ASF, APRR and Sanef..</p> <p>July 18, 2005: the French Government launches The Toll-Road Motorway Concessions Privatization process. Bidders are invited to submit indicative bids.</p> <p>July 28, 2005: The government publishes the draft concession agreements which bidders must agree to accept.</p> <p>August 22, 2005: Nineteen indicative bids are submitted for the three toll roads concessions.</p> <p>October 2, 2005: The government announces the second phase of the auction process; bidders are invited to submit firm offers by November 7, based on additional specifications.</p> <p>November 7, 2005: Bids are received by the French Government for the three toll roads concessions; 4 bids are offered for APRR, 4 bids are offered for Sanef, and 1 bid is offered for ASF.</p> <p>December 1/2, 2005: Representatives of the French Government meet with the all of the bidders individually to review their respective bid packages.</p> <p>December 13, 2005: The French Government announces the winning bidders for the three toll roads concessions.</p>	<p>March 2, 2004: City issues Request for Concessionaire Qualifications.</p> <p>May 5, 2004: City announces that five bidding groups are qualified to bid.</p> <p>May 27, 2004: An invitation to bid is provided to each qualified bidder along with a draft concession agreement and detailed information about the Skyway.</p> <p>July 8, 2004: Prospective bidders provide comments on the draft concession agreement.</p> <p>September, 2004: Prospective bidders are provided with the bid form and a final concession agreement.</p> <p>October 14, 2004: Bids from three bidders are received by the City.</p> <p>October 15, 2004: The City announces the winning bidder.</p>	<p>September 28, 2005: State of Indiana issues Request for Toll Road Concessionaire Proposals (Qualifications).</p> <p>October 26, 2005: State receives proposals. .</p> <p>October 2005: State selects qualified bidders and issues invitation to bid.</p> <p>November/December 2005: Prospective bidders are provided with detailed information about the Toll Road, the concession agreement and the bid form.</p> <p>January 20, 2006 (Friday): Bids from three bidding groups are received by the State.</p> <p>January 23, 2006 (Monday): The State announces the winning bidder.</p>

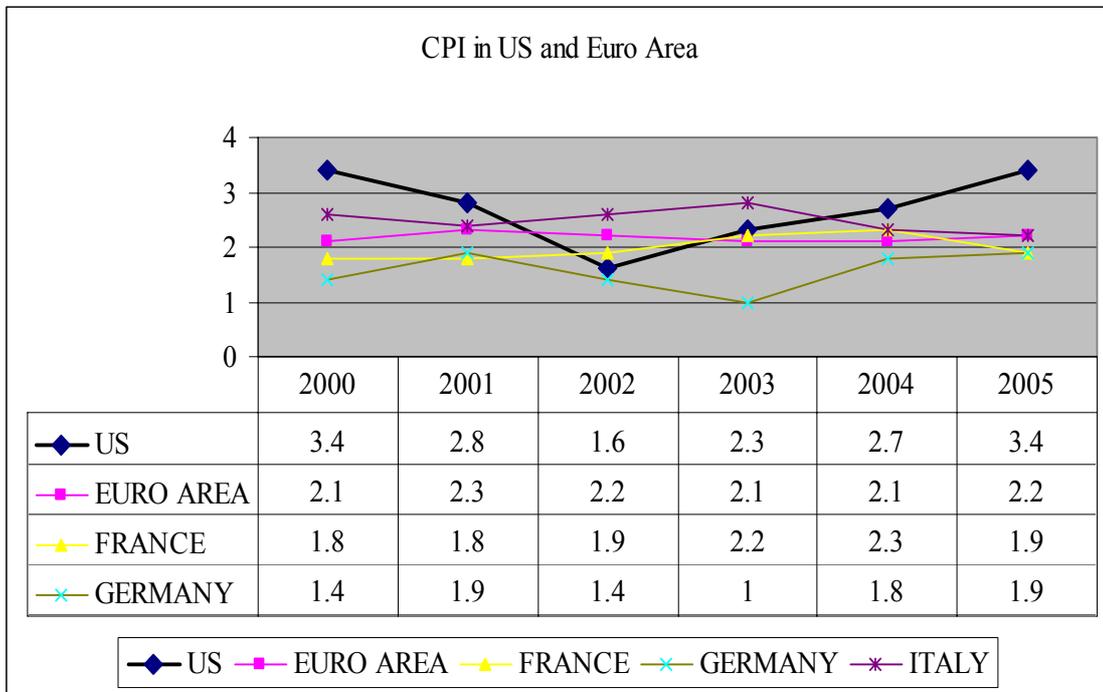
Note: The three French concessions were auctioned separately, but at the same time. The process and timeline used is outlined below.

