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Traffic Forecasting Risk Study Update 2005: Through Ramp-Up And Beyond

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Traffic Forecasting Risk Study Update 2005: Through Ramp-Up And Beyond

The 2005 traffic risk study update carried out by Standard & Poor's Ratings Services further supports our earlier conclusions regarding toll road forecasting performance in the first year of operations. Optimism bias--overforecasting asset use--and error remain prevalent. Beyond Year 1, our case study analysis does not support the notion of any systematic improvement in forecasting accuracy. Optimism bias and error measurement statistics remain constant through Years 2 to 5.

This bias and error is not caused by a failure by forecasters to consider the impact of ramp-up upon project opening. The majority of case studies that we analyzed had some form of ramp-up profile imposed on their forecasts. Actual ramping–up, however, is often far less aggressive than is assumed, and can take many years. Beyond ramp-up, a number of toll road case studies still fail to meet use expectations.

From a subset of case studies, Standard & Poor's was able to disaggregate traffic forecasting performance by vehicle type. The variability of truck forecasts was particularly high. This variability can magnify the uncertainty associated with revenue projections because trucks typically pay high tariffs and, therefore, make a disproportionate contribution to total project income.

Given the nature and extent of uncertainty that surrounds traffic forecasts, projects with investment-grade aspirations that expose lenders to demand risk will need to demonstrate financial resilience under various and rigorous sensitivity and scenario stress tests. These projects should have sufficient liquidity throughout the life of the concession to be able to accommodate performance that falls short of expectations. The results of sensitivity tests and stress scenario analyses provide a guide to the size, shape, and quality of liquidity appropriate at investment grade.

An investment-grade toll road transaction is not necessarily the one that performs robustly against the most likely future-year scenario. It is the one that performs robustly against a number of likely future-year scenarios.

In addition to presenting the most recent Year 1 data and associated analysis, updating our earlier findings, this Traffic Risk Update report begins to look beyond the first 12 months of tolling operations at traffic forecast performance in subsequent years. For our previous studies see: "Traffic Risk in Start-Up Toll Facilities", published on Aug. 15, 2002; "Traffic Forecasting Risk: Study Update 2003", published on Nov. 6, 2003, and "Traffic Forecasting Risk: Study Update 2004", published on Oct. 19, 2004. All three articles are available on RatingsDirect, Standard & Poor's Web-based credit analysis system.

Background

Since 2002, Standard & Poor's has been compiling data on toll road traffic forecasting performance, comparing predictions of asset use with outturn results. Our sample--which continues to expand as new data is made available--now contains 104 international toll road, bridge, and tunnel case studies. More than 90% of our sample represents project-financed concessions. Excluding the non project-financed concession case studies from the sample had no statistically significant impact on our findings.

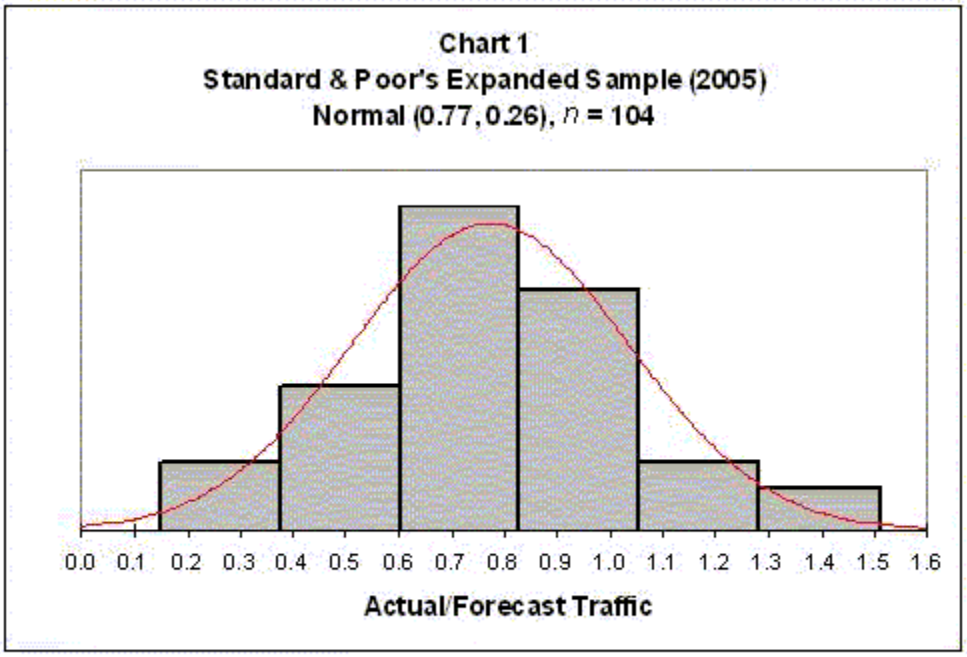
To date, our research has focused on Year 1 performance. This reflects financial structures that commonly leave lenders particularly exposed to traffic risk in the earliest years of operations.

