# Experience and Accountability in Municipal Debt Management Networks

Justin Marlowe Associate Professor Evans School of Public Affairs University of Washington

jmarlowe@washington.edu

May 27, 2013



May 27, 2013

1 / 12

The Question: How does the social structure - namely "interconnectedness" - of public capital markets affect public debt management performance?



- of public capital markets affect public debt management performance?
  - Interconnectedness is good for users because of scale economies and broader information sharing



- of public capital markets affect public debt management performance?
  - Interconnectedness is good for users because of scale economies and broader information sharing
  - Interconnectedness is bad for users because of information hoarding, concentration of risk, and agency problems



- of public capital markets affect public debt management performance?
  - Interconnectedness is good for users because of scale economies and broader information sharing
  - Interconnectedness is bad for users because of information hoarding, concentration of risk, and agency problems

Key Finding: Capital market centralization tends to benefit state and local governments



- of public capital markets affect public debt management performance?
  - Interconnectedness is good for users because of scale economies and broader information sharing
  - Interconnectedness is bad for users because of information hoarding, concentration of risk, and agency problems

Key Finding: Capital market centralization tends to benefit state and local governments

Findings suggest important implications for the \$4 trillion USD municipal bond market, and for the growing \$150 billion USD market for China local government bonds

UNIVERSITY of WASHINGTON

## "Debt Management Networks" Coordinate New Issues



Marlowe (University of Washington)

APPAM-SIRPA Conference

May 27, 2013 3 / 12



• Underwriter(s) - typically regional or national investment banks - purchase the bonds and re-sell to customers



May 27, 2013

3 / 12

- Underwriter(s) typically regional or national investment banks purchase the bonds and re-sell to customers
- Financial advisor advises on issue structure, market timing, and other tactics



- Underwriter(s) typically regional or national investment banks purchase the bonds and re-sell to customers
- Financial advisor advises on issue structure, market timing, and other tactics
- Bond attorney "bond counsel" attests to the bond's tax status



- Underwriter(s) typically regional or national investment banks purchase the bonds and re-sell to customers
- Financial advisor advises on issue structure, market timing, and other tactics
- Bond attorney "bond counsel" attests to the bond's tax status

Most underwriting is done through syndicates with a "lead manager" or "co-managers" who run the syndicate



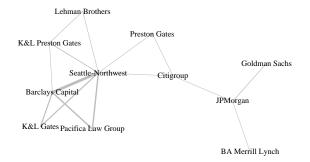
- Underwriter(s) typically regional or national investment banks purchase the bonds and re-sell to customers
- Financial advisor advises on issue structure, market timing, and other tactics
- Bond attorney "bond counsel" attests to the bond's tax status

Most underwriting is done through syndicates with a "lead manager" or "co-managers" who run the syndicate

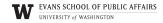


## Debt Management Networks - An Example

#### University of Washington



Martin Nelson & Co

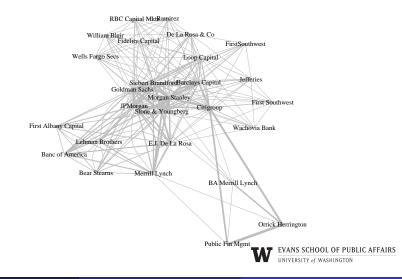


Marlowe (University of Washington)

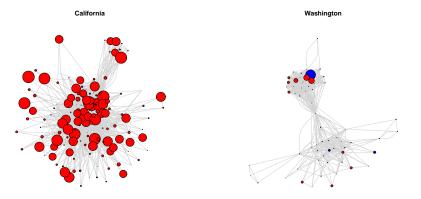
APPAM-SIRPA Conference

#### Debt Management Networks - Another Example

Bay Area (CA) Toll Authority



## Statewide Debt Management Networks







1. Degree - To how many other nodes are you connected? ( $\overline{x} = 10.2\%$  of all possible connections, SD = 14.2%)



- 1. Degree To how many other nodes are you connected? ( $\overline{x} = 10.2\%$  of all possible connections, SD = 14.2%)
- Eigenvector Centrality Are you connected to other well-connected nodes? (i.e. the "Google" criterion")



May 27, 2013

7 / 12

- 1. Degree To how many other nodes are you connected? ( $\overline{x} = 10.2\%$  of all possible connections, SD = 14.2%)
- 2. Eigenvector Centrality Are you connected to other well-connected nodes? (i.e. the "Google" criterion")
- 3. Betweenness How deep is your network of indirect contacts?



- 1. Degree To how many other nodes are you connected? ( $\overline{x} = 10.2\%$  of all possible connections, SD = 14.2%)
- Eigenvector Centrality Are you connected to other well-connected nodes? (i.e. the "Google" criterion")
- 3. Betweenness How deep is your network of indirect contacts?
- 4. Closeness How many nodes must another node pass through to contact you?



