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Credit Support and Infrastructure Investment: The Case of the Transportation Infrastructure Finance and Innovation Act (TIFIA) Program

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16. Abstract

Infrastructure project development in the United States frequently relies on debt financing. Project sponsors typically borrow money for project design and construction through private capital markets, but the Transportation Infrastructure Finance and Innovation Act (TIFIA) program of the U.S. Department of Transportation (USDOT) also provides a complementary public financing program for surface transportation infrastructure development projects. This research empirically evaluates whether and how the TIFIA program's creditworthiness profile, measured via credit ratings, changed between the MAP-21 and FAST Act periods. The findings provide meaningful insights, and follow-up research will be important.

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CHAPTER 1

Introduction

While direct government funding often provides essential support, infrastructure project development in the United States frequently relies on debt financing. Project sponsors typically borrow money for project design and construction through private capital markets, but the Transportation Infrastructure Finance and Innovation Act (TIFIA) program of the U.S. Department of Transportation (USDOT) also provides a complementary public financing program for surface transportation infrastructure development projects. Enacted via 1998's Transportation Equity Act for the 21st Century (TEA-21) to facilitate critical improvements to the U.S. surface transportation system, the TIFIA program provides long-term, low-interest loans and other forms of credit assistance to eligible surface transportation projects of national or regional significance. By leveraging federal funds via such financial assistance, the program aims to attract greater private-sector and non-federal, public-sector investment in surface transportation infrastructure (USDOT 2018). As a result, the program has often played an especially important role in the development of surface transportation infrastructure via public-private partnership (P3) approaches. As of 2019, the program had provided $32 billion in support to 74 infrastructure projects across 21 states (Mallett 2019).

The TIFIA program lends money under very favorable terms, thereby enhancing project attractiveness for other lenders. For instance, the TIFIA program offers loans at the federal interest rate, usually the lowest rate in the market – 1.45% on May 26, 2020, for example. This interest rate does not vary by the project's creditworthiness. The TIFIA program also subordinates its loans to its projects' other loans as long as the projects meet their agreed-upon debt service obligations and remain in good standing. Further, TIFIA allows borrowers to delay the start of repayment until 5 years after the project's substantial completion, with interest accruing to the principal balance during that period. In this way, TIFIA reduces the weighted average cost of capital (WACC) below what it would otherwise be.

In making loans, TIFIA accepts the risk that borrowers may not meet their debt service obligations, whether because of toll revenue shortfalls, construction cost overruns, delays, or other similar challenges. In order to assess borrowers' ability to repay their obligations, the TIFIA program, like all lenders, relies on credit ratings from third-party firms such as Moody's, Standard & Poor's, and Fitch Ratings to assess borrowers' creditworthiness. The program requires that all borrowers acquire an "investment grade" (minimum BBB or equivalent) credit rating by two recognized bond rating firms. The resulting bond ratings provide an indicator of how much risk the TIFIA program expects to take on. The most creditworthy projects (i.e., AAA or equivalent) present relatively little risk. A program portfolio including primarily BBB projects would represent greater risk.

To the extent that the TIFIA program lends to projects with A/AA/AAA ratings, it protects itself from claims that it puts the U.S. treasury at undue risk and that, in doing so, it threatens the program's future prospects for renewal. On the other hand, this conservative approach may reduce the program's ability to produce important public value via BBB projects not otherwise supported by private financial markets alone

(Mallett 2019). Two recent legislative changes may have influenced the program's portfolio balance in this regard.

First, 2012's Moving Ahead for Progress in the 21st Century (MAP-21) dramatically expanded TIFIA's scope, increasing its credit authority by nearly tenfold for fiscal years (FY) 2013 and 2014, later extended to FY 2015 under a similar framework. MAP-21 also introduced authority for "master credit agreements" and established a "first-come, first-served" process for applications, replacing an annual competition model (USDOT 2012; n.d.).