Year 1 Data Analysis: Update 2005

At the end of 2004, when we last reported our study findings, our toll road, bridge, and tunnel sample comprised 87 case studies. The sample is now 104 (August 2005). This increase reflects credit analysis and surveillance activity over the last nine months across many of Standard & Poor's offices and the release of a sizeable volume of new, multiyear traffic data from a leading European toll road concessionaire with international projects.

Our earlier research revealed considerable variability (error) in traffic forecasting performance, and the existence of systematic optimism bias. Performance ranged from actual traffic that was only 15% of that forecast to forecasts that were exceeded by more than 50%. On average, across all case studies, toll road forecasts overestimated Year 1 traffic by 20%-30%.

Chart 1 presents the Year 1 traffic forecasting performance from all our 104 case studies. Consistent with earlier analysis, performance is measured in terms of the ratio of actual traffic volumes to forecast asset use.

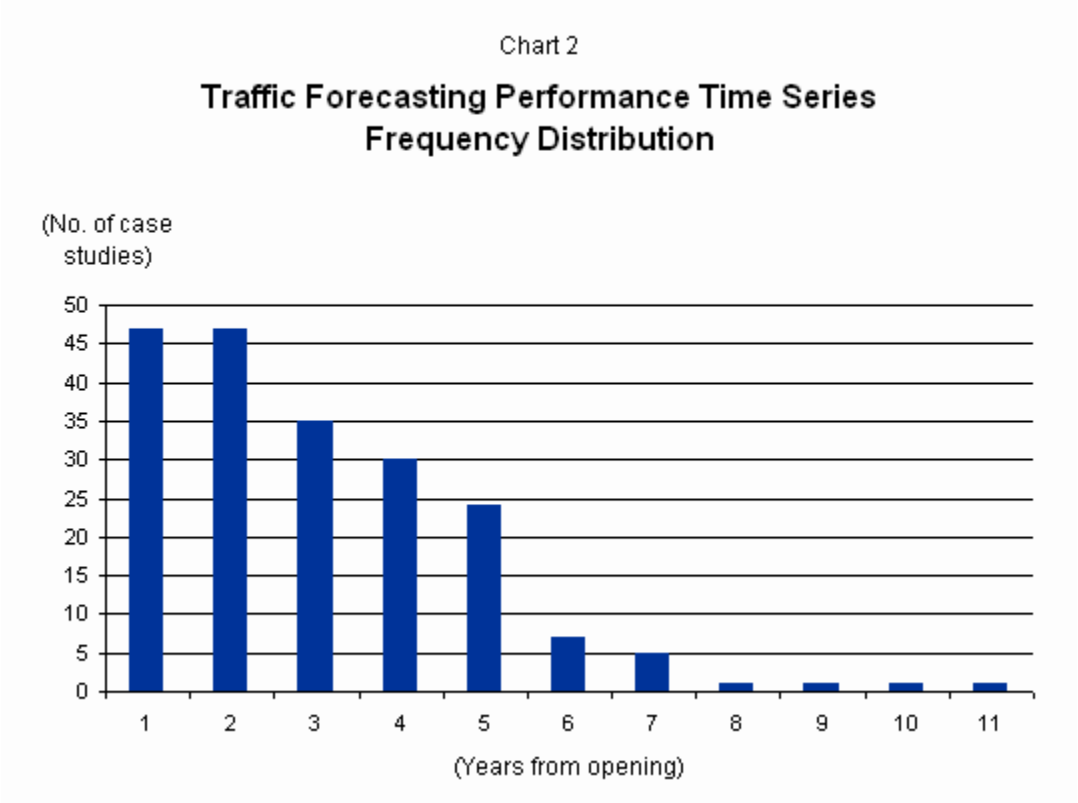


The mean of the distribution still sits well below 1.0 at 0.77, underscoring the sector's systematic tendency toward optimism bias. The standard deviation--which measures error--remains large at 0.26, identical to last year's value.

Through Ramp-Up And Beyond

In 2005, we revisited our toll road, bridge, and tunnel case studies to extract actual and forecast data from periods beyond Year 1. The resulting sampling frame is summarized in chart 2.

Chart 2

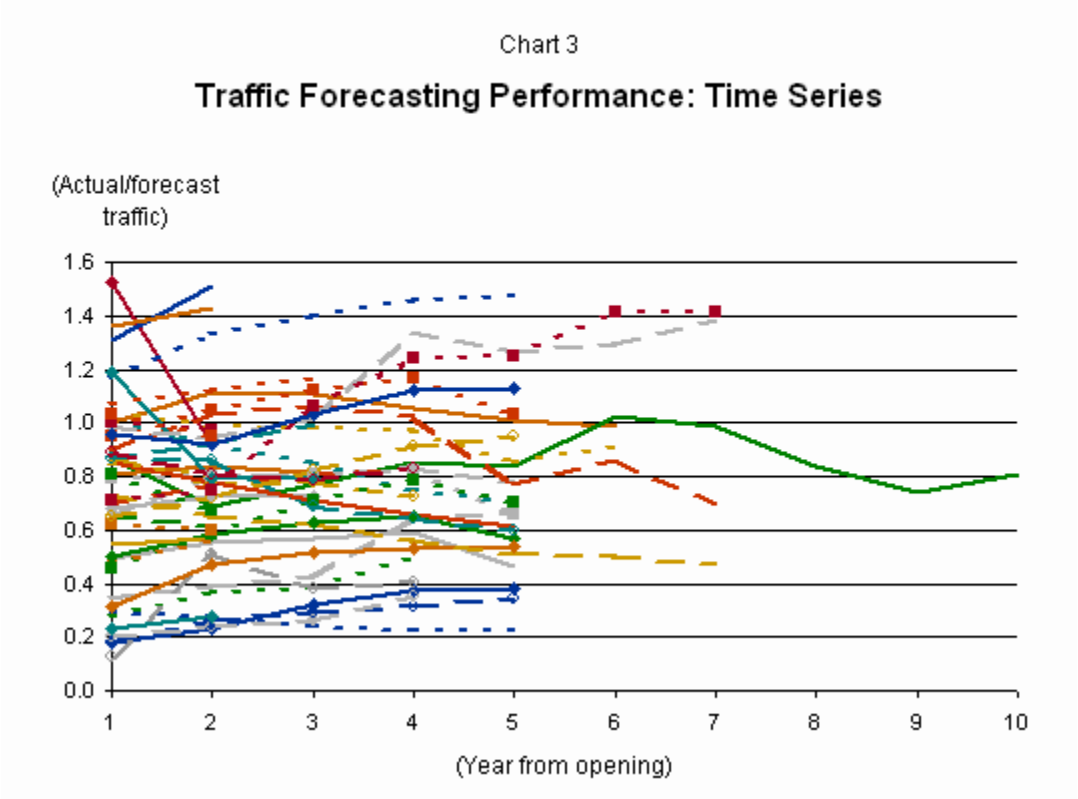


Unsurprisingly, the frequency distribution "tails off" rapidly. At present, we have only seven case studies that cover Years 1 to 6, for example. Although this constrains the conclusions that we can draw about toll road traffic forecasting performance after Year 5, it reflects the innovative nature of the sector and the fact that operational project-financed infrastructure concessions are a relatively recent phenomenon. A significant number of highway concessions globally still remain in design or under construction.