Source: Authors.

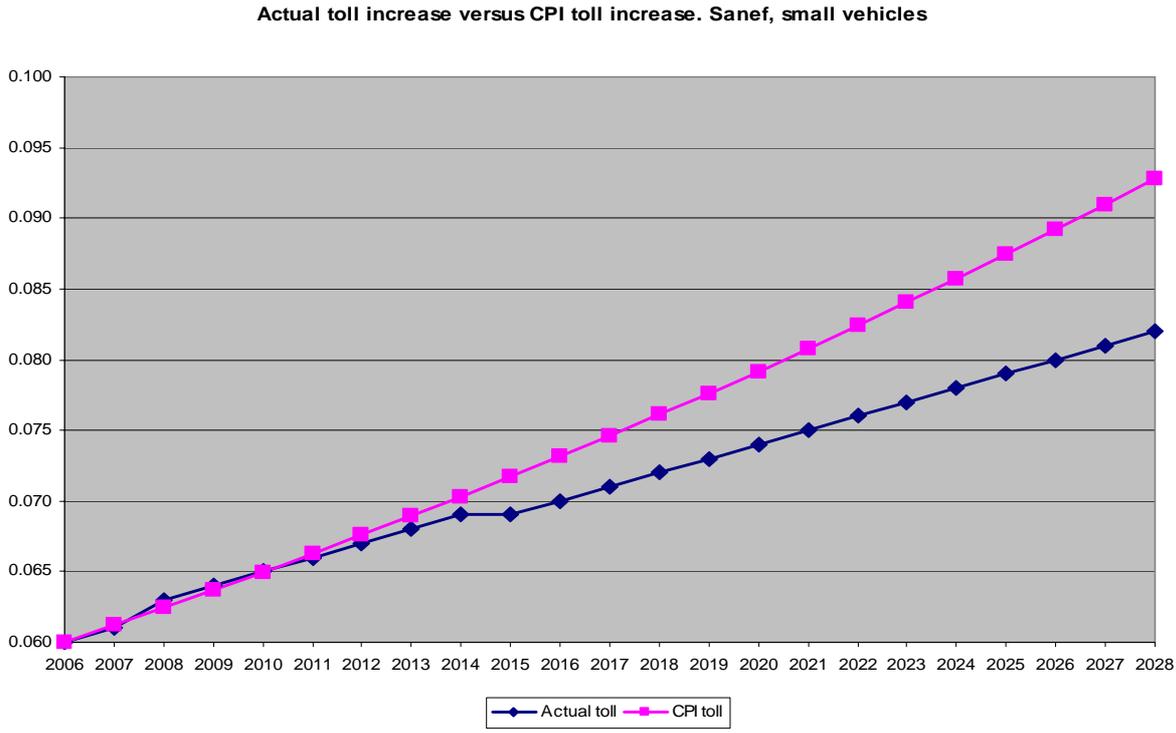
Table A-2. Recent history of CPI and change in nominal GDP/capita in the US

Year		US CPI	Chg. In GDP/cap.	Greater of CPI & GDP
1	1995	2.50%	3.36%	3.36%
2	1996	3.30%	4.45%	4.45%
3	1997	1.70%	4.97%	4.97%
4	1998	1.60%	4.11%	4.11%
5	1999	2.70%	4.75%	4.75%
6	2000	3.40%	4.74%	4.74%
7	2001	1.60%	2.12%	2.12%
8	2002	2.40%	2.35%	2.40%
9	2003	1.90%	3.77%	3.77%
10	2004	3.30%	5.91%	5.91%
	10 yr. Avg.	2.44%	4.05%	4.06%

