Your community gets a B-: analysis of the specific and curious realm of airport bond rating

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AIRPORT BOND RATINGS

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ABSTRACT

Commercial airports are publicly-owned transportation infrastructure, usually funded with bonds. The bond rating decision for these entities thus has important ramifications for bond investors, issuers, airport managers, and even the communities the airports serve, but the rating decision process is not well understood. This paper discusses a simulation of the rating process in two decision environments, including a downgrade. The effect of information framing in an environment of incomplete data is examined using amateur evaluators. Amateur evaluators were utilized to understand how people with limited financial analysis skills would respond when presented with incomplete information and a primed scenario. The results indicate that amateur evaluators were more likely to downgrade a bond grade than a ratings agency, but this effect was moderated for amateur evaluators with more work experience. Implications for airport and supply chain infrastructure are discussed.

INTRODUCTION

Access to financial capital for U.S. airports is a requirement for sustained performance. Funding can come in many forms, including airport revenue and federal, state, and local grants (Zou et al., 2015). Another primary source of capital for U.S. airports continues to be the municipal bond market.

For background, bonds – like stock issues or loans – help entities raise money. Bond issuers receive financial capital in return for a promise to pay back the principal plus a premium (i.e. interest) to the capital provider. The size of this premium is usually tied to a bond's grade and the perceived riskiness of the bond, essentially an assessment of the likelihood that the issuer will default on it. A bond's grade, determined after a review by a credit rating agency, can severely impact the borrowing costs of bond issuers (Grammenos, Alizadeh, and Papapostolou, 2007). A lower grade indicates a higher level of riskiness, and therefore a higher premium on top of the principal must be offered to potential capital providers. Thus, it serves a bond issuer well to earn the most advantageous grade possible to lower the interest payments associated with bond outlays.

The intent of the current research is to better understand the grading process of municipal bonds specifically utilizing airport bonds as the primary example. Because of a lack of information deemed important by credit ratings agencies to fully assess

bond grades, an experiment was designed and implemented to examine if amateur bond graders evaluated an existing airport bond in the same manner as professionals of a credit rating agency. The experiment also analyzed the possible influence of framing on decisions. This understanding is critical because the bond grading process is opaque and capital seekers need to fully appreciate if differences exist between professionals and other people in an environment where information is incomplete.

This work responds to calls for additional research in understanding the present state of capital inputs for the aviation industry (Fu, Homsombat, and Oum, 2011; Zou et al., 2015). It has important implications for airports, airport managers, municipal budgets, and the future level of community supply chain infrastructure. A lower bond grade limits the ability of a municipality to borrow to maintain or improve the condition of an airport. Thus, bond grades can affect the size of bond outlays, the number of bond outlays, and future behavior (i.e. a negative experience may prevent municipal leaders from undertaking needed improvements).

At a macro level of analysis, infrastructure (for example: airports) plays a major role in supply chain logistics. Yet infrastructure receives little attention in the logistics and supply chain literature. We see few articles on the nature and structure of ports, airports, and other primarily publicly owned facilities, despite their importance to the operation of both domestic and international logistics operations and supply chain design. Even the literature on supply chain finance focuses on money flows and financial arrangements related to inventory (Hoffman, 2005; Kouvelis and Zhou, 2011; Gelsomino et al., 2016). Further, there seems to be little understanding of how infrastructure is funded, where it exists, or its strategic importance not only in developing sound supply chains and transportation systems, but also in the global political arena (Li,, Cui, and Lu, 2014). We also find that infrastructure and infrastructure finance has been neglected in

business curricula. It appears that building roads is left to engineers, despite the crucial nature of infrastructure to the business community and consequently to the business student.

This paper contributes to the literature in three ways: first, it addresses the importance of infrastructure finance and financial ratings firms; second, it demonstrates a method for teaching the infrastructure concepts; and third, it adds to the body of literature in supply chain behavioral research (Knemeyer and Naylor, 2011; Siemsen, 2011).

