TEST FOR RACIAL DISCRIMINATION IN MUNICIPAL BOND DATA

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ECONOMICS AND DISCRIMINATION

- Becker (1957) argues that discrimination will be crowded out of markets because actors who don't share irrational biases will lose money to those who don't misperceive the value and return of the financial instruments they are prejudiced against. Markets will discipline away this behavior.
- In *Animal Spirits* Akerlof and Shiller (2010) argue that psychological biases do influence economics, and specifically mention racial discrimination.

REASONS TO EXPECT UNBIASED BOND MARKETS

- Behavioral
- High monetary stakes
- Transparent monetary stakes
- Impersonal exchange
- Money now for money later is perfectly substitutable

REASONS TO EXPECT BIASED BOND MARKETS

- Evaluations of risk are heavily influenced by emotional processes and Kahneman's "System 1" (2011), which is intuitive, quick, largely operates outside of consciousness, and responds disproportionately to narratives.
- Perceptions of competence and integrity could disadvantage non white male actors. Negative stereotypes appear relevant to risk.
- Given the many options for expected returns, non-monetary aspects of bonds may enter decision (e.g. home town/state, college affiliations)

IF WE DO FIND BIASES, PATTERNS IN THE DATA MAY SUGGEST SPECIFIC CAUSAL MECHANISMS.

- Mayors are salient, get more media coverage so may influence risk perceptions through System 1.
- Finance directors are more responsible for municipal debt, so more likely to operate through System 2, the slow, effortful, conscious processing we think of as rational, and might be due to Becker's "taste for discrimination" and/or systematic negative beliefs about the competence/integrity of members of social groups.

RESEARCH BACKGROUND

- **Research Questions**:
  1. Whether municipal entities led by members of racial minorities are perceived as riskier than equivalent entities in municipal bond markets?
  2. If there is no evidence of racial discrimination in bond markets, what factors influence municipal credit ratings and bond pricing?
- **Dependent Variables of Interest**:
  1. Bond pricing: reflects perceived risks of debt default in a secondary market in which securities are traded among investors; interest rates are generally the main factor driving bond values
  2. Credit rating: reflects perceived risks of debt default in primary market in which a government initially issues debts; and hence, may be affected by macro-economy, bond sizes and financial condition

TESTING MODEL & DATA

- Bond pricing model: Reoffering yield (yield at first public sale) as a function of socioeconomic characteristics, issuer financial condition, market conditions at the time of sale, bond issue characteristics, and race/gender variables (Kriz 2003)
  - OLS regression with robust standard errors
- Credit rating model: Credit rating as a function of socioeconomic characteristics, issuer financial condition, and race/gender variables (Chen, Kriz, and Wang 2015)
  - Ordered probit
- Data on 250,000+ bonds issued during 2005-2010
  - Random sample of 500 bonds issued by local governments for general improvements financed through ad valorem property taxes. Bonds are all tax-exempt and interest payments are not subject to the AMT. They are also not bank-qualified, have maturities greater than 1 year, and are issued through public sales (no private placements)
  - Data on race and gender were gathered through inspection of the cities' official government websites (i.e., Mayor's Biography and Comprehensive Annual Financial Reports for the names of City Manager and Finance Director) and publically available websites including LinkedIn and Wikipedia to determine races and genders by names.

