

# Measuring International Financial Supervisory Transparency

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# Why financial supervisory transparency?

Financial supervisory transparency has been **lauded** as promoting:

- ▶ financial system stability,
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# Promotion

Supervisory transparency has been **promoted** by international/supra-national institutions including the IMF, Basel Committee, and the European Union.

But...

We **lack reliable, cross-country**, and **cross-time** indicators of financial supervisory transparency to **test** these assertions.

# Objective

Our objectives are to:

- ▶ **Develop** a reliable and valid indicator of supervisory transparency across countries and time.
  - ▶ Largely complete.
- ▶ Use the indicator to **examine**:
  - ▶ why countries become more/less transparent,
  - ▶ how, if at all, supervisory transparency affects economic outcomes.

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# Methodological Contribution

(At least) two important methodological contributions:

- ▶ Develop a Hierarchical Bayesian Item Response Theory-based **unique indicator** of countries' **willingness to credibly** reveal basic facts about their **financial systems to international actors**.
- ▶ Show that **missing financial system data is often endogenous** to financial system difficulties and policymaker's aspirations.

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Previous supervisory transparency indices generally use **surveys** of supervisors and then **sum** responses.

- ▶ Lierdorp et al. (2013)
- ▶ Arnone, Darbar, and Gambini (2007)
- ▶ Seelig and Novoa (2009)
- ▶ Masciandaro, Quintyn, and Taylor (2008)

# Issues with previous methods

There are a number of issues with previous methods:

- ▶ Ironically, many of the surveys are **not transparent**.
- ▶ Survey methods are **laborious**.
- ▶ Surveys rely on **temporally ephemeral** information.
  - ▶ So, survey methods provide only brief windows, **not time series**.
- ▶ Summing responses **assumes** that each item should be **weighted equally**.
- ▶ **High non-response rate** (Liedorp et al. had a response rate of 57%). This information is often **ignored**.
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# Our Approach

**Missing data as data!** (see Hollyer et al. 2014)

Treat financial regulatory transparency (FRT) as an **unobserved latent variable**.

Our **FRT Index** summarizes countries' **likelihood of reporting** yearly data to indices included in the World Bank's Global Financial Development Database (**GFDD**).

## Observations and items

**60 high income countries, 22 years (1990-2011), 14 items.**

# The model

$$y_{k,c,t} = \begin{cases} 1 & \text{if item } k \text{ reported in country } c, \text{ year } t \\ 0 & \text{if item } k \text{ not reported in country } c, \text{ year } t \end{cases}$$

Estimate (based on Stan Development Team 2014, 49-50):

$$\Pr(y_{k,c,t} = 1 | \alpha_{c,t}) = \text{logit}[\exp(\gamma_k) * (\alpha_{c,t} - \beta_k + \delta)]$$

where:

- ▶  $\alpha_{c,t}$  is the estimated propensity for country  $c$  at year  $t$  to report item  $k$ . This can be thought of as the **transparency** score.
- ▶  $\gamma_k$  is the **discrimination** parameter for item  $k$
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## Priors (1)

$$\alpha_{c,1990} \sim N(0, 1)$$

$$\text{Rescentered by } \frac{\alpha_{c,1990} - \bar{\alpha}_{1990}}{SD_{\alpha,1990}}$$

Priors for  $t > 1$

$$\alpha_{c,t} \sim N(\alpha_{c,t-1}, \sigma_{\alpha c}) \forall t > 1$$

with half-Cauchy prior (see Gelman, 2007; Polson and Scott, 2012)

$$\sigma_{\alpha c} \sim \text{Cauchy}(0, 0.25)$$

## Priors (2)

Similarly:

$$\begin{aligned}\delta &\sim \text{Cauchy}(0, 0.25) \\ \beta &\sim N(0, \sigma_\beta) \\ \gamma &\sim N(0, \sigma_\gamma)\end{aligned}\tag{1}$$

where

$$\begin{aligned}\sigma_\beta &\sim \text{Cauchy}(0, 0.25) \\ \sigma_\gamma &\sim \text{Cauchy}(0, 0.25)\end{aligned}\tag{2}$$

# Estimation

We estimated the model using **Stan**/No-U-Turn Sampler (recommended for highly correlated data).

