Discussion: “The Pricing of Sovereign Risk under Costly Information”

(Grace Gu and Zachary Strangebye)

West Coast Workshop in International Finance,
Santa Clara University

Ricardo Fernholz

Claremont McKenna College

November 3, 2017

Notable Contributions

- Evidence of time-varying macroeconomic volatility is rapidly growing
  - Bloom (2009), Fernandez-Villaverde et al. (2011)
- Introduce costly info acquisition (Veldkamp, 2011) into sovereign risk model: lenders incur cost to acquire some info about default probab.
  - *Endogenous time variation in country risk spread* that is quantitatively important (calibrated model explains 78% of total)
  - During crises, default risk rises but risk premium falls because of info acquisition—standard models may understate default risk during crises
  - U-shaped relationship between transparency and sovereign welfare

Intuition, Questions, and Testable Implications

- Basic mechanism behind main results is intuitive and reasonable
  - Lenders acquire costly info primarily during crises
  - This causes bond yields to respond to normally unobserved shocks during crises, which raises spread volatility
- Methodological contribution is notable in its own right
  - Sovereign's default and borrowing decisions as well as lenders' costly info acquisition are jointly endogenous
- Two main questions came to mind while reading the paper:
  1. What type of info are lenders actually acquiring during crises?
  2. How do calibration assumptions affect the quantitative results?

Intuition, Questions, and Testable Implications

- Basic mechanism behind main results is intuitive and reasonable
  - Lenders acquire costly info primarily during crises
  - This causes bond yields to respond to normally unobserved shocks during crises, which raises spread volatility
- Methodological contribution is notable in its own right
  - Sovereign's default and borrowing decisions as well as lenders' costly info acquisition are jointly endogenous
- Two main questions came to mind while reading the paper:
  1. What type of info are lenders actually acquiring during crises?
  2. How do calibration assumptions affect the quantitative results?

Public Information Acquisition?

- Idea of costly info acquisition primarily during crises is key to results
  - Novel idea, intuitively realistic assumption
- Less intuitive is the assumption that acquired info is public
  - A public forecaster incurs info acquisition costs to produce a higher quality signal during crises
  - This higher quality signal is common knowledge among all lenders
  - Paper does address this assumption:

    Tractability (p. 12) "There is an inherent difficulty associated with market-based information acquisition problems."

    Interpretation (p. 13) "Real world analogues of the forecaster might be... Bloomberg or Reuters... the Wall Street Journal or the Financial Times... Moody's or S&P... the IMF."

Public Information Acquisition?

- Idea of costly info acquisition primarily during crises is key to results
  - Novel idea, intuitively realistic assumption
- Less intuitive is the assumption that acquired info is public
  - A public forecaster incurs info acquisition costs to produce a higher quality signal during crises
  - This higher quality signal is common knowledge among all lenders
  - Paper does address this assumption:

    Tractability (p. 12) "There is an inherent difficulty associated with market-based information acquisition problems."

    Interpretation (p. 13) "Real world analogues of the forecaster might be... Bloomberg or Reuters... the Wall Street Journal or the Financial Times... Moody's or S&P... the IMF."

The Forecaster

- There is one forecaster for all lenders, solves info acquisition problem

$$\min_{\rho_{mx,t} \in [0,1]} E_{\tilde{x}_t} E_{\tilde{m}_{t+1}, \tilde{s}_{t+1} | \tilde{x}_t, s_t} \left[d_t(\tilde{m}_{t+1}, \tilde{s}_{t+1}, B_{t+1}) - \bar{d}_t \right]^2 + \kappa I(\rho_{mx,t})$$

  - d_t is 0 if no default, 1 if default
  - $\bar{d}_t$ is forecaster's forecast of d_t
  - $\rho_{mx,t}$ is info content of forecast (correlation between signal x_t and unobserved shock m_{t+1}), $\kappa > 0$ measures cost of info acquisition

- During crises, squared forecast error $E[d_t - \bar{d}_t]^2$ is most sensitive to info content of forecast $\rho_{mx,t}$, so forecaster optimally decides to acquire more info and incur more costs

Testable Implications of Public Info Acquisition

- Simple testable prediction of the model
  - Forecaster's signal, x_t, is common knowledge among all lenders, so signal and its info content (accuracy) can be observed
  - Model predicts that info content of forecaster's signal, $\rho_{mx,t}$, will be greater during crises than during normal times
- Is this prediction supported by the data?
  - Stylized model, but paper mentions IMF, Bloomberg/Reuters, WSJ/FT
  - Paper uses searches for "Ukraine IMF" to measure info acquisition, so why not look at quality of IMF forecasts in and out of crises?
  - Naive intuition is that this prediction is not supported by the data

Testable Implications of Public Info Acquisition

- Simple testable prediction of the model
  - Forecaster's signal, x_t, is common knowledge among all lenders, so signal and its info content (accuracy) can be observed
  - Model predicts that info content of forecaster's signal, $\rho_{mx,t}$, will be greater during crises than during normal times
- Is this prediction supported by the data?
  - Stylized model, but paper mentions IMF, Bloomberg/Reuters, WSJ/FT
  - Paper uses searches for "Ukraine IMF" to measure info acquisition, so why not look at quality of IMF forecasts in and out of crises?
  - Naive intuition is that this prediction is not supported by the data

Better Public Forecasts during Crises?

What if the data do not support the model's prediction that public forecasts are more accurate during crises?