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
yield	Reoffering Yield	449	3.504	0.921	0.520	6.150
lnpopn	City Population (Logs)	474	15.870	0.830	13.407	17.425
unemployment	State Unemployment Rate	474	5.859	1.921	2.900	13.300
pc_inc_ann	State Per Capita Income	474	40050.820	5737.150	26754.700	56959.410
general_revenue_gsp	General Revenue as % of Gross State Product	474	10.766	2.070	7.613	32.901
general_expenditure_gsp	General Expenditures as % of Gross State Product	474	10.600	1.897	7.056	18.600
budget_surplus_gsp	Budget Surplus as % of Gross State Product	474	0.166	0.782	-1.343	14.301
total_debt_outstanding_gsp	Total Debt as % of Gross State Product	474	7.413	4.559	1.592	20.691
bbi20	Bond Buyer Index (Broad Index of Municipal Bond Yields)	474	4.493	0.312	3.820	6.010
volty8wmave_bbi20	8 Week Moving Average of Bond Buyer Index (Measure of Yield Volatility)	474	10.586	7.652	2.000	50.318
bbvissplywkly	4 Week Visible Supply (Measure of Demand for Capital)	474	10851.120	3479.838	1825.400	19952.500
matyears	Years to Maturity	474	9.075	5.884	1.000	29.967
issuesize	Issue Size (000s)	474	19600.000	90900.000	150.000	1000000.000
call	Callability (Bond is Callable)	474	0.409	0.492	0.000	1.000
crate	Credit Rating (1=NR, AAA=11)	474	7.665	3.356	1.000	11.000
negot	Issued through Negotiated Offering (1=Negotiated, 0=Competitive)	474	0.285	0.452	0.000	1.000
insure	Bond Insurance (1=Yes, 0=No)	474	0.462	0.499	0.000	1.000
midwest	City in Midwest Census Region (1=Yes, 0=No)	474	0.464	0.499	0.000	1.000
midatlantic	City in Midatlantic Census Region (1=Yes, 0=No)	474	0.046	0.211	0.000	1.000
northeast	City in Northeast Census Region (1=Yes, 0=No)	474	0.247	0.432	0.000	1.000
southeast	City in Southeast Census Region (1=Yes, 0=No)	474	0.055	0.228	0.000	1.000
southwest	City in Souihwest Census Region (1=Yes, 0=No)	474	0.148	0.355	0.000	1.000
west	City in West Census Region (1=Yes, 0=No)	474	0.040	0.196	0.000	1.000
mayoraa	Mayor is African-American (1=Yes, 0=No)	312	0.038	0.193	0.000	1.000
mayorhisp	Mayor is Hispanic (1=Yes, 0=No)	312	0.016	0.126	0.000	1.000
mayorwhite	Mayor is White (1=Yes, 0=No)	312	0.946	0.227	0.000	1.000
mayorwoman	Mayor is Female (1=Yes, 0=No)	313	0.128	0.334	0.000	1.000
mgraa	City Manager/Administrator is African-American (1=Yes, 0=No)	93	0.054	0.227	0.000	1.000
mgrhisp	City Manager/Administrator is Hispanic (1=Yes, 0=No)	93	0.022	0.146	0.000	1.000
mgrwhite	City Manager/Administrator is White (1=Yes, 0=No)	93	0.925	0.265	0.000	1.000
mgrwoman	City Manager/Administrator is Female (1=Yes, 0=No)	87	0.218	0.416	0.000	1.000
financeaa	Finance Director is African-American (1=Yes, 0=No)	95	0.074	0.263	0.000	1.000
financehisp	Finance Director is Hispanic (1=Yes, 0=No)	95	0.063	0.245	0.000	1.000
financewhite	Finance Director is White (1=Yes, 0=No)	95	0.863	0.346	0.000	1.000
financewoman	Finance Director is Female (1=Yes, 0=No)	96	0.375	0.487	0.000	1.000

RESULTS – BOND REOFFERING YIELD – MAYOR

Variable	Coefficent	Robust Standard Error	t	P>|t|
Constant	-1.991	0.942	-2.11	0.04
lnpopn	0.197	0.042	4.75	0.00
unemployment	-0.197	0.023	-8.57	0.00
pc_inc_ann	0.000	0.000	-3.15	0.00
budget_surplus_gsp	0.041	0.020	2.02	0.04
bbi20	0.829	0.146	5.67	0.00
volty8wmave_bbi20	-0.022	0.006	-3.47	0.00
bbvissplywkly	0.000	0.000	1.20	0.23
matyears	0.090	0.010	8.71	0.00
issuesize	0.000	0.000	1.11	0.27
call	0.170	0.099	1.71	0.09
crate	-0.044	0.012	-3.68	0.00
negot	-0.039	0.081	-0.49	0.63
insure	0.107	0.069	1.54	0.12
mayoraa	0.106	0.255	0.41	0.68
mayorhisp	-0.163	0.193	-0.84	0.40
mayorwoman	0.036	0.094	0.38	0.70
N	297			
R^2	0.73			

RESULTS – BOND REOFFERING YIELD – CITY MANAGER

Variable	Coefficent	Robust Standard Error	t	P>|t|
Constant	-0.910	2.110	-0.43	0.67
lnpopn	0.148	0.093	1.59	0.12
unemployment	-0.191	0.061	-3.11	0.00
pc_inc_ann	0.000	0.000	-0.78	0.44
budget_surplus_gsp	0.122	0.262	0.47	0.64
total_debt_outstanding_gsp	-0.009	0.021	-0.42	0.68
bbi20	0.735	0.380	1.93	0.06
volty8wmave_bbi20	-0.026	0.013	-2.02	0.05
bbvissplywkly	0.000	0.000	0.71	0.48
matyears	0.091	0.024	3.82	0.00
issuesize	0.000	0.000	0.41	0.69
call	0.291	0.226	1.29	0.20
crate	-0.042	0.034	-1.25	0.21
negot	-0.068	0.175	-0.39	0.70
insure	0.059	0.157	0.38	0.71
mgraa	-0.360	0.278	-1.29	0.20
mgrhisp	0.687	0.508	1.35	0.18
mgrwoman	-0.140	0.177	-0.79	0.43
N	86			
R^2	0.73			

RESULTS – BOND REOFFERING YIELD – FINANCE DIRECTOR

Variable	Coefficent	Robust Standard Error	t	P>|t|
Constant	-3.984	2.128	-1.87	0.07
lnpopn	0.276	0.085	3.27	0.00
unemployment	-0.180	0.044	-4.14	0.00
pc_inc_ann	0.000	0.000	-1.51	0.13
budget_surplus_gsp	0.049	0.027	1.84	0.07
total_debt_outstanding_gsp	0.022	0.022	1.03	0.31
bbi20	0.991	0.370	2.68	0.01
volty8wmave_bbi20	-0.028	0.013	-2.21	0.03
bbvissplywkly	0.000	0.000	0.66	0.51
matyears	0.100	0.018	5.58	0.00
issuesize	0.000	0.000	0.21	0.83
call	0.101	0.197	0.51	0.61
crate	-0.031	0.033	-0.94	0.35
negot	-0.107	0.150	-0.71	0.48
insure	0.026	0.125	0.20	0.84
financeaa	-0.141	0.540	-0.26	0.80
financehisp	-0.019	0.183	-0.10	0.92
financewoman	-0.131	0.133	-0.98	0.33
N	95			
R^2	0.71			

