

Smart Systemic-Risk Scores

-

Sylvain Benoit

Discussion by Paul Beaumont¹

-

12th Financial Risks International Forum - Institut Louis Bachelier

Tuesday, March 19th 2019

¹Université Paris Dauphine - ACPR

Motivation

- SIFIs: classification created in 2011 to address the "too-big-to-fail" problem

Motivation

- SIFIs: classification created in 2011 to address the "too-big-to-fail" problem
- Banks classified as SIFIs subject to higher capital requirements

Motivation

- SIFIs: classification created in 2011 to address the "too-big-to-fail" problem
- Banks classified as SIFIs subject to higher capital requirements
- Classification of SIFIs: simple average of 5 systemic-risk categories

Motivation

- SIFIs: classification created in 2011 to address the "too-big-to-fail" problem
- Banks classified as SIFIs subject to higher capital requirements
- Classification of SIFIs: simple average of 5 systemic-risk categories
- Problem: volatile categories are *de facto* more important (Benoit et al. 2018)
 - Solution: standardization of the categories

This paper

Can we do better? Can we formalize the way we think about SIFIs?

This paper

Can we do better? Can we formalize the way we think about SIFIs?

This paper:

- Introduces the axioms of Chen et al. (2013) in the context of SIFIs
- Suggests a measure that equalize the contribution to variance of each category (*smart indicator*)
- Good properties of smart indicators: low variance without capping

This paper

Can we do better? Can we formalize the way we think about SIFIs?

This paper:

- Introduces the axioms of Chen et al. (2013) in the context of SIFIs
- Suggests a measure that equalize the contribution to variance of each category (*smart indicator*)
- Good properties of smart indicators: low variance without capping

I would like to see:

- A better integration of the theoretical framework
- Some clarifications on your methodological choices
- More discussion of the objectives of the regulator

Theoretical axioms - 1/2

Chen et al. (2013):

- $x_{i,\theta}$ losses of firm i in state θ , X_θ vector of losses of the economy in state θ ,
 X_θ matrix of losses

Theoretical axioms - 1/2

Chen et al. (2013):

- $x_{i,\theta}$ losses of firm i in state θ , X_θ vector of losses of the economy in state θ , X_θ matrix of losses
- $\rho(x_i)$: Risk of firm i ($\rho(x_i) = E[x_i]$)

Theoretical axioms - 1/2

Chen et al. (2013):

- $x_{i,\theta}$ losses of firm i in state θ , X_θ vector of losses of the economy in state θ , X_θ matrix of losses
- $\rho(x_i)$: Risk of firm i ($\rho(x_i) = E[x_i]$)
- $\rho(X)$: Systemic risk of the economy ($\rho(X) = E[\sum x_i]$)

Theoretical axioms - 1/2

Chen et al. (2013):

- $x_{i,\theta}$ losses of firm i in state θ , X_θ vector of losses of the economy in state θ , X_θ matrix of losses
- $\rho(x_i)$: Risk of firm i ($\rho(x_i) = E[x_i]$)
- $\rho(X)$: Systemic risk of the economy ($\rho(X) = E[\sum x_i]$)
- If the function $X \rightarrow \rho(X)$ verifies some simple properties
 - Monotonicity, convexity, positive homogeneity...

Theoretical axioms - 1/2

Chen et al. (2013):

- $x_{i,\theta}$ losses of firm i in state θ , X_θ vector of losses of the economy in state θ , X_θ matrix of losses
- $\rho(x_i)$: Risk of firm i ($\rho(x_i) = E[x_i]$)
- $\rho(X)$: Systemic risk of the economy ($\rho(X) = E[\sum x_i]$)
- If the function $X \rightarrow \rho(X)$ verifies some simple properties
 - Monotonicity, convexity, positive homogeneity...
- Then there exists Δ and ρ_0 such that $\rho(X) = \rho_0(\Delta(X_\theta))$
- In the example above $\Delta(X_\theta) = \sum x_{i,\theta}$ and $\rho_0(Y) = E[Y]$

Theoretical axioms - 1/2

Chen et al. (2013):

- $x_{i,\theta}$ losses of firm i in state θ , X_θ vector of losses of the economy in state θ , X_θ matrix of losses
- $\rho(x_i)$: Risk of firm i ($\rho(x_i) = E[x_i]$)
- $\rho(X)$: Systemic risk of the economy ($\rho(X) = E[\sum x_i]$)
- If the function $X \rightarrow \rho(X)$ verifies some simple properties
 - Monotonicity, convexity, positive homogeneity...
- Then there exists Δ and ρ_0 such that $\rho(X) = \rho_0(\Delta(X_\theta))$
- In the example above $\Delta(X_\theta) = \sum x_{i,\theta}$ and $\rho_0(Y) = E[Y]$
- Allows to characterize very simply a wide set of systemic risk measures

Theoretical axioms - 2/2

Benoit (2019):

Theoretical axioms - 2/2

Benoit (2019):

- $x_{i,k,\theta}$ k -th systemic-risk indicator of bank i in state θ (size of bank i in 2019)

Theoretical axioms - 2/2

Benoit (2019):

- $x_{i,k,\theta}$ k-th systemic-risk indicator of bank i in state θ (size of bank i in 2019)
- $S_{i,\theta}^\omega = \sum \omega_k x_{i,k,\theta}$ systemic-risk score of bank i in state θ (systemic risk measure of bank i in 2019 under using weights ω_k)

Theoretical axioms - 2/2

Benoit (2019):