LITERATURE REVIEW

Agency Theory and Airport Managers

The classic agency problem arises when cooperating parties have different goals to be achieved through the same means (Jensen and Meckling, 1976; Eisenhardt, 1989). A prime example of the principal agent problem is an employee-employer relationship. The employer may seek abnormal profits or growth of a company, while an employee may simply want a paycheck and a good quality of life. While differing goals are not automatically a negative, the further goals are misaligned between principals and agents, the greater the chance for conflict and increased costs of monitoring (Fama and Jensen, 1983). Potential agency issues can be exacerbated in airport bond markets.

Accessing financial capital is a factor of production which can create an array of complex relationships among owners, managers, and creditors (Armstrong, Guay, and Weber, 2010). U.S. airports finance large investment projects with revenue bonds (Fuhr and Beckers, 2009). In effect, airport managers serve multiple principals when capital funds are raised through bond markets. Airport managers report directly to city, county, or regional commissions but act as indirect agents for creditors for specific airport bonds. This can form a

relationship where government acts as a steward for the private investors (Oum, Adler, and Yu. 2006), ensuring airports work towards achieving their own goals while also maintaining the fiduciary responsibility of paying back borrowed funds.

The trend of financing airport projects with private investment including bonds has actually been driven by the "cash-in" principle of municipal governments (Cruz and Marques, 2011). The "cash-in" strategy refers to governments taking a relatively safe and stable public asset, such as an airport, and capitalizing on that asset for financial continuity (Cruz and Sarmento, 2017). For example, municipalities and private investors alike know that commercial airports have a high probability of continued operations. Both parties seek to capitalize on this, with one accepting an investment for the continued or improved operation of that asset, while the other party seeks a guaranteed return on investment. Essentially, this is the source of the agency problem for airport managers when dealing with multiple principals.

While their direct superiors can give airport managers direct feedback or actionable goals, bond investors must give feedback indirectly. Rather bond investors either have to assume their investment is being handled in their best interest or rely on an outside party for judgment. These outside parties include credit rating agencies.

Rating Agencies

Credit rating agencies operate in an oligopolistic market with little competition (LeMay, Burns, and Hawkins, 2016). Moody's, Fitch, and Standard and Poor's rate 95% of the general obligation bonds globally (Evans, 2015). While this market structure suggests the potential for a mixture of collusion and forbearance, competition seems to be fairly intense (Becker and Milbourn, 2011). This competition is further exacerbated by a unique setup in bond markets where the issuers themselves pay

for the credit analysis and resultant rating (Livingston and Zhou, 2016). An obvious conflict of interest exists because the bond issuer has long-term fiscal incentives to select the credit rating agency which will provide the best rating. As a result, investors should use caution if they rely solely on credit rating agencies' analyses when making investment decisions. In fact, each of the big three credit rating agencies were found to have distorted markets and provided an overly positive view of bonds and securities that failed in the global financial crisis in 2007 and 2008, and again in the European sovereign debt crisis in 2010 (Long, 2013).

Bonds are usually rated in two phases: at the initial outlay and then through an annual "watch" phase that can confirm or alter the original bond grade. While competition can drive bond ratings slightly positive at outlay, it is also the period in which the bond grade is most fully analyzed (Bae, Kang, and Wang, 2015). Credit rating agencies derive most of their revenue from bond outlays, not monitoring. The credit rating agencies also know that the most eyes are on them at the time of bond issue, so reputational effects may be present (Hau, Langfield, and Marques-Ibanez, 2013). Recertifying bonds, or altering their initial grade, accounts for a small percentage of the earnings for credit rating agencies (Driss, Massoud, and Roberts, Forthcoming). Since the surveillance mechanisms are costly, recertification usually comes after a quick review of objective data specific to the issuer, a review combined with subjective judgement (Raiter, 2009; LeMay et al., 2016). This can result in multiple problems. Of obvious concern would be bonds that should have been downgraded, but weren't due to oversight. Another concern is the impact of downgrade on an entity when the reasons for a downgrade seem arbitrary and opaque. This is further impacted by the potential subjective nature of analysis. A template of criteria from all analyses may aid rating agencies and raters when recertifying bonds. While a standardized template can be an obvious place to start for (re)analysis, credit rating

agencies must judge each bond, or specific supply chain expenditure, on that issue's own merits (Moon and LeBlanc, 2008).