The 2015 Fixing America's Surface Transportation (FAST) Act then reduced the program's credit authority by over 70% for fiscal years 2016 through 2020 (Jeff Davis 2015), most likely because the program did not fully utilize the credit authority granted in MAP-21. The FAST Act also clarified the program's "master credit agreement" authority, modified funding redistribution requirements, expanded eligibility to transit-oriented development, and prioritized small and/or rural projects (USDOT n.d.; n.d.). Finally, the act also required the U.S. Department of Transportation to expedite projects thought to be lower risk, requesting $100 million or less in credit assistance, possessing a dedicated revenue stream unrelated to project performance, and possessing standard loan terms.

Given these dramatic funding shifts, and with the FAST Act reauthorization period reaching its close, policymakers may wish to evaluate whether the FAST Act's regulatory changes influenced the risk profile presented by recent TIFIA-supported projects. As a result, the following analysis examines whether and how the TIFIA program's creditworthiness profile, measured via credit ratings, changed between the MAP-21 and FAST Act policy periods.

CHAPTER 2

Methodology

DATA AND VARIABLES

According to USDOT data (USDOT n.d.), the TIFIA program supported 54 surface transportation projects during the MAP-21 and FAST Act periods, FY 2013-2020. One MAP-21 project, the SR 520 Floating Bridge, lacked publicly available credit ratings data and was dropped from the analysis, bringing the final sample size to 53 projects representing $23.4 billion in TIFIA assistance value. The MAP-21 period (FY 2013-2015) accounted for 25 of the projects and $12.4 billion in TIFIA assistance; the FAST Act period (FY 2016-2020) accounted for 28 of the projects and $11 billion in TIFIA assistance.

In the absence of quantitative TIFIA program evaluation literature, and finding limited publicly available financial information at the project level, the authors developed a project-level dataset for the 53 projects, with variables as summarized in Table 1.

Table 1. Dataset variables

Variable	Name	Unit and Measurement	Data Source(s)
Descriptive Statistics	Project Cost/ TIFIA Assistance Volume	Million $US	TIFIA Website (USDOT)
Regression Analysis y_i	Credit Rating	Investment-grade ratings at financial close, coded as binary variable of A-group (A/AA/AAA) = 1 and B-group (BBB) = 0	NRSRO Ratings Reports[1]
Regression Analysis T_i	FAST Act	0 = MAP-21 (FY 2013-2015) 1 = FAST Act (FY 2016-2020)	TIFIA Factsheets (USDOT)
Regression Analysis X_i	Project Type	Categorical Dummies:[2] Transit (base category), Road and Toll, and Bridge	TIFIA Website (USDOT)
Regression Analysis X_i	Primary Revenue Pledge	Categorical Dummies: Toll revenue[3] and Other[4]	TIFIA Website (USDOT)

Notes:

[1] DBRS Morningstar, Fitch Ratings; Kroll Bond Rating Agency; Moody's; Standard and Poors Capital IQ.
[2] USDOT classification included six categories: Transit, Public Transit (coded in the present research as "Transit"), Toll Managed Lanes, Toll Facilities, Roadways (coded together in the present research as "Road and Toll"), and Bridge (coded in the present research as "Bridge").
[3] Five projects categorized as "user charges" were reclassified as toll revenue for the purposes of this research: SR 91 Corridor Improvement, I-95 HOV / Hot Lanes, North Tarrant Express (Segment 3A and 3B), Northwest Corridor, and Ohio River Bridges Downtown Crossing. Had the SR 520 Floating Bridge been included in the analysis, it would also have fallen into this category.
[4] Including availability payments, state or local appropriations, and tax revenues.

Dependent Variable: Credit Ratings

In addition to collecting descriptive data (total project cost and TIFIA assistance value) for the sample projects undertaken during the MAP-21 and FAST Act periods, the authors collected credit ratings data as the analyses' dependent variable (y_i), as assigned at the time of financial close. The authors concluded that such credit ratings offer a sufficiently conservative measure of risk, since TIFIA loans tend to be more stable than other assets in project portfolios. Other project risk indicators were considered but rejected given comparability challenges across projects.