- $x_{i,k,\theta}$ k-th systemic-risk indicator of bank i in state θ (size of bank i in 2019)
- $S_{i,\theta}^\omega = \sum \omega_k x_{i,k,\theta}$ systemic-risk score of bank i in state θ (systemic risk measure of bank i in 2019 under using weights ω_k)
- Define global systemic risk indicator as $\rho : S^\omega \rightarrow \rho(S^\omega)$ where S^ω matrix of systemic risk scores with weights ω

Theoretical axioms - 2/2

Benoit (2019):

- $x_{i,k,\theta}$ k-th systemic-risk indicator of bank i in state θ (size of bank i in 2019)
- $S_{i,\theta}^\omega = \sum \omega_k x_{i,k,\theta}$ systemic-risk score of bank i in state θ (systemic risk measure of bank i in 2019 under using weights ω_k)
- Define global systemic risk indicator as $\rho : S^\omega \rightarrow \rho(S^\omega)$ where S^ω matrix of systemic risk scores with weights ω
- Allows to define a metric ρ to compare different weighting scheme

Theoretical axioms - 2/2

Benoit (2019):

- $x_{i,k,\theta}$ k-th systemic-risk indicator of bank i in state θ (size of bank i in 2019)
- $S_{i,\theta}^\omega = \sum \omega_k x_{i,k,\theta}$ systemic-risk score of bank i in state θ (systemic risk measure of bank i in 2019 under using weights ω_k)
- Define global systemic risk indicator as $\rho : S^\omega \rightarrow \rho(S^\omega)$ where S^ω matrix of systemic risk scores with weights ω
- Allows to define a metric ρ to compare different weighting scheme

First remark: no more risk here. Yet mention of "risk of systemic risk indicator", "smart betas".

- Risk \rightarrow variance
- Not so much a question of measuring risk as a way to define an optimal indicator (Svensson and Woodford 2003)

Preferences of the regulator

What is a good measure to compare weighting schemes?

Preferences of the regulator

What is a good measure to compare weighting schemes?

- $\rho(S^\omega) = E[\sum S_i^\omega]$ not informative

Preferences of the regulator

What is a good measure to compare weighting schemes?

- $\rho(S^\omega) = E[\sum S_i^\omega]$ not informative
- The author chooses $\rho(S^\omega) = E[\text{Var}(S^\omega)]...$

Preferences of the regulator

What is a good measure to compare weighting schemes?

- $\rho(S^\omega) = E[\sum S_i^\omega]$ not informative
- The author chooses $\rho(S^\omega) = E[\text{Var}(S^\omega)]...$
- ... with an additional constraint: all categories should be treated symmetrically

You should discuss more the preferences of the regulator

Preferences of the regulator

What is a good measure to compare weighting schemes?

- $\rho(S^\omega) = E[\sum S_i^\omega]$ not informative
- The author chooses $\rho(S^\omega) = E[\text{Var}(S^\omega)]...$
- ... with an additional constraint: all categories should be treated symmetrically

You should discuss more the preferences of the regulator

- Is it really optimal to have an indicator with a low variance?

Preferences of the regulator

What is a good measure to compare weighting schemes?

- $\rho(S^\omega) = E[\sum S_i^\omega]$ not informative
- The author chooses $\rho(S^\omega) = E[\text{Var}(S^\omega)]...$
- ... with an additional constraint: all categories should be treated symmetrically

You should discuss more the preferences of the regulator

- Is it really optimal to have an indicator with a low variance?
- *"An overly high dispersion means that some financial institutions contribute in a large [...] measure to the risk of the system"*

Preferences of the regulator

What is a good measure to compare weighting schemes?

- $\rho(S^\omega) = E[\sum S_i^\omega]$ not informative
- The author chooses $\rho(S^\omega) = E[\text{Var}(S^\omega)]...$
- ... with an additional constraint: all categories should be treated symmetrically

You should discuss more the preferences of the regulator

- Is it really optimal to have an indicator with a low variance?
- *"An overly high dispersion means that some financial institutions contribute in a large [...] measure to the risk of the system"*
- But what if some banks are actually contributing to a large extent to systemic risk?

Preferences of the regulator

What is a good measure to compare weighting schemes?

- $\rho(S^\omega) = E[\sum S_i^\omega]$ not informative
- The author chooses $\rho(S^\omega) = E[\text{Var}(S^\omega)]...$
- ... with an additional constraint: all categories should be treated symmetrically

You should discuss more the preferences of the regulator

- Is it really optimal to have an indicator with a low variance?
- *"An overly high dispersion means that some financial institutions contribute in a large [...] measure to the risk of the system"*
- But what if some banks are actually contributing to a large extent to systemic risk?
- Could you try to formalize the "symmetric treatment" constraint?

A quick technical remark

Not completely sure of your normalization choice

- In your paper you impose $\rho(1) = 0$
- Chen et al. (2013) impose $\rho(1) = F > 0$
- This normalization choice seems important to obtain the decomposition (Theorem 1)

Incentives

"By setting smaller weights for the most volatile categories, I create positive incentives for banks, especially non-SIFIs, to increase their risk taking in these categories without being heavily (and quickly) penalized by additional capital requirements. I argue that this pattern may increase financial stability since banks will become more substitutable by allowing some banks to increase their market shares in specialized activities, such as the custody services."

- To which extent can banks react to the indicators? Do changes in the ranking occur frequently?
- Is it desirable to have banks that are more similar?
- Shouldn't your weighting scheme change over time?

Good luck with the paper!