TOWARD MUNICIPAL CREDIT SCORING

Marc D. Joffe

CDIAC Pre Conference
October 17, 2012

Public Sector Credit Solutions
640 Davis Street Unit 40
San Francisco, CA 9411 USA

Phone: **415-578-0558**
marc@publicsectorcredit.org
http://www.publicsectorcredit.org/pscf.html

Scoring

Some well known applications:

- California's Academic Performance Index
- BCS Computer Rankings
- Consumer Reports Product Ratings
- US News College Rankings

Approach:

- Use a composite of *measurable* issuer attributes
- Transparent methodology
- Ideal score would take the form of a default probability

Benefits

- Easy to keep current
- Can be applied to *all* issuers – even those that don't purchase ratings

Why a Default Probability?

- Default probability scores would allow us to estimate “fair value” yields for municipal bonds
- Other components of fair value include:
  - Recovery rate
  - Risk premium
  - Tax treatment adjustments
- Fair value (aka intrinsic value) calculations are common for corporate and structured bonds – we could improve transparency and liquidity by applying this technique to munis
- A widely accepted system that translates fiscal changes to updated default probabilities and fair bond yields would assist issuers in analyzing the debt service impact of their policy choices

Public Sector Credit Solutions
640 Davis Street Unit 40
San Francisco, CA 9411 USA

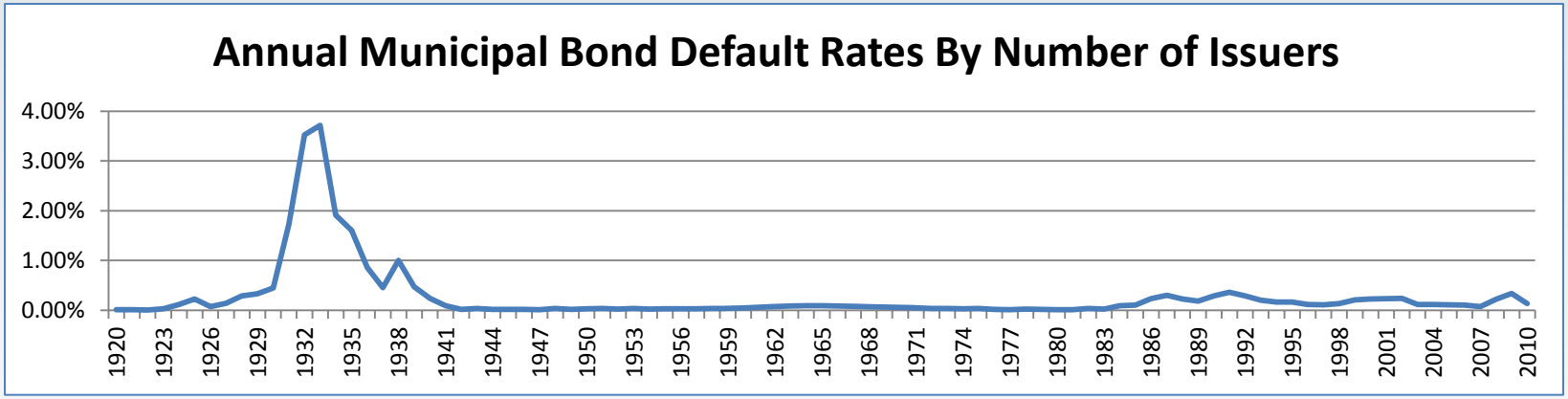
Phone: **+1-415-578-0558**
marc@publicsectorcredit.org
http://www.publicsectorcredit.org/pscf.html

Estimating Default Probabilities

- Different types of models have been developed for different asset classes.
- The most relevant asset class for our purpose is debt issued by private (i.e., unlisted) firms.
- The dominant methodology for estimating private firm default probability involves the following:
  - Gather data points for a large set of firms that have defaulted and for comparable firms that have not defaulted
  - Use theory and statistical analysis to determine a subset of variables that distinguish between defaulting and non-defaulting firms
  - Use statistical software to fit a model on the selected variables. Data for current issuers can then be entered into the model to calculate their default probabilities
- George Hempel applied this approach to municipal bonds, but only had access to a small data sample.

Applying this Approach

- Problem: Lack of recent defaults.
  - Income Securities Advisors' database contains fewer than 40 general obligation and tax supported bond defaults between 1980 and mid-2011.