The ratings data derived from ratings reports published by Nationally Recognized Statistical Ratings Organizations (NRSROs) such as Fitch, S&P, and Moody's. For analytical purposes, the ratings were consolidated into two categories: A ratings (A/AA/AAA) and B ratings (BBB). Since the TIFIA program requires investment-grade ratings for eligibility, no sample projects possessed ratings below BBB. Although different NRSROs can produce heterogeneous ratings, most of the sample projects possessed two NRSRO ratings falling within a single coded category.

Primary Independent Variable: The FAST Act Policy

Since the analyses investigate the impact of the FAST Act's regulatory changes on TIFIA program outcomes, the analysis constructed a dummy treatment variable (T_t) as the primary independent variable. For the sample projects reaching financial close during the MAP-21 period (FY 2013-2015), this variable was coded 0; for projects reaching financial close during the FAST Act period (FY 2016-2020), this variable was coded 1.

Control Variables

Using data available via the USDOT TIFIA website (USDOT n.d.; Office of Management and Budget (OMB) 2020), the authors also constructed control variables (X_i) including project type (Transit, the base category; Road and Toll; Bridge) and primary revenue pledge (Toll, including user fees; Other, including availability payments, state or local appropriations, and tax revenues).

ANALYTICAL MODELS

To evaluate the potential relationship between policy period and the TIFIA program's creditworthiness profile, the authors employed a Linear Probability Model (LPM) approach, as summarized in Equation 1, and an Average Treatment Effect (LPM-ATE) approach, as summarized in Equation 2. Both models are extensions of the Ordinary Least Square (OLS) regression methodology. In each case, yi depicts credit ratings weighted by project count or by project loan amount. For example, if project i received a $100 million TIFIA loan, the statistical package weighted the project 1 time in the project count regression analysis and 100 times in the project loan volume analysis. Xi depicts control variables by project and Tt depicts the FAST Act policy variable.

$$y_i = \alpha + \beta \boldsymbol{X_i} + \varepsilon_{it} \qquad (1)$$

$$y_i = \alpha + \delta T_t + \beta \boldsymbol{X_i} + \varepsilon_{it} \qquad (2)$$

$$y_i = \ln \frac{p}{1-p} = \alpha + \delta T_t + \beta \boldsymbol{X_i} + \varepsilon_{it} \qquad (3)$$

The LPM analysis (Equation 1) probes potential baseline relationships between the control variables and the dependent variable without accounting for policy treatment effects. The LPM-ATE analysis (Equation 2) then tests for policy treatment effects. Finally, the authors also performed a non-linear, binary Logit regression analysis, summarized in Equation 3, as a sensitivity check.

CHAPTER 3

Findings

DESCRIPTIVE ANALYSIS

Figures 1, 2, and 3 compare project characteristics during the MAP-21 and FAST Act periods both proportionally (left) and over time (right). The dashed line between FY 2015 and FY 2016 in the column charts distinguishes the MAP-21 and FAST Act periods. Figure 1 depicts these data by project count, Figure 2 by TIFIA assistance amount, and Figure 3 by total project cost. The project count distributions shown in Figure 1 appear relatively unchanged between the MAP-21 and FAST Act periods. The distributions depicted in Figures 2 and 3, however, show a trend toward greater support for A/AA/AAA rated projects under the FAST Act period compared to the MAP-21 period when measured by assistance amount and total project cost. The large fluctuations seen in project selection numbers over time make further comparisons difficult.