Municipal Bond Grading – Airports

Using municipal bonds for airports as a specific example, Fitch applies five criteria broadly to grade airport bonds: 1) Revenue risk – volume, 2) Revenue risk – price, 3) Infrastructure development/ renewal, 4) Debt structure, and 5) Debt service (Fitch 2012a). These criteria, termed "Key Rating Drivers" or "Key Rating Factors" interchangeably, help Fitch determine an airport's resilience of demand as well as an airport's flexibility to offset the volatility associated with the airline industry (LeMay et al., 2016). These concepts, paired with an airport's actual market size, help contribute to the grade of bonds associated with that particular airport (Fitch, 2012a).

However, a prime contention of the current research is that bond grades may be assigned unfairly. This primarily stems from the fact that airport bonds have an artificial ceiling imposed on them by Fitch (Fitch 2012a). All markets, regardless of size, have a ceiling, with smaller markets having a progressively lower "top" grade. This imposed anchor, along with the knowledge that key rating factors are subjectively interpreted, makes one assume that a rating for a particular airport is provided based on the judgement of the analysts assigned those markets (LeMay et al., 2016). These judgments can have a large impact financially, operationally, and strategically for communities as a link has been shown between credit ratings and borrowing costs (Calcagno and Benefield, 2013). While a relationship between a lower bond rating and higher borrowing costs is probably intuitive, other factors such as the ability to take on multiple capital improvement projects at one time have to be considered. Also, receiving a poor bond grade on one project may influence the pursuit of another project if a bond grade is required.

Pairing these thoughts is critical when one also considers that municipal bonds are notoriously sound investments. The default risk for municipalities is very low (Kincaid, 2016).

Additionally, over half of the States in the U.S. prevent municipalities from declaring bankruptcy (Swedroe, 2013). On a per issuance basis, municipal bonds fail .086% of the time where corporate bonds fail 35.63% of the time (Appleson, Parsons, and Haughwout, 2012). Those percentages are based on 54,486 municipal bond outlays for the period between 1986 and 2011 versus 5,656 corporate bonds for the same period. Arguably, if ceilings are being imposed on bond grades for municipalities, then perhaps floors should be imposed as well. If municipal bonds' failure rates are so low, it would be assumed that changes to bond grades during the "watch" phase would be the result of obvious factors. A downgrade would be triggered by known negative influences. However, it appears that is not always the case.

Decision-Making: Framing, Anchoring and Halo Effects

Psychological effects can influence the decisions of those assigned to assess bonds on behalf of credit rating agencies. Information utilized to grade bonds is reported annually in a context that possibly influences, at least in part, the way in which the information is considered. Shafir, Simonson, and Tversky (1993) identify two broad approaches to decision-making under conditions of uncertainty and conflict: formal models and reason-based analysis. Formal models include normative models like expected utility theory (von Neumann and Morgenstern, 2007) and descriptive models like prospect theory (Kahneman and Tversky, 1979). Formal models usually associate numerical values with alternatives; such models usually either maximize gains or minimize losses (Shafir et al., 1993). Reason-based analyses typify business and political discourse, notably in the interpretation of

case studies in law schools and business schools (Shafir et al., 1993).

Unless they are quantified and consciously included in formal models, contextual openers like priming, anchoring, and framing have little influence on decision-making that employs formal models. However, such openers can clearly influence decisions in reason-based choice. This is because context can be a piece of information considered when it is unclear what information is needed to make a necessary decision. In a way, context sets the stage and places potential boundaries around a decision event. Context can anchor a decision maker to a specific comparison value, or prime or frame a decision maker's mindset when considering information to make a decision (Kahneman, 2011). More complex decision environments may make the effects of specific primes, frames, and anchors more difficult to discern, in part because the choices become multi-layered (Caussade et al., 2005). This means that the influence of the opener may become more difficult to discern if prior or later layers of choice cover up or distort the influence of the opener. When outcomes can vary greatly, so can the ability of decision-makers to discriminate, especially as the items become more difficult to categorize (Schneider, 1995).