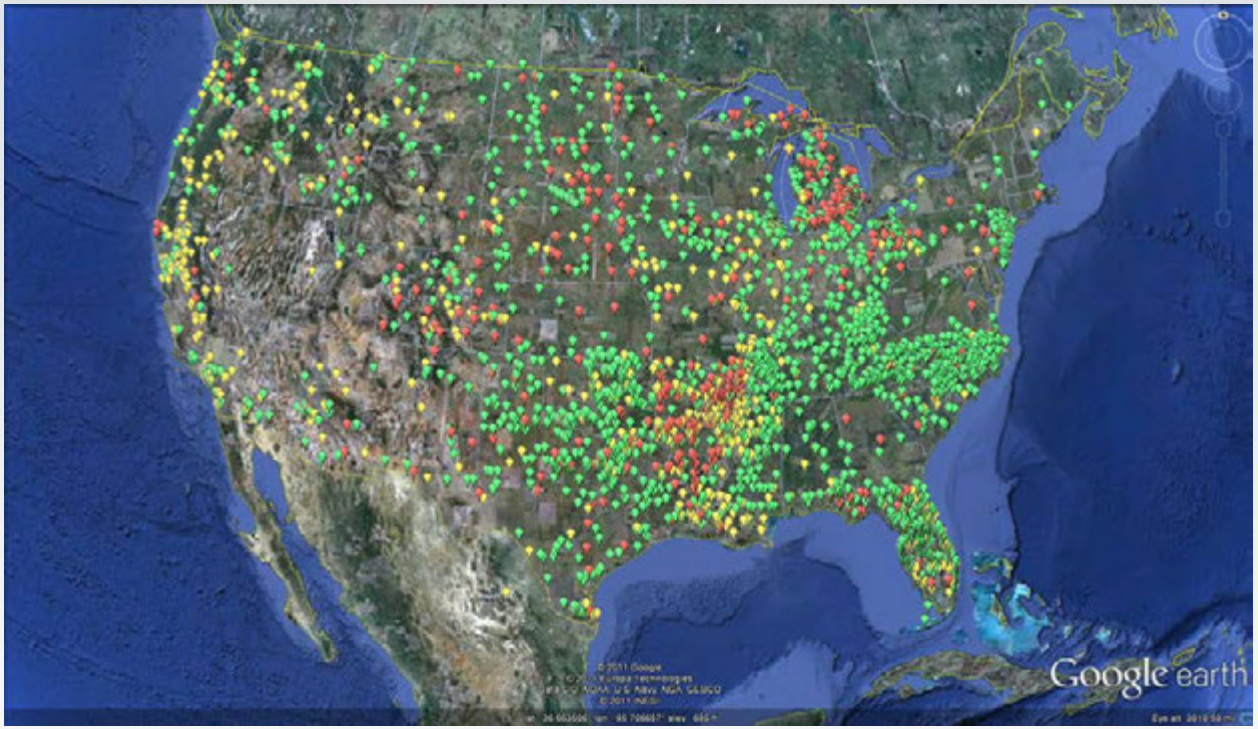
Source: Kroll Bond Rating Municipal Bond Study (2011)

- Solution: Follow the example of Reinhart & Rogoff (2009) by looking at older defaults.

Public Sector Credit Solutions
640 Davis Street Unit 40
San Francisco, CA 9411 USA

Phone: **+1-415-578-0558**
marc@publicsectorcredit.org
http://www.publicsectorcredit.org/pscf.html

US Municipal Bond Defaults: 1920 to 1939



Yellow = Special Districts

Red = School districts

Green = Cities, States and Counties

Source: Public Sector Credit Solutions Default Database

- Over 5000 defaults in all
- Defaults heavily concentrated in specific states, esp. Florida, the Carolinas, Arkansas, Louisiana, Texas, New Jersey, Michigan, Ohio and California
- No defaults reported in Maryland, Delaware, Connecticut, Vermont and Rhode Island

Public Sector Credit Solutions
640 Davis Street Unit 40
San Francisco, CA 9411 USA

Phone: **+1-415-578-0558**
marc@publicsectorcredit.org
http://www.publicsectorcredit.org/pscf.html