The challenges of compiling a traffic forecast performance time series are exacerbated by the common practice of preparing revised or rebased forecasts for toll facilities whose predicted use departs significantly from expectations. In such instances, credit surveillance documentation may fail to report the original forecasts.

Chart 3 summarizes our results. One hypothesis we wanted to test was that forecasting optimism bias and error reduces after Year 1. That hypothesis is not supported by our findings.

Chart 3



If actual traffic performance had systematically improved over time (in comparison with their respective forecasts) a general upward trend in the ratio of actual to forecast traffic to more than 1.0 would be observed over time. It is not. Instead, a mixed picture emerges, with a number of case studies failing to match their forecasts by Year 5 or, in some cases, beyond. Clearly some caution is required at this stage, because our sample size prohibits the drawing of definitive conclusions. This preliminary analysis, however, suggests that there is no automatic improvement in traffic forecasting accuracy after Year 1.

The extent of optimism bias and error in the case study traffic forecasts from Years 2 to 5 is similar to that observed for Year 1 data. Table 1 suggests that neither the mean of the distribution nor its standard deviation alter significantly during the first five years of operations.

Table 1

Forecast Performance Distribution Statistics For Years 1-5

Years from opening	Mean	Standard deviation
Year 1	0.77	0.26
Year 2	0.78	0.23
Year 3	0.79	0.22
Year 4	0.80	0.24
Year 5	0.79	0.25

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The Trucking Challenge

A subset of our case studies provided traffic forecasts and asset use statistics by vehicle category, reflecting tolling policies with differential tariffs and/or shadow toll payment mechanisms that distinguished light vehicles (private cars) from heavy ones (mainly trucks weighing more than 3.5 metric tons). Disaggregated analysis revealed that the variability associated with truck forecasts was consistently higher that that observed for light vehicles. The standard deviation for trucks was 0.33, compared with 0.26 for all vehicles.

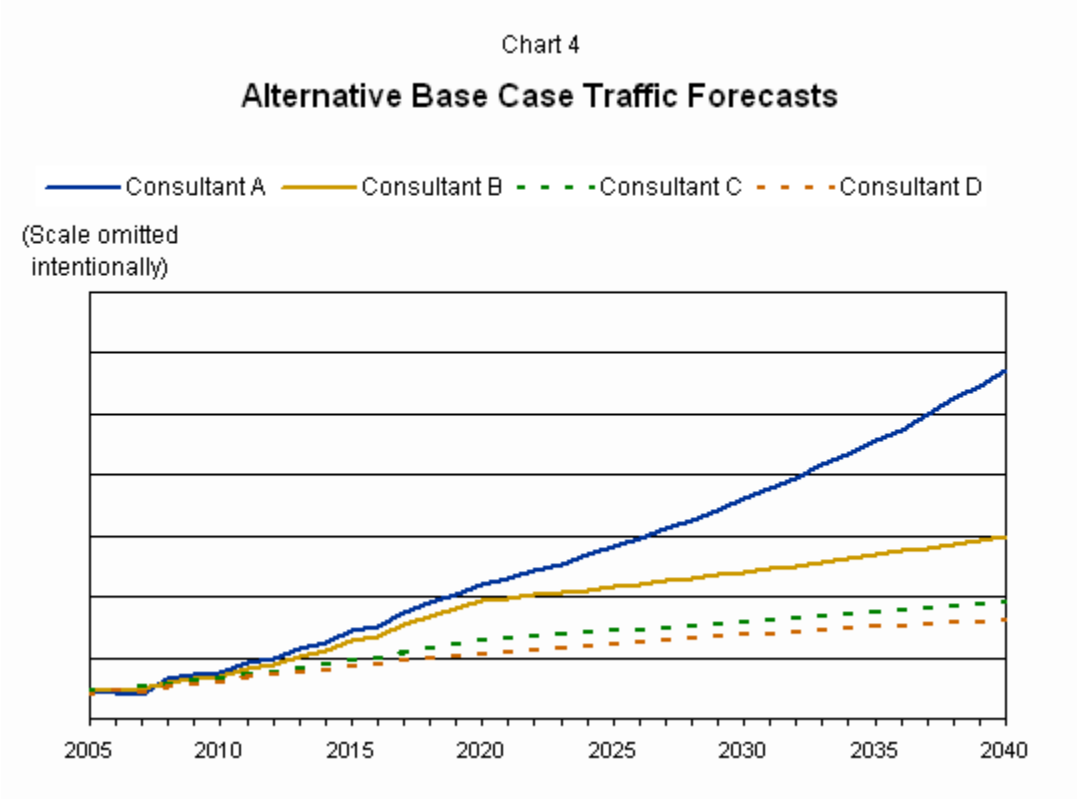
This finding accords with intuition and is supported by anecdotal evidence from traffic forecasting firms, which in the past have reported that the trucking community's behavioral response to tolls is particularly difficult to predict. This is especially true in road haulage sectors dominated by owner-drivers rather than fleet operations. In terms of route choice, smaller haulage contractors can remain very sensitive to tolls and, upon the opening of a new facility, often support an extended "protest period" by refusing to pay tolls as a matter of principle.