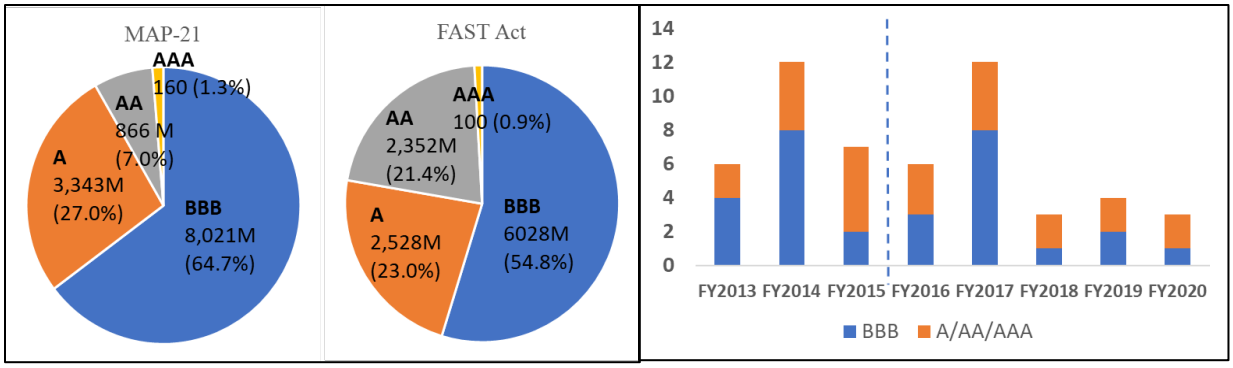

Figure 1. Number of TIFIA projects by credit rating at financial close

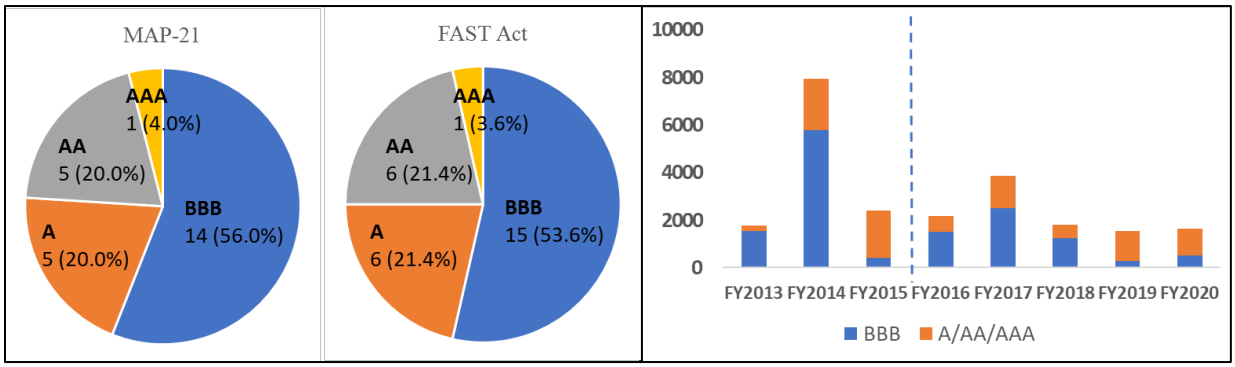

Figure 2. TIFIA assistance volume (millions of $US) by credit rating at financial close

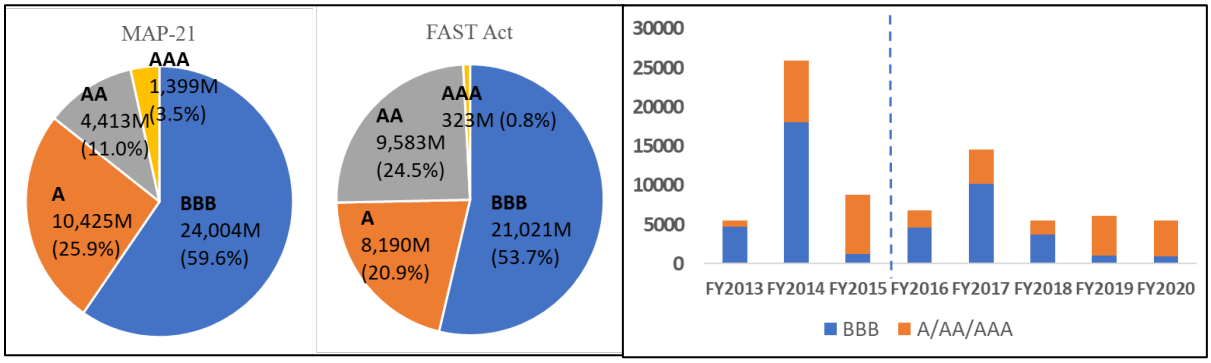

Figure 3. Total project cost (millions of $US) by credit rating at financial close