RESULTS – CREDIT RATING - MAYOR

Variable	Coefficent	Standard Error	t	P>|t|
unemployment	0.048	0.033	1.46	0.15
pc_inc_ann	0.000	0.000	1.92	0.05
gsp_naics_ann	0.000	0.000	0.55	0.58
total_debt_outstanding_gsp	-0.031	0.018	-1.67	0.09
taxes_gsp	-0.146	0.063	-2.32	0.02
budget_surplus_gsp	0.113	0.077	1.46	0.14
mayoraa	0.140	0.312	0.45	0.66
mayorhisp	0.429	0.481	0.89	0.37
mayorwoman	0.271	0.180	1.51	0.13
N	312			
Likelihood-Ratio ($\chi2(9)$)	22.35			
P>$\chi2$	0.008			
% Predicted Correctly	27.88%			
% Predicted within 1 Category	64.42%			

RESULTS – CREDIT RATING – CITY MANAGER

Variable	Coefficent	Standard Error	z	P>|z|
unemployment	0.131	0.071	1.86	0.06
pc_inc_ann	0.000	0.000	1.39	0.17
gsp_naics_ann	0.000	0.000	-0.04	0.97
total_debt_outstanding_gsp	-0.025	0.040	-0.61	0.54
taxes_gsp	-0.140	0.132	-1.07	0.29
budget_surplus_gsp	0.209	0.415	0.51	0.61
mgraa	0.729	0.501	1.46	0.15
mgrhisp	0.226	1.397	0.16	0.87
mgrwoman	0.328	0.292	1.12	0.26
N	87			
Likelihood-Ratio ($\chi2(9)$)	11.66			
P>$\chi2$	0.233			
% Predicted Correctly	45.98%			
% Predicted within 1 Category	88.51%			

RESULTS – CREDIT RATING – FINANCE DIRECTOR

Variable	Coefficent	Standard Error	z	P>|z|
unemployment	0.122	0.056	2.18	0.03
pc_inc_ann	0.000	0.000	1.83	0.07
gsp_naics_ann	0.000	0.000	-0.58	0.56
total_debt_outstanding_gsp	-0.080	0.040	-2.01	0.05
taxes_gsp	0.055	0.121	0.46	0.65
budget_surplus_gsp	-0.069	0.123	-0.56	0.58
financeaa	-0.241	0.486	-0.50	0.62
financehisp	0.856	0.508	1.68	0.09
financewoman	-0.419	0.233	-1.80	0.07
N	95			
Likelihood-Ratio ($\chi2(9)$)	13.27			
P>$\chi2$	0.151			
% Predicted Correctly	42.10%			
% Predicted within 1 Category	81.05%			

CONCLUSIONS

- No evidence of difference in reoffering yields for bonds
- Suggestion of slightly better credit ratings for cities with Hispanic finance directors and slightly poorer credit ratings for cities with female finance directors
  - Closest to significant is $p < 0.1$ so not statistically significant
- Need more data (only 12 black mayors so far)
- Power analysis using scandals and/or downgrades
- If we think of this underpowered study as a preview, then the results are paradoxical. The closest evidence appears to be through an intentional conscious process that most scholars expect to be disciplined away by efficient markets.

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OUTLINE

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LITERATURE REVIEW

- **Huang (2013)** empirically confirmed that macro-economics, (per capita income), demographic (total number of population), and government finance (general fund balance and debt burden) are the main factors influencing municipal credit ratings
- **Johnson & Kriz (2005)** found that tax and expenditure limits reduce credit rating due to perceived risks for debt defaults
- **Rablend (2013)** empirically proved that during the 2008 US financial crisis, credit rating agencies tend to issue higher rates to municipal bond than those of private bonds, all else equal, given the unlimited taxing power of government bonds
- **Bernhard & Leblang (2006)** demonstrated that political risks (i.e., probability of cabinet dissolution) tend to negatively affect interest rates because the public associates the likelihood of government debt defaults with government stability
- **Reeves (1997) and Haynie (2002)** asserted that African-Americans are evaluated less positively than whites in elections because of their race and without due regard to their personal characteristics
- **Zhao & Guo (2011)** empirically proved that "the perceived quality of state government management" significantly influences credit ratings, especially for those states perceived as high performers
- **Wilson (2005)** used data from Panel Study of Income Dynamics in 1991-1999 to obtain empirical evidence suggesting that at the managerial level, African Americans have higher rates of dismissal irrespective of human capital, career aspirations, and job/labor market characteristics