## Accessing source and data

The **source code** is available at:

<https://github.com/FGCH/FRTIndex>

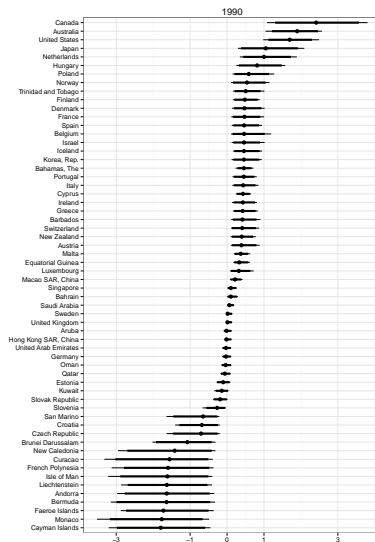
The (beta version) of the FRT Index set can be **downloaded** into R with:

```
frt_index <- repmis::source_data('http://bit.ly/1rZ49jB')
```

# What are we actually measuring?

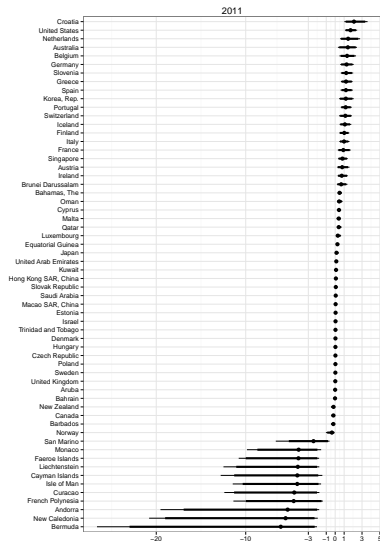
The willingness of a country to report **minimally credible** information about its financial system **to international institutions and investors.**

# FRT Index Overview (1990)

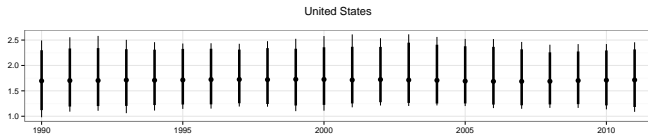
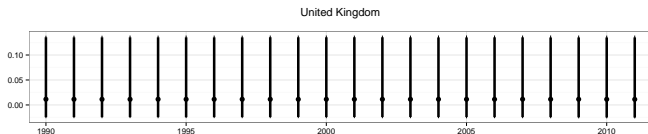
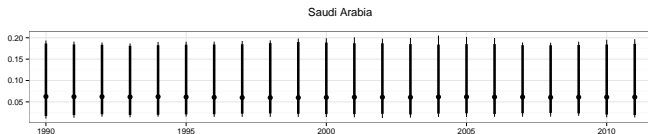




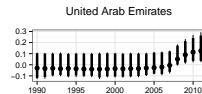
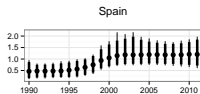
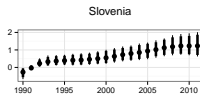
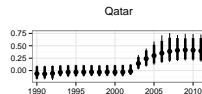
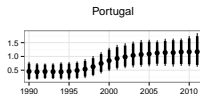
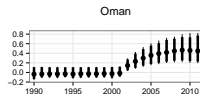
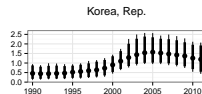
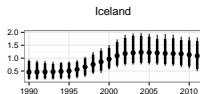
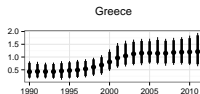
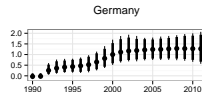
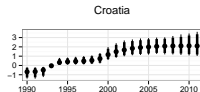
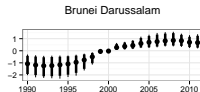
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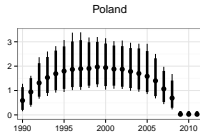
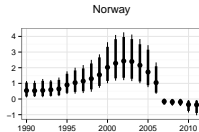
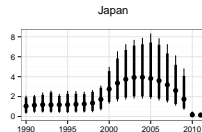
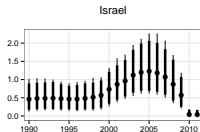
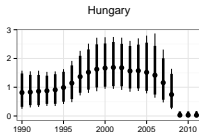
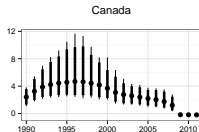
# Stable Countries