To corroborate the trends suggested by the figures, the authors performed t-tests on the mean difference in credit ratings between the MAP-21 and FAST Act periods (A group coded 1, B group coded 0). The results, shown in Table 2, confirm the findings suggested by the figures. When considering credit ratings by project count (as shown in Figure 1), the difference in mean credit rating between the MAP-21 and the FAST act periods is not statistically significant. In contrast, the differences in mean credit rating between the two periods—higher mean rating under MAP-21 than under the FAST Act—was statistically significant when weighted for TIFIA assistance amount (as shown in Figure 2) and when weighted for total project cost (as shown in Figure 3). These test results suggest that the TIFIA program provided a greater proportion of its support to higher-rated A/AA/AAA projects during the FAST Act period than during the MAP-21 period.

Table 2. Mean difference in the credit rating at financial close, t-test results

	(1) No. of Project	(2) TIFIA Volume	(3) Project Cost
Credit	0.0243	0.0910***	0.0591***
Ratings	(0.140)	(0.00645)	(0.00351)
N	53	23,087	79,349

Notes: Robust standard errors in parentheses (); *** p<0.01, ** p<0.05, * p<0.1.

While the descriptive charts and t-test results present consistent findings, they do not account for non-policy factors like project type and primary project funding approach. To control for these factors and estimate pure FAST Act impacts, the analysis turned to regression methods.

REGRESSION ANALYSES

Estimation 1: Credit Ratings Weighted by Project Frequency

The first regression analyses focused on credit ratings weighted by project frequency, with the results shown in Table 3. Columns 1 and 2 show the impact of general project characteristics (Equation 1); columns 3 through 5 show the impact of the FAST Act along with various control variables (Equation 2). Column 6 shows the outcome of the binary Logit approach as a sensitivity check (Equation 3).

Table 3. TIFIA project credit rating models by project frequency

No. of Projects	Rating (1)	Rating (2)	Rating (3)	Rating (4)	Rating (5)	Rating (6)
	LPM	LPM	LPM-ATE	LPM-ATE	LPM-ATE	B Logit
FAST Act			0.0243	0.0805	0.143	0.138
			(0.140)	(0.147)	(0.145)	(0.732)
Project Type (Base Category: Transit)						
Toll and Roads	-0.310**	-0.127		-0.320**	-0.130	-0.119
	(0.146)	(0.158)		(0.147)	(0.152)	(0.692)
Bridges	-0.132	-0.173		-0.0892	-0.101	-0.082
	(0.239)	(0.238)		(0.255)	(0.249)	(1.007)
Toll Primary Rev.		-0.394**			-0.421***	-0.399***
		(0.152)			(0.147)	(0.826)
Constant	0.632***	0.673***	0.440***	0.589***	0.601***	0.394***
	(0.114)	(0.108)	(0.101)	(0.141)	(0.127)	(0.578)
Observations	53	53	53	53	53	53
R-squared	0.084	0.186	0.001	0.090	0.203	[0.159]

Notes: Robust standard errors in parentheses (); pseudo R-squared in brackets []; *** p<0.01, ** p<0.05, * p<0.1.

The LPM results show that projects pledging toll revenue as their primary revenue source tend to have lower credit ratings. Column 1 shows this as statistically significant under the Road and Toll project type, shifting to the toll revenue variable in Column 2. After controlling for the revenue pledge, project type did not have a significant impact. Since toll revenues tend to be more uncertain than revenue sources like state and local government appropriations, tax revenues, or availability payments, this finding is not surprising. Turning to the LPM-ATE results, the analyses find no significant FAST Act policy impact on project credit ratings. This finding is consistent with the descriptive analysis shown in Figure 1 and Table 2. The Logit analysis found comparable results.

Estimation 2: Credit Ratings Weighted by TIFIA Loan Amount

The second regression analyses focused on credit ratings weighted by TIFIA loan amount, with the results shown in Table 4. As with Table 3, columns 1 and 2 show the impact of general project characteristics on credit ratings as weighted by TIFIA loan amount (Equation 1); columns 3 through 5 show the impact of the FAST Act policy (Equation 2). Column 6 shows the outcome of the binary Logit approach as a sensitivity check (Equation 3).