The grading of a bond would appear to be a layered, complex choice. In the case of the raters at an agency like Fitch, the watch phase may offer the employees issuing the ratings reports little or no risk. The employees can simply follow procedures and incorporate information that changes the valence of the bond from positive to negative, using the most recent rating as an anchor point for the decision. This leaves open the possibility that a bond that should have been rated AAA, but was rated BBB+ by rule, would be downgraded to BBB because of new information with minor negative effect on the riskiness of the bond. This phenomenon may be rooted in the behavioral economics paradigm of anchoring. Arguably, a bond grade serves as an anchor during a reassessment phase. Bonds are being compared more so to their previous assessment, rather than their actual risk of default.

In classic anchoring studies, the anchors were based in numbers that were irrelevant to the choice at hand. For example, Tversky and Kahneman (Kahneman, 2011), rigged a 'Wheel of Fortune' to give students one of two numbers, 10 and 65. Then the students were asked to estimate the percentage of African nations in the UN. Those who saw 10, guessed that 25% of UN nations were African. Those who saw 65, guessed that 45% were African nations (Kahneman, 2011). Obviously, the wheel of fortune numbers were irrelevant to the percent estimates, but they influenced the choices anyway. In the case of airport bond grades, we believe existing grades to be influencing the reassessment grade of the bond. This is problematic for many reasons. First, as mentioned, airport bond grades have a ceiling. Certain domestic airports may not receive a higher grade due to broad categorization factors that may or may not actually apply to a specific airport. Second, we believe that not all analysts understand that municipal bonds cannot default, directly influencing the inherent riskiness of a bond. If a previous bond grade can influence a decision, so perhaps can the knowledge that default is unlikely. Third, an airport bond grade can directly and indirectly affect a municipality's finances for an extended time.

Armed with this information, the current research sought amateur bond graders to assess a specific instance where a bond outlay was downgraded. Amateur graders were utilized to assess the decision point because of the belief that the contextual anchor of a previously issued bond grade was playing a greater role in the bond assessment than financial performance factors. This is because financial information in the bond grading process can be incomplete or subjectively interpreted. As such examining behavioral factors like anchors become appropriate to assess with amateur graders.

HYPOTHESES DEVELOPMENT

In 2008, the city of Pensacola, FL issued nearly $36 million dollars of airport bonds for capital improvements to the existing airport infrastructure including airport terminal expansion and parking lot construction. Fitch Ratings Agency was contracted to provide a ranking on the bond issue and provided a BBB+, the highest bond grade awarded to an airport of Pensacola's size (Fitch, 2012a).

Bonds are watched with an annual regrading. In this manner, bond grades can be raised, reaffirmed, or lowered. In 2012, the airport bonds from Pensacola were downgraded to BBB. The primary reasons offered for the bond downgrade were stagnant traffic levels, a debt burden higher than allowed for debt coverage service levels, and a lack of cash flow from a structured airline agreement (Fitch, 2012b). However, objective quantifiable data on the downgrade was limited (Fitch, 2012b; LeMay et al., 2016).

With financial data being incomplete and the financial analysis being a subjective process, the bond process may be impacted by different factors. Arguably, anchors may be a reference point for bond grades when financial information is limited. In this case, one or two of five key ratings drivers may be perceived as negative; but information on the other ratings factors are incomplete. Because of incomplete information, undue weight may be given to where a bond is currently assessed instead of judging how likely a bond default actually is. The process becomes one of justifying the limited amount of information present versus an established metric (i.e. a bond's current grade), instead of fully considering the information against how likely an entity is to declare bankruptcy. This issue may indicate that anchoring is driving a bond's grade instead of the financial metrics grading agencies say are important.

Given our understanding of the imperfect bond grading process and the susceptibility of evaluators to forces identified in the behavioral science literature, the authors developed two hypotheses on the role that framing and anchoring information will play on decisions by amateur bond graders:

> H1: Provided the information that few municipal bonds default, amateur graders will not downgrade municipal bonds as much as professional analysts across similar metrics.

> H2: Provided the information that few municipal bonds default, amateur graders with more experience in the business world will not downgrade municipal bond ratings as much as amateur graders with less experience.