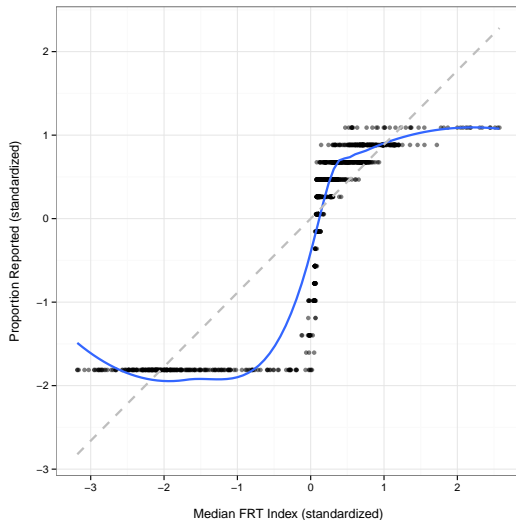
# Improving Countries



# Declining Countries

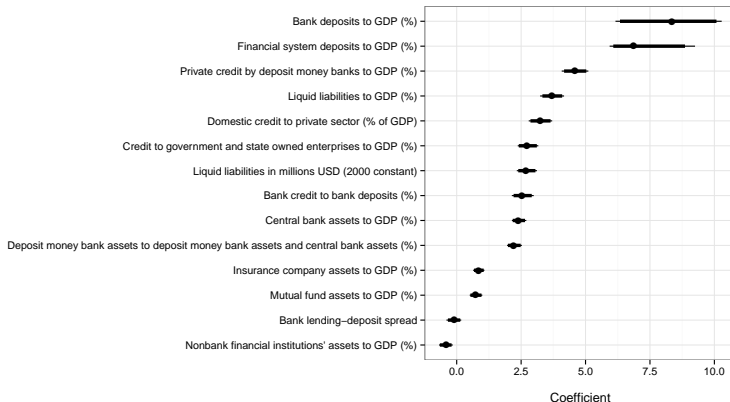


# Comparison to frequency measure



# Discrimination parameter

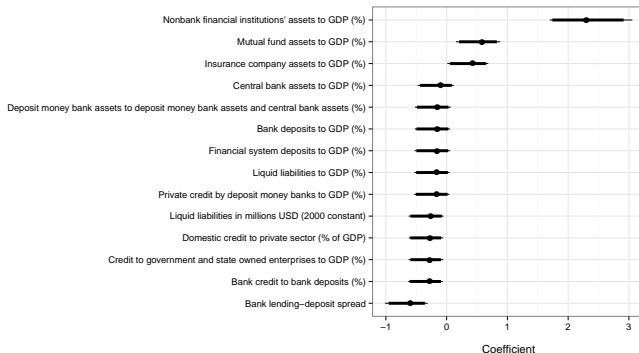
How well reporting an item predicts reporting other items.



# Difficulty parameter

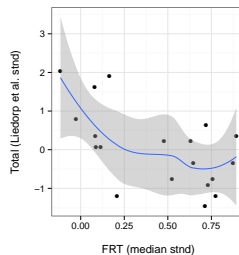
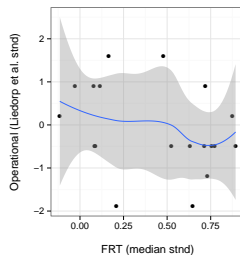
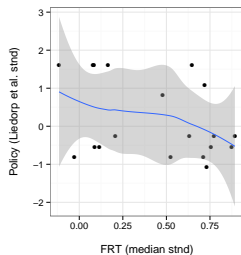
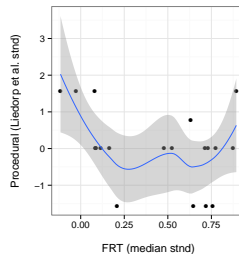
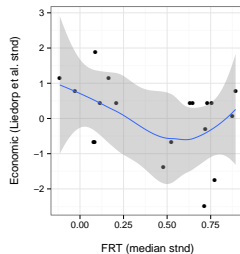
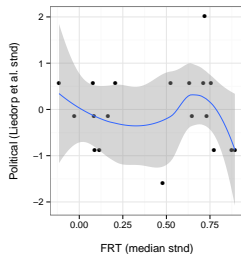
On average how well reported is the item.

**Higher** scores indicate **lower reporting**, i.e. more 'difficult' to report.



# Comparison to survey/frequency measures

## Comparison to Liedorp et al. (2013)





## One annoying issue...

There is a possibility that **missing-ness** is sometimes caused by World Bank **data handling errors** rather than countries' willingness to report.

For example, Bank Deposits to GDP (%) is not reported for the UK. However, a **mirror** of the GFDD (FRED) **does have** the data.

`http://research.stlouisfed.org/fred2/series/DDOI02GBA156NWDB`

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- ▶ Examine how reporting is associated with economic outcomes:
  - ▶ Investment flows
  - ▶ Financial stability

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