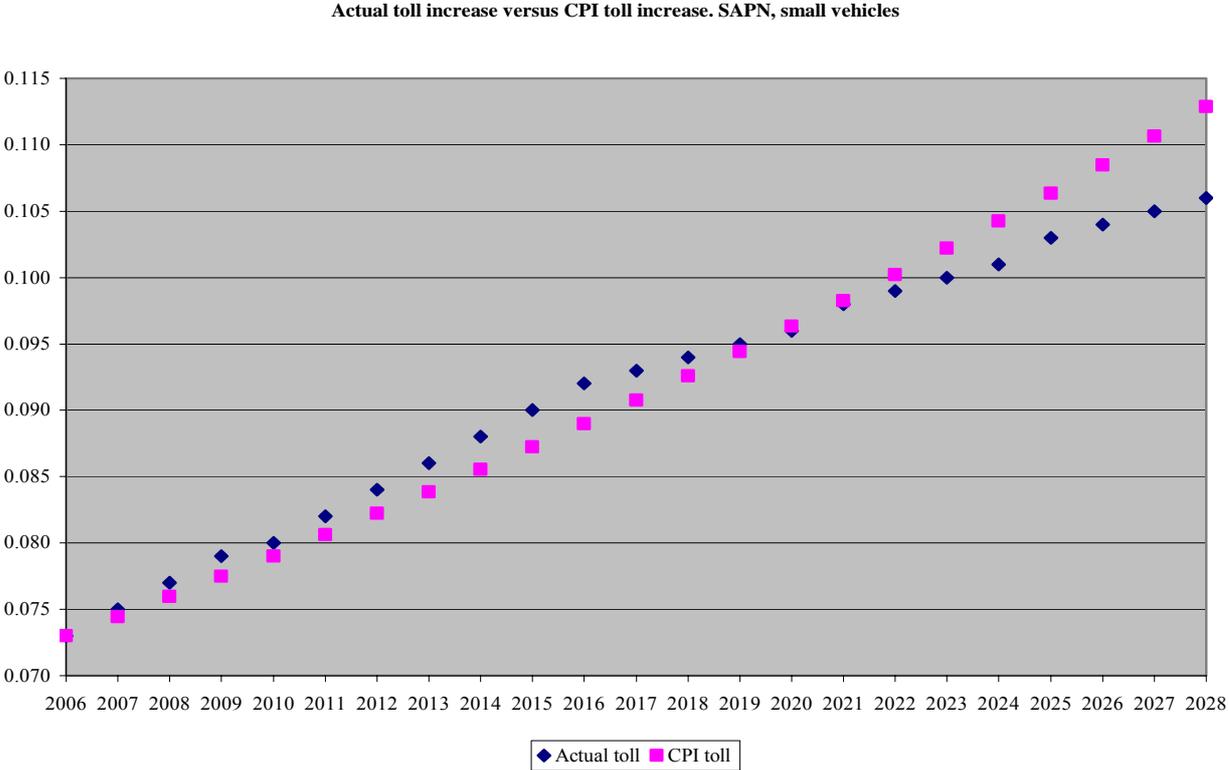
Graph 1. CPI in US and Euro area.



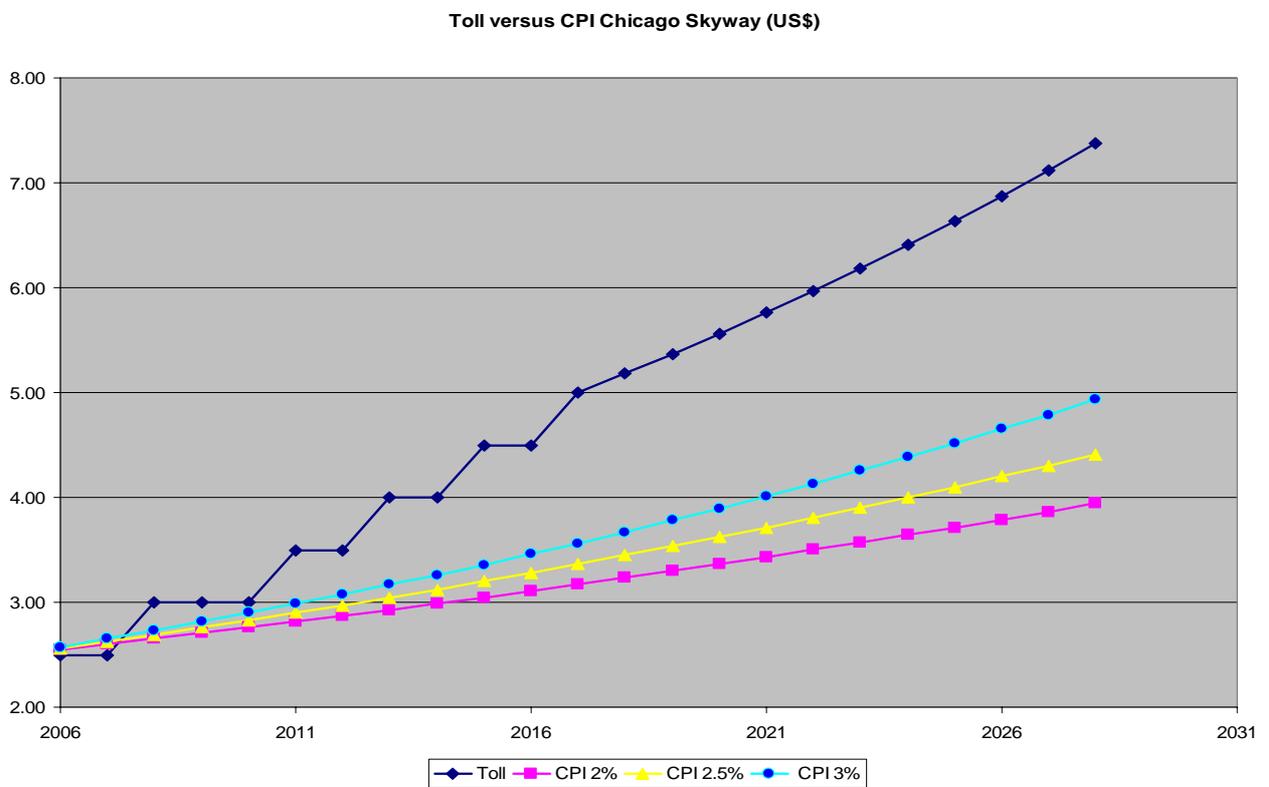
Graph 2: Actual toll increase versus CPI toll increase. Sanef, small vehicles (cents of Euro per kilometer)