Drivers of Depression-Era Defaults

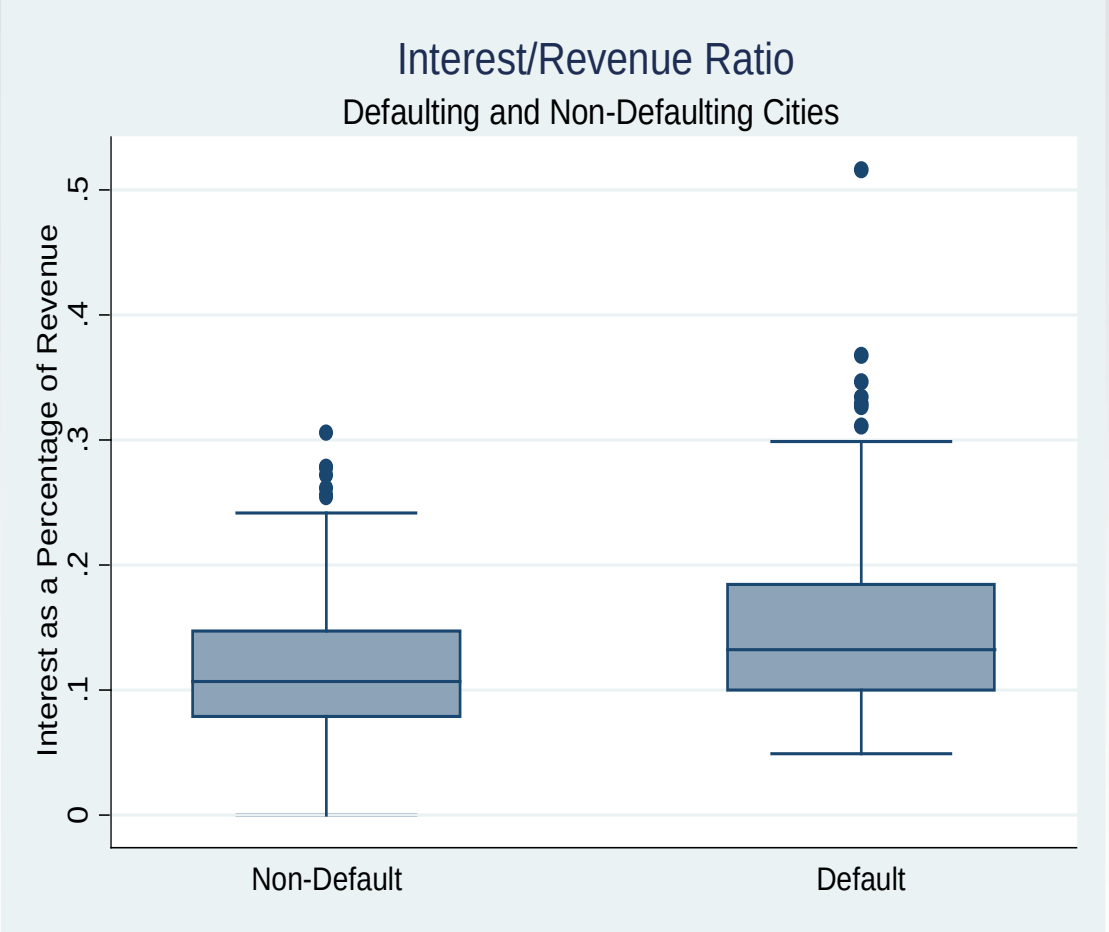
- Poor control of municipal bond issuance in certain states such as Florida (which had outlawed state debt), Michigan, New Jersey and North Carolina.
- Many defaults stemmed from bank failures and bank holidays. When banks holding sinking funds and other municipal deposits were not open, issuers could not access cash needed to perform on their obligations.
- Prohibition had eliminated alcohol taxes as a revenue source; local income and sales taxes had yet to become common. Cities were thus heavily reliant on real estate taxes. When real estate values fell and property tax delinquencies spiked, many issuers became unable to perform.
- Many defaults occurred in drainage, irrigation and levee districts. Bonds funding these agricultural infrastructure projects were serviced by taxes paid by a small number of farmers or farming companies. A single delinquency could thus trigger a default.

Public Sector Credit Solutions
640 Davis Street Unit 40
San Francisco, CA 9411 USA

Phone: **+1-415-578-0558**
marc@publicsectorcredit.org
http://www.publicsectorcredit.org/pscf.html

Interest Expense to Revenue Ratio

- US Census reported annual fiscal data for major cities annually in the 1930s, so this ratio may be calculated.
- The box and whisker diagram at the right compares the ratio for defaulting and non-defaulting cities.
- High ratio non-default observations were concentrated in Virginia – which has a unique law requiring the State to cover municipal bond defaults.
- Still studying other outliers – some of the defaults with low ratios may be the result of bank failures or bank holidays.



Public Sector Credit Solutions
640 Davis Street Unit 40
San Francisco, CA 9411 USA

Phone: **+1-415-578-0558**
marc@publicsectorcredit.org
http://www.publicsectorcredit.org/pscf.html

Conclusion / Next Steps

- Interest to revenue ratios could be one of a number of metrics used to create a municipal default probability score
- Other metrics in the model will need to address:
  - Vulnerability to revenue declines.
  - Proportion of “unmanageable” expenses (aside from interest) that will confront issuers in the near to intermediate term – pension costs being the most prominent example.
- Once the algorithm is developed scores should be regularly computed and made widely available
- While not a full replacement for fundamental credit analysis, municipal credit scoring promises to improve market access for smaller issuers and encouragement alignment of bond yields and underlying risks

Public Sector Credit Solutions
640 Davis Street Unit 40
San Francisco, CA 9411 USA

Phone: **+1-415-578-0558**
marc@publicsectorcredit.org
http://www.publicsectorcredit.org/pscf.html