As with the Estimation 1 findings, the weighted LPM results show that projects pledging tolls as their primary revenue source tend to have 35% lower ratings than projects pledging other forms of primary revenue. The weighted analysis shows meaningful differences in project ratings across project types as well. Toll and roadway projects, regardless of primary revenue pledge, tend to have 12% lower ratings than transit projects. Bridge projects have ratings 6% higher than transit projects, suggesting that lenders consider bridges lowest risk and toll and roadway projects highest risk when compared to transit projects, other factors being equal. As suggested by the descriptive analysis shown in Figure 2 and Table 2, the LPM-ATE results show that a larger proportion of TIFIA support went to A/AA/AAA rated projects during the FAST Act period than during the MAP-21 period. The estimated coefficient suggests that the average credit rating, per million dollars of TIFIA spending, was 24% higher under FAST Act than under MAP-21. Interestingly, the FAST Act policy coefficient is larger when project type and primary revenue pledge are

controlled, suggesting that project selection favored A-rated projects even when project type and revenue pledge were identical.

Table 4. TIFIA project credit rating models weighted by loan amount (millions of $US)

US Million $	Rating (1)	Rating (2)	Rating (3)	Rating (4)	Rating (5)	Rating (6)
	LPM	LPM	LPM-ATE	LPM-ATE	LPM-ATE	B Logit
FAST Act			0.0910***	0.234***	0.244***	0.224***
			(0.00645)	(0.00626)	(0.00604)	(0.035)
Project Type (Base Category: Transit)						
Toll and Roads	-0.261***	-0.122***		-0.294***	-0.153***	-0.120***
	(0.00663)	(0.00656)		(0.00634)	(0.00591)	(0.032)
Bridges	0.134***	0.0621***		0.247***	0.179***	0.170***
	(0.00983)	(0.00979)		(0.0102)	(0.0101)	(0.046)
Toll Primary		-0.354***			-0.362***	-0.362***
Revenue		(0.00623)			(0.00541)	(0.038)
Constant	0.501***	0.573***	0.361***	0.388***	0.456***	-0.292***
	(0.00510)	(0.00503)	(0.00437)	(0.00580)	(0.00553)	(0.028)
Observations	23,087	23,087	23,087	23,087	23,087	23,087
R-squared	0.097	0.187	0.009	0.145	0.239	[0.196]

Notes: Robust standard errors in parentheses (); pseudo R-squared in brackets [];*** p<0.01, ** p<0.05, * p<0.1.

IMPLICATIONS

The quantitative results suggest that the TIFIA program allocated more of its credit support to more highly rated projects under the FAST Act than under MAP-21. This effect is observed even when accounting for projects' reliance on tolls as a primary revenue pledge and for changes in the project mix between the two periods. The effect is not apparent when looking only at project counts.

The results do not provide an explanation for why such a shift occurred, although several factors may have played a role. For example, the FAST Act reduced TIFIA's overall lending authority, potentially incentivizing a more conservative project selection process. Similarly, defaults by lower-rated projects may have heightened decision makers' sensitivity to project risk.

CHAPTER 4

Conclusions

The preceding research empirically evaluates whether and how the TIFIA program's creditworthiness profile, measured via credit ratings, changed between the MAP-21 and FAST Act periods. While the findings provide some meaningful insights, several limitations suggest follow-up research.

First, the empirical findings may be biased by unobserved factors, data and methodological deficiencies such as omitted variables, or high variance within the existing controls. As a result, subsequent research should revisit the analysis with additional evidence and possibly alternative analytical models, particularly those that relate to public financing evaluation. In addition, further investigations into risk management within the TIFIA program would be beneficial. While the FAST Act's budget pressures likely influenced program decision-making, general risk management—political as well as financial—likely played an important role.

Second, the preceding analysis offers only a very narrow evaluation of the program's outcomes, given the TIFIA program's many dimensions. More thorough evaluation research might explore the TIFIA program's credit subsidy metrics, application processing speed, and support levels as a share of overall project costs. Evaluations of this nature would prove valuable for all stakeholders in the U.S. surface transportation infrastructure marketplace.

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