METHODOLOGY AND FINDINGS

To test these hypotheses, we conducted a behavioral experiment. Behavioral experiments provide an opportunity to understand the nuances of decision making (Knemeyer and Naylor, 2011). We chose experimentation for this investigation for three specific reasons. First, behavioral experiments provide a high level of control to help adequately judge causality (McGrath, 1981; Thomas et al., 2013). Second, behavioral experiments allow us to analyze specific cause-and-effect relationships between variables because they grant a higher level of control over those variables (Thomas, Esper, and Stank, 2010). Third, we wanted to assess the relationship between specific independent variables and the dependent variable of bond grade. In this instance, the research team was particularly interested in the effect of the knowledge actual municipal bond defaults would have on a bond grade. We are providing a different anchor or frame to our amateur graders and seeing if this impacts the reason-based choice they are making in any way.

We asked a convenience sample of college enrollees from a Florida university to analyze the

same data that Fitch Ratings published in its annual report on a continuing airport bond. The sample included both graduate students and undergraduate students. The use of student samples in behavioral supply chain research is an established methodology (Cantor and Macdonald, 2009; Thomas et al., 2010; Thomas et al., 2013; Mir, Aloysius, and Eckerd, 2016; Tokar et al,. 2016). College students are appropriate for the current research for two primary reasons. First, we seek internal validity by randomly assigning participants to our treatment control (Stevens, 2011). Second, we have specifically sought amateurs, or individuals with minimal experience, to analyze information as it relates to generating a bond grade (Thomas, 2011). Thus, specific interest is focused on the decision making of individuals who are unfamiliar with bond grading. We examine anchoring and not quantifiable financial analysis.

We gave the ratings exercise to 75 college students, 28 of whom were graduate students. We distinguish between graduate and undergraduate students

expected between the two groups. This work experience and understanding of business environments may help graduate students distinguish between the effects of anchors. Collectively, the college students were given the five key rating criteria that Fitch Ratings published as airport bond rating criteria for the years covered by the data— 2010, 2011, and 2012. The 2012 review was pertinent because that was the year that the Pensacola Airport bond was downgraded.

The forms used for the exercise created two different conditions. In the first condition, participants were given the information that only 47 municipal bond issues defaulted between the years of 1986 and 2011. In the second condition, this information was withheld. Otherwise, the forms used in the exercise were identical.

The forms included information on the five key ratings criteria for the years 2010, 2011, and 2012. The forms are shown in the Appendix to this paper. As can be seen from the forms, the data are

TABLE 1
SUMMARY OF FITCH AIRPORT RATING CRITERIA INFORMATION SUMMARY FOR RATING PENSACOLA AIRPORT BONDS

Fitch Criteria	Number of Drivers (within the Criteria)	Number of Complete Drivers for Pensacola (2010 to 2012)
1 – Revenue Risk Volume	3	3
2 – Revenue Risk Price	2	1
3 – Infrastructure Development and/or Renewal	2	1
4 – Debt Structure	5	3
5 – Debt Service	4	1

complete for all three years for some measures of the criteria, but not for others (Fitch 2010, 2011, and 2012b). That is because these forms contain only the information used in Fitch press releases for these years. The gaps in this information are shown in Table 1. All of the published data fit into the measures of the five ratings criteria as described by Fitch (Fitch 2010, 2011, and 2012b).

Forty students, including 13 graduate students were given the form that included the information about municipal bond defaults. Thirty five students, including 15 graduate students, were given forms that excluded this information. Both groups were asked to examine year-over-year changes in the measures used to rate each criterion and then mark it with a "+", "-", or "=" sign. This was intended to summarize their judgement of the impact that changes in the measure should have on the bond grade. For example, for key ratings factor – revenue risk volume – participants were given information on enplanement base, enplanement growth, and carrier risk for the years 2010, 2011, and 2012 as this is what appeared in the related Fitch releases. Each participant marked the blank space next to the measure in accordance with his or her judgement. This process was repeated for all five ratings

criteria. At the end of the exercise, participants were asked to add up their plus and minus signs. Then they were asked to grade the bond on a scale in which they were all fluent: A, A-, B+, B, B-, C+, C, C-, D, and F. They were informed that Fitch's rating for the bond in 2010 was B+.