May 27, 2013

7 / 12

- 1. Degree To how many other nodes are you connected? ( $\overline{x} = 10.2\%$  of all possible connections, SD = 14.2%)
- 2. Eigenvector Centrality Are you connected to other well-connected nodes? (i.e. the "Google" criterion")
- 3. Betweenness How deep is your network of indirect contacts?
- 4. Closeness How many nodes must another node pass through to contact you?
- 5. Transitivity i.e. "clique-ishness" Are two of your contacts connected themselves? (opposite of centrality)



May 27, 2013

7 / 12

- 1. Degree To how many other nodes are you connected? ( $\overline{x} = 10.2\%$  of all possible connections, SD = 14.2%)
- 2. Eigenvector Centrality Are you connected to other well-connected nodes? (i.e. the "Google" criterion")
- 3. Betweenness How deep is your network of indirect contacts?
- 4. Closeness How many nodes must another node pass through to contact you?
- 5. Transitivity i.e. "clique-ishness" Are two of your contacts connected themselves? (opposite of centrality)
- 6. Net First principal component on all the above measures



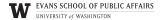
- 1. Degree To how many other nodes are you connected? ( $\overline{x} = 10.2\%$  of all possible connections, SD = 14.2%)
- 2. Eigenvector Centrality Are you connected to other well-connected nodes? (i.e. the "Google" criterion")
- 3. Betweenness How deep is your network of indirect contacts?
- 4. Closeness How many nodes must another node pass through to contact you?
- 5. Transitivity i.e. "clique-ishness" Are two of your contacts connected themselves? (opposite of centrality)
- 6. Net First principal component on all the above measures

Computed annually by state, weighted by par value, for "undirected" networks. Then standardized against the empirical conditional distribution function.





• True Interest Cost - the interest rate on the bonds



- True Interest Cost the interest rate on the bonds
- Underwriter Spread fees the government pays to investment banks



- True Interest Cost the interest rate on the bonds
- Underwriter Spread fees the government pays to investment banks
- Impact of underwriter spread on true interest cost (not covered here)



- True Interest Cost the interest rate on the bonds
- Underwriter Spread fees the government pays to investment banks
- Impact of underwriter spread on true interest cost (not covered here)
- "Post-Sale Spread" present value (in \$) difference between pre-sale and post-sale yield spreads (not covered here)



### The "Standard Model"



Marlowe (University of Washington)

APPAM-SIRPA Conference

May 27, 2013 9 / 12



Credit Quality - Highest of Moody's, Standard & Poor's, or Fitch underlying rating by category - AAA, AA, A, BBB, BB, and not rated; Credit enhancements - monoline bond insurance and state credit enhancement programs



May 27, 2013

9 / 12

Credit Quality - Highest of Moody's, Standard & Poor's, or Fitch underlying rating by category - AAA, AA, A, BBB, BB, and not rated; Credit enhancements - monoline bond insurance and state credit enhancement programs

Other bond characteristics - par value, years to maturity, call feature, sinking fund, federal taxable, AMT, general obligation vs. revenue pledge, bank qualified



Credit Quality - Highest of Moody's, Standard & Poor's, or Fitch underlying rating by category - AAA, AA, A, BBB, BB, and not rated; Credit enhancements - monoline bond insurance and state credit enhancement programs

Other bond characteristics - par value, years to maturity, call feature, sinking fund, federal taxable, AMT, general obligation vs. revenue pledge, bank qualified

State and year fixed effects



May 27, 2013

9 / 12

Credit Quality - Highest of Moody's, Standard & Poor's, or Fitch underlying rating by category - AAA, AA, A, BBB, BB, and not rated; Credit enhancements - monoline bond insurance and state credit enhancement programs

Other bond characteristics - par value, years to maturity, call feature, sinking fund, federal taxable, AMT, general obligation vs. revenue pledge, bank qualified

State and year fixed effects

To the standard model I add the three year moving average each weighted, standardized intermediary centrality measure



## Data and Methods



Marlowe (University of Washington)

APPAM-SIRPA Conference

May 27, 2013 10 / 12



Number of intermediaries and dyads varies across states CA = (422 intermediaries; 32,345 dyads); TX = (335 intermediaries; 47,646 dyads); WA = (165 intermediaries; 7,025 dyads)



10 / 12

Number of intermediaries and dyads varies across states CA = (422 intermediaries; 32,345 dyads); TX = (335 intermediaries; 47,646 dyads); WA = (165 intermediaries; 7,025 dyads)

Empirical Strategy: Regress each debt management performance measure on the standard model; regressions are OLS with standard errors corrected for heteroskedasticity and issuer clustering



Number of intermediaries and dyads varies across states CA = (422 intermediaries; 32,345 dyads); TX = (335 intermediaries; 47,646 dyads); WA = (165 intermediaries; 7,025 dyads)

Empirical Strategy: Regress each debt management performance measure on the standard model; regressions are OLS with standard errors corrected for heteroskedasticity and issuer clustering

l also provide comparison estimates for the effect of an intermediary's <u>market share</u> instead of centrality



On a \$3 million, 18 year bond issue issue with level debt service, a TIC decrease from 4.41% to 4.10% means \$76,000 in additional proceeds. For a \$30 million issue with similar characteristics this means \$781,000 in additional proceeds.



11 / 12

On a \$3 million, 18 year bond issue issue with level debt service, a TIC decrease from 4.41% to 4.10% means \$76,000 in additional proceeds. For a \$30 million issue with similar characteristics this means \$781,000 in additional proceeds.

Spread increases TIC, but impact does not vary much across states



11 / 12

On a \$3 million, 18 year bond issue issue with level debt service, a TIC decrease from 4.41% to 4.10% means \$76,000 in additional proceeds. For a \$30 million issue with similar characteristics this means \$781,000 in additional proceeds.

Spread increases TIC, but impact does not vary much across states

No clear pattern in any of the sub-sample evidence







Clear that intermediary market share is something different from intermediary centralization



Clear that intermediary market share is something different from intermediary centralization

Future questions:



Clear that intermediary market share is something different from intermediary centralization

Future questions:

• What about network stability? Network cohesion?



12 / 12

Clear that intermediary market share is something different from intermediary centralization

Future questions:

- What about network stability? Network cohesion?
- Should issuers be more or less central in networks?



Clear that intermediary market share is something different from intermediary centralization

Future questions:

- What about network stability? Network cohesion?
- Should issuers be more or less central in networks?
- How does the structure of the statewide network affect statewide sale execution?