Truckers' response to tolls can be an important credit consideration. Trucks commonly pay 2x-5x the respective car tariff (sometimes this toll multiple is as high as 10x) and so their contribution to total revenues can be significant. Standard & Poor's recently reviewed a typical toll road where, although trucks accounted for less than 10% of traffic, they contributed more than 25% of total revenues. On some French toll road networks, trucks contribute one-third of toll income. For this reason, where truck-related incomes are significant, Standard & Poor's will carefully review the assumptions behind truck forecasts and will look for robust justification for these assumptions. For investment-grade ratings, future-year truck use may be subjected to particularly severe downside stress testing if the respective forecasts seem unsupported or optimistic.

Forecast Uncertainty And Variability Constrains Credit Quality

Standard & Poor's is frequently presented with conflicting base (i.e. central) case forecasts for the same project, compiled by different firms at or near the same point in time, on behalf of different project counterparties, and incorporating different assumptions. By way of illustration, a recent example is presented in chart 4. The vertical scale units have been omitted to retain project and source anonymity.

Chart 4



Even in the short to medium term, the differences between these forecasts are material. The differences between the lowest and highest base-case forecasts in the example presented above are summarized in table 2:

Table 2

Conflicting Traffic Forecasts

Forecast period (from project opening)	Difference between highest and lowest base-case forecast (%)*
5 years	26
10 years	66
15 years	106
20 years	130
25 years	164
30 years	204
35 years	255

*This is not the difference between high and low growth sensitivity tests. This is the difference between alternative base-case forecasts.

Analysis of the assumptions behind the forecasts presented above--and others--demonstrates that very different projections of asset use result from relatively small divergence among the model input assumptions. This highlights a critical issue that often serves to constrain the credit quality of toll facility transactions incorporating demand risk. Traffic forecasts, particularly in the medium to longer term, can remain very sensitive to marginal parameter changes within the modeling framework, even though these parameter values are drawn from an entirely plausible range. In terms of assessing the reliability of future project cash flows, rigorous sensitivity testing clearly has a

pivotal role to play in such cases.

Sidebar: Sample Bias

Throughout the research effort Standard & Poor's has remained critically aware of the potential for our selection of toll facilities to incorporate sampling bias. Although a sample of 104 international case studies from a single asset class reflects a certain critical mass that, by itself, can temper the impact of bias, we are conscious that our case studies have not been selected randomly. The majority are toll facilities that have been presented to us for credit analysis as stand-alone assets or have been selected by banks as constituents of collateralized loan obligation portfolios. This sample undoubtedly reflects an over-representation of toll facilities with higher credit quality. Consequently, very poorly performing assets will remain under-represented in the sample and the results derived from our case studies are likely to be flattered in comparison with average, global toll road traffic forecasting performance.

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