The participants were guided through this process with a PowerPoint presentation that included definitions of the key criteria and their measures. The participants were allowed to ask questions to clarify these definitions and criteria. Then they assessed the criteria one-by-one. The process took between 35 and 45 minutes. All presentations were given by the same member of the research team, assisted by the other members to assure that all of the procedures were carried out in a consistent fashion.

From the experiment worksheets, we have created a dependent variable for the participant's rating change in 2011 and one for 2012. For example, if a student downgraded the bond one increment in 2011 – B+ to B in their vocabulary – this appears as a negative one. We model the participant decision with:

$$y\_2011= \alpha+\beta\_{(1\text{-}2011)} x\_1+\beta\_{(2\text{-}2011)} x\_2+\beta\_{(3\text{-}2011)} x\_3+\beta\_{(4\text{-}2011)} x\_4+\beta\_{(5\text{-}2011)} x\_5+u\_2011$$

$$y\_2012= \alpha+\beta\_{(1\text{-}2012)} x\_1+\beta\_{(2\text{-}2012)} x\_2+\beta\_{(3\text{-}2012)} x\_3+\beta\_{(4\text{-}2012)} x\_4+\beta\_{(5\text{-}2012)} x\_5+\beta\_6 y\_2011+ u\_2012$$

where all of the right hand side variables denoted with an *x* are discreet (e.g., MBA student status) and each equation ends with an error term. Details for the variables, including mean and standard deviation, can be found in Table 2. The only variation across the equations occurs in the right hand side variable y_{2011} for the change in grade for the next year, y_{2012}.

Parameter estimates from the model appear in Table 3. One variation of the model included a dummy variable for participant gender (right side), but the results are not sensitive to this choice in specification. The first finding confirms the dependent variable averages from Table 2 as the participants downgraded the bonds (significant, negative values for the intercept).

The results show limited support for hypothesis one in decisions for 2011, at the p < .10 level. In other words, students who received the low-default frame – that 47 municipal bonds failed over the past 25 years – were somewhat less likely to downgrade. The treatment is not significant for the 2012 decisions; the knowledge of municipal bond defaults over the past 25 years played no role in the grade of the Pensacola Airport bonds in 2012, a year where Fitch Ratings actually did downgrade the bonds. In summary, we find mixed results for hypothesis one;

it was only somewhat supported in a year where Fitch did not downgrade.

Results indicate that amateur bond graders with more professional experience (i.e. graduate students) would adjust bond grades differently than their counterparts in 2011 at the p < .10 level. The result for 2012 is a larger and highly statistically significant coefficient where amateur graders with more professional experience were less likely to downgrade. For example, the model with the gender effect (right side of Table 3) has an intercept of negative 1.3365 but an MBA student adjustment of positive 1.4633. Therefore, hypothesis two is supported.

Examining the results of the study compared to hypothesis one indicate that anchoring respondents to the fact that few municipal bond defaults have occurred over the past 25 years does not influence the decision of respondents to downgrade bonds. Essentially, we looked to reframe a respondent's decision by providing amateur graders the same incomplete financial information analysts received, Pensacola's current bond grade, and indicating that municipal bonds default at an extremely low rate. This contextual factor, the low rate of municipal bond default, was a variable that had limited impact on students as a whole. Perhaps respondents

TABLE 2
SUMMARY STATISTICS (N = 75)

Variable	Model Name	Mean	Standard Deviation
Bond grade change for 2011	Y_{2011}	-0.640	1.835
Bond grade change for 2012	Y_{2012}	-0.613	2.046
Treatment (Information that few municipal bonds default)	x_1	0.533	0.502
MBA student	x_2	0.373	0.487
Pre-MBA student	x_3	0.187	0.393
Female	x_4	0.187	0.392

discounted this fact because they perceived that the statement was only broadly related to their specific bond regrade. While understandable, careful financial analysis occurs at time of bond outlay; not necessarily during the annual watch phase (Hau et al. 2013). Regardless, the current bond grade played more of a role in respondents decision to change a bond grade than information on municipal bond default rates.