1. May need to add exogenous time-variation in volatility
   - Will help to make forecaster's public signal less accurate during crises
   - How much time variation in volatility explained by endogenous info acquisition vs. exogenous assumption?
2. Assume lenders acquire private rather than public info during crises
   - Could also mean lenders interpret public info differently
   - Potentially a more intuitive and realistic assumption
   - Is the model tractable in this case, and do main results change?

Better Public Forecasts during Crises?

What if the data do not support the model's prediction that public forecasts are more accurate during crises?

1. May need to add exogenous time-variation in volatility
   - Will help to make forecaster's public signal less accurate during crises
   - How much time variation in volatility explained by endogenous info acquisition vs. exogenous assumption?
2. Assume lenders acquire private rather than public info during crises
   - Could also mean lenders interpret public info differently
   - Potentially a more intuitive and realistic assumption
   - Is the model tractable in this case, and do main results change?

Private Information Acquisition in the Model

- Assume lenders acquire private rather than public info during crises
  - Could also mean lenders interpret public info differently
- One challenge in this case is that bond price q_t becomes a public signal that aggregates lenders' private info
  - To prevent full info revelation, can introduce noise traders (Kyle, 1985)
- Qualitative results should be unaffected
  - During crises, lenders still acquire costly info, so bond yields still respond to normally unobserved shocks and thus spread volatility rises
  - No longer any prediction that public signal accuracy improves in crises
- Quantitative results may change substantially, however

Private Information Acquisition in the Model

- Assume lenders acquire private rather than public info during crises
  - Could also mean lenders interpret public info differently
- One challenge in this case is that bond price q_t becomes a public signal that aggregates lenders' private info
  - To prevent full info revelation, can introduce noise traders (Kyle, 1985)
- Qualitative results should be unaffected
  - During crises, lenders still acquire costly info, so bond yields still respond to normally unobserved shocks and thus spread volatility rises
  - No longer any prediction that public signal accuracy improves in crises
- Quantitative results may change substantially, however

Info Acquisition and Model Calibration

- Info acquisition measured via Abnormal Search Volume Index (ASVI)
  - SVI measured using Google searches for "Ukraine IMF"
  - ASVI measures log deviation of SVI from median of previous periods
  - Definition follows Da, Engelberg, and Gao (JF, 2011)

- Unit info cost κ is calibrated to match fraction of time ASVI $> \zeta$
  - Info threshold ζ is defined as $\zeta = 0.5 \max\{\text{ASVI}_t\}$
  - Only one episode in data, around 2014 Russian annexation of Crimea

How Sensitive are the Quantitative Results?

- Paper proposes model-free metric of time variation in spread volatility

$$\text{CVR} = \frac{1}{\hat{T}} \sum_{t \in \hat{T}} \frac{\hat{\sigma}_{t:t+w}}{\hat{\sigma}_{t-w-1:t-1}}$$

  - $\hat{T}$ is set of periods with large change in spread (Aguiar et al., 2016)
  - $\hat{\sigma}_{x:y}$ is sample st. dev. using periods from x to y
  - Benchmark model sets $w = 5$

- Calibrated model explains 78% of CVR from data, which is a nice result, but how sensitive is this result to calibration assumptions?
  - Different info thresholds ζ
  - Match moments of ASVI distribution instead of using info thresholds

Calibrated Info Cost κ Depends on Info Threshold ζ

Figure 2: Quarterly ASVI for the Search Term "Ukraine IMF"

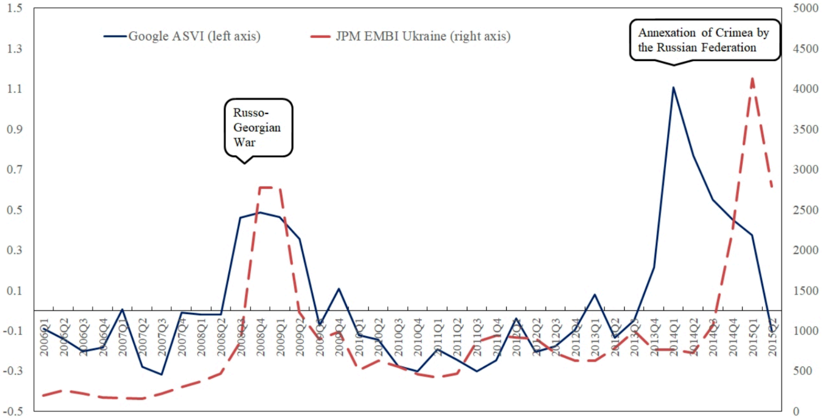

Figure: Info threshold used in calibration is $\zeta = 0.5 \max\{\text{ASVI}_t\}$

Quantitative Results Vary with Info Cost κ

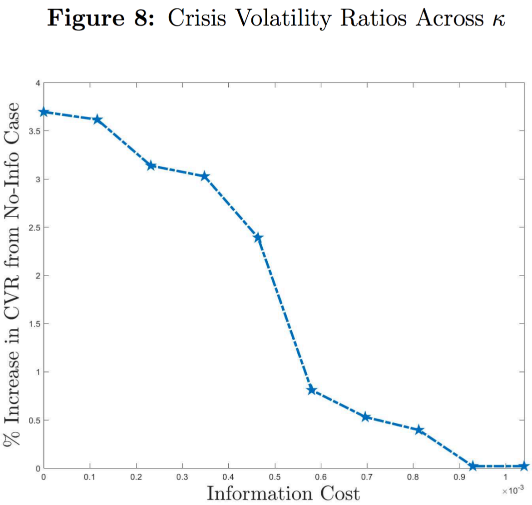

Figure: Calibrated value in model is $\kappa = 0.522 \times 10^{-3}$

The End

Thank You