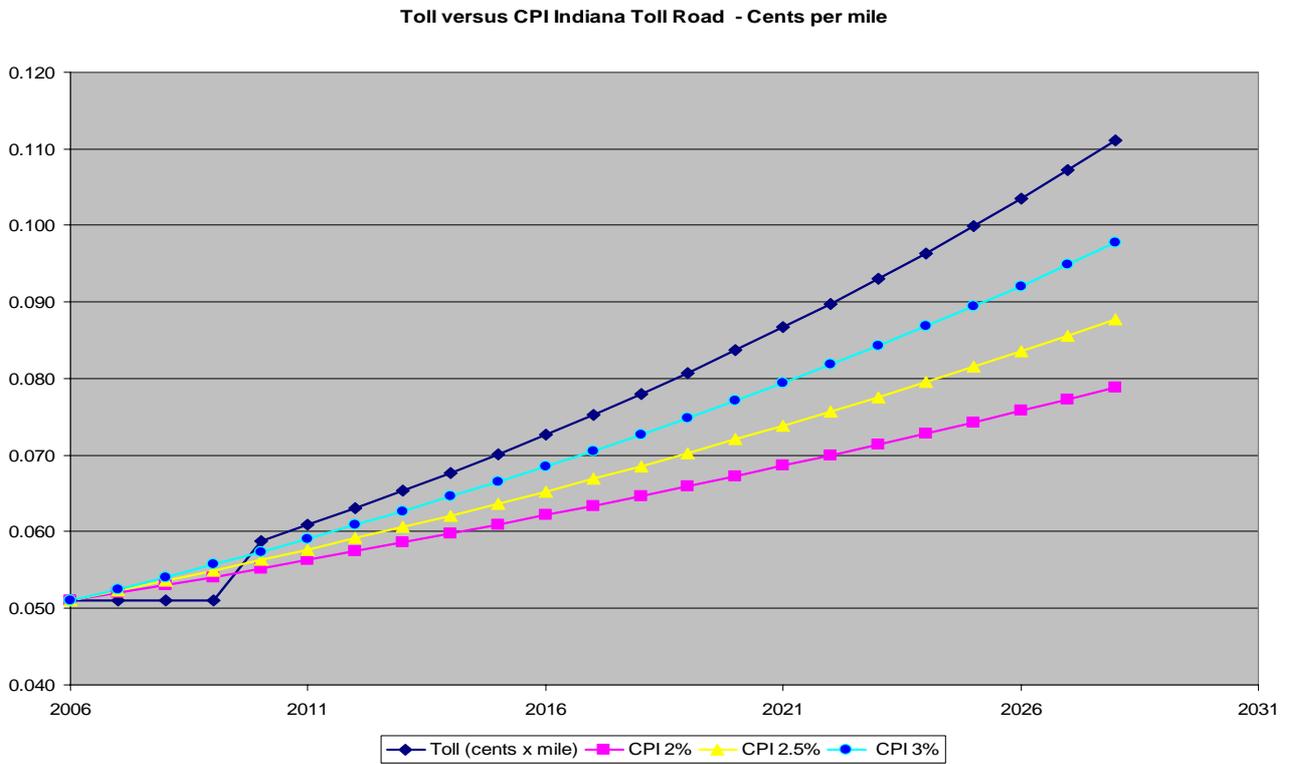
Graph 3: Actual toll increase versus CPI toll increase. SAPN, small vehicles (cents of Euro per kilometer)



Graph 4: Actual toll increase versus CPI toll increase in Chicago Skyway (total toll US\$)



Graph 5: Actual toll increase versus CPI toll increase in Indiana Toll Road (cents US\$ per mile)



Graph 6. Actual toll increase versus CPI toll increase in Chicago Skyway (total toll US\$). Total length of concession.