When the student groups were separated between undergraduate and graduate respondents, there was a significant difference between the two respondent bases. Graduate students were statistically significantly less likely to downgrade a bond in the presence of municipal bond default rate information than their undergraduate counterparts. One possible

reason for this explanation is the professional experience graduate students typically bring to their studies. Graduate students have oftentimes been business professionals and as such may cognitively process information differently than people with less experience. Perhaps graduate students realize that low municipal bond default rates indicate the financial safety of these investments. Alternatively, negative information would have to be perceived as very negative if a bond downgrade was to occur. In essence, graduate students may more fully understand how the business operates.

DISCUSSION AND IMPLICATIONS

Suggesting that amateur bond graders and credit rating agency employees are the same is not

TABLE 3
DETERMINANTS OF BOND GRADE CHANGES
(+1 is an upgrade and -1 is a downgrade, standard errors in parenthesis)

| Variable | Coefficient for Grade Change | | | |
	2011	2012	2011	2012
Intercept	-1.4075***	-1.4048**	-1.3780***	-1.3365***
	(0.3944)	(0.4961)	(0.4099)	(0.4827)
Treatment Frame	0.7604*	-0.1190	0.7758*	-0.0790
(Information that	(0.4179)	(0.4683)	(0.4239)	(0.4743)
few municipal				
bonds default)				
MBA student	0.8759*	1.4176***	0.8935*	1.4633***
	(0.4636)	(0.5204)	(0.4705)	(0.5273)
Pre-MBA student	0.1873	0.9286	0.20324	0.9683
	(0.5725)	(0.6276)	(0.5789)	(0.6332)
2011 Bond Grade	--	-0.2381*	--	-0.2411*
		(0.1300)		(0.1306)
Female	--	--	-0.1267	-0.3108
			(0.4384)	(0.4794)
Adjusted R^2	0.04	0.08	0.03	0.07

* Significant ($p<0.1$)
** Significant ($p<0.05$)
*** Significant ($p<0.01$)
Note: Treatment frame individuals received information that only 47 municipal bond issues defaulted between the years of 1986 and 2011.

something we take lightly. The entire grading process of municipal bonds should be analyzed, however, because of the obvious impact bond grades (and potential downgrades) can have on municipalities, including both the resident population and the firms who use the funded infrastructure. Our amateur graders often matched the changes by Fitch experts, even when armed with the experimental frame of the municipal bond default information. The graders with more professional experience differed from our traditional undergraduate students in that they were not as willing to downgrade bonds in 2012. In reality, Pensacola bonds were downgraded in 2012. While one would hope Fitch employees would have some experience-based knowledge that would help grade bonds, investors truly do not know the specifics behind why bonds are downgraded or upgraded. In other words, positive or negative changes for a particular metric do not convey any sense of weight.

It is understandable why researchers lack full clarity on the bond grading process since Fitch competes with other credit rating agencies. However, this lack of clarity can sometimes surprise a bond-issuer. Alternatively, the bond grade ceiling seems arbitrary. Fitch press releases note the size of the airport as a potential cap to the liquidity of an airport, with larger airports eligible for higher grades. Regardless of fairness, it is important to question if this standard accurately reflects the risk of a bond grade. Finally, one must wonder if agencies should even grade municipal bonds after issue. As mentioned, the failure rate is miniscule.

Bond grades clearly affect the perception of airport management. Steady or rising bond grades may have a positive effect on the perception of airport managers and the job they are doing, but a downgrade is likely to be seen as a loss, so downgrades can have serious repercussions for airport managers including loss of employment (known outcome from the Pensacola Airport Bond downgrade). This negative outcome is especially disturbing if the exact reasons for a bond downgrade are unknown.

Another impact of bond grades is on a municipality seeking to raise capital for infrastructure funding, which remains a critical global issue (Spychalski, 2011; Love, Ahiaga-Dagbui, and Irani 2016). Bond grades directly affect interest rate charges for a municipality and impact the amount of funding sought. A higher grade signals less risk for a bond issue and usually lowers the interest rate, and therefore interest rate payments, associated with bonds. A lower grade signifies that bonds may be riskier and typically raises the interest rate, and interest rate payments, associated with bonds. The obvious losers in this situation are constituents who reside in the locale where a bond issue is being considered. A lower grade may signify that municipal taxes will have to be raised to pay for the higher interest rates. Alternatively, and as a result of a potential lower credit rating, the amount of the bond issue may have to be lowered, thus affecting the actual capital project deemed important to the municipality.

Such bond grades also affect other users of facilities funded by these bonds, not just the local managers and residents. For example, UPS and FedEx build sort facilities across the country. These facilities tie the companies to a certain location. A lower bond grade increases the price of new transportation infrastructure. It may have an immediate impact on already planned future projects and potentially alter future proposals. This can be a dire situation for a civic area that could fund infrastructure projects that were appropriately rated, but has to wait to pay off higher than necessary financial obligations. Time is at a premium in municipalities where capital projects can take many years from planning to completion (Xiao, Fu, and Zhang, 2016). That is why eliminating bias in bond-rating decisions is so important.

Please note, we are not suggesting artificially high grades for risky bonds. Rather, we are imploring

credit rating agencies to adequately assess the rating process, including considering new key rating factors with or without a contractual obligation to do so. Eliminating the surprise from a downgrade is, in our view, an absolute necessity. Thus, the agencies should provide clarity to municipalities and investors as to why a downgrade is happening. As downgrades occur now, language seems obtuse as to why downgrades actually happen. There is an unfortunate social exclusion process at work (i.e. lower current, and lower future access to, supply chain infrastructure) with limited objectifiable support (Schwanen et al., 2015). Therefore credit rating agencies must be explicit as jobs, new charges to taxpayers, and other supply chain infrastructure funding can be at stake.

In addition, in this complex process, there is little doubt that behavioral biases and effects play a major role, one that varies from context to context. We have two areas of concern here. First, the presentation of information – such as the frame used in this study – should have no impact on future air travel for a community. The reader should recall from Table 1 that information for several of the Fitch criteria were not complete in the press releases for 2010 through 2012, meaning the presentation of information was not complete and can be viewed as a frame (perhaps unintentional, perhaps not).

Second, Fitch limits an airport like PNS to a BBB+ rating, despite the absence of defaults among bonds issued by such airports. This limit itself may be a function of a bias that relies on a simple concept: bigger is better, so smaller is worse. With this as an underlying given, the data that has accumulated over time does not matter, even if it supports the idea that such airports offer no more risk than larger airports. Thus, grading behavior can become imprinted over time which may impact bond grades to a greater extent than objective historical data, so the taxpayers in the area covered by the airport still end up paying more for their bond issue than the taxpayers in an area covered by a larger airport (Davis-Sramek et al., 2017).

The possibility of imprint means another framing effect could influence the process, the halo effect. Halo effects differ from anchors in the sense that the former are more general than anchoring and adjustment effects (Cialdini and Goldstein, 2004). In the current case, the presence of the city name, Pensacola, may bias the subject's grade of the bonds because they already have an opinion of the city or an opinion of the airport. For example, could someone's knowledge of Pensacola being on the Gulf Coast be paired with BPs oil spill, negatively impacting bond grades even if objective material states the two are unrelated? Offering the same objective operational information about an unidentified airport might produce a different set of results and the role of halo effects is a potential subject for future research.

CONCLUSION

The purpose of the current research was to explore bond grading procedures and investigate the impact they may have on airports and municipal bond outlays. Behavioral information was presented to show how biasing effects can occur during subjective analysis. While subjective analysis may not be prevented, an example is offered to show how one decision can have a severe impact on the financial needs of communities when using municipal bonds to finance key transportation infrastructure. In the current study providing a new anchor to amateur graders , that of the low rates of municipal bond defaults, did not impact graders' decisions to lower a bond assessment. However, when amateur graders were separated between perceived experience levels more experienced graders were less likely to downgrade municipal bonds as compared to their less experienced counterparts. Truly the results indicate that professional with more experience ignore contextual anchors, or process them differently.

The current study uses undergraduate and graduate students as respondents. While the students can certainly respond to behavioral stimuli, assessing financial analysts under the same experimental conditions would lend further credence to the current results. Additionally, examining a different bond downgrade would also be helpful. Future research should look to address these issues. Future research could also examine how bond downgrades influence capital projects within communities. Another suggestion is to examine the cost of initial capital for municipalities after a well-publicized, unrelated municipal default. Regardless, further examination of behavioral science factors and supply chain capital is needed.

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