

Bank Resolution and the Structure of Global Banks

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Motivation

Problem: How to resolve systemic financial institutions (G-SIFIs)?

- ▶ Aim: Avoid Lehman scenario or tax-funded bailout
- ▶ Dodd Frank proposes OLA, partly modeled after FDIC receivership

Main challenge: Swift transfer of assets and liabilities not possible

- ▶ FDIC resolution relies on **P&A**, usually over weekend
- ▶ **does not work for G-SIFIs:** too complex, too large, global scale

Solution: Resolution happens exclusively on the liability side

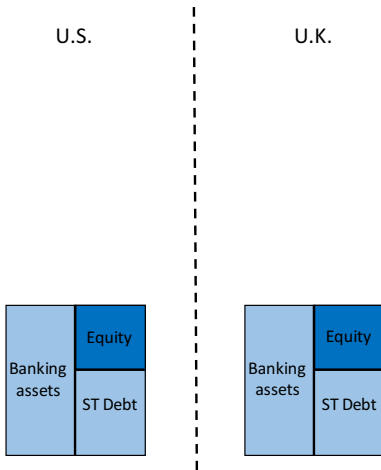
- ▶ holding companies issue equity and LT debt as loss-absorbing capital
- ▶ recapitalization via a liability-side: TLAC written down during crisis

This paper: Economic analysis of two main resolution proposals

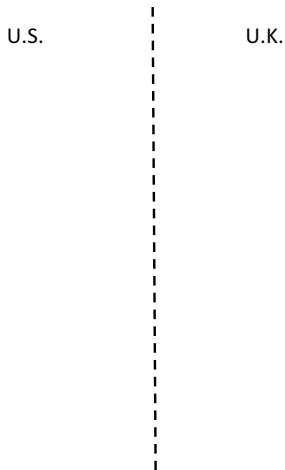
- ▶ **Multiple Point of Entry vs. Single Point of Entry**

Two Approaches: MPOE and SPOE

Multiple Point of Entry (MPOE):

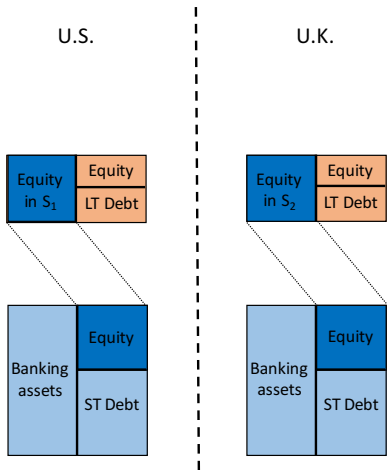


Single Point of Entry (SPOE):

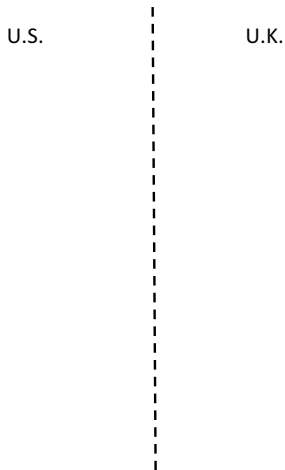


Two Approaches: MPOE and SPOE

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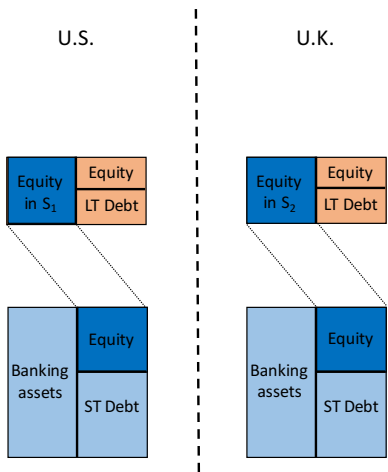
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Two Approaches: MPOE and SPOE

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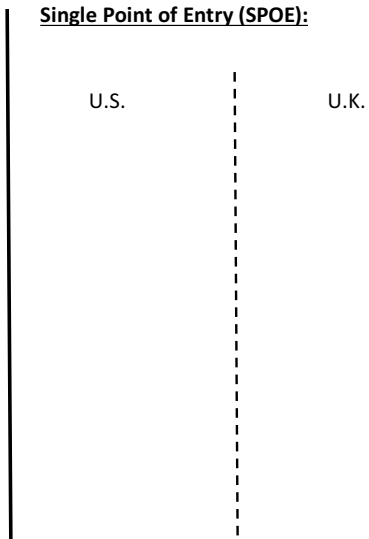
Loss-absorbing capital in each jurisdiction



Single Point of Entry (SPOE):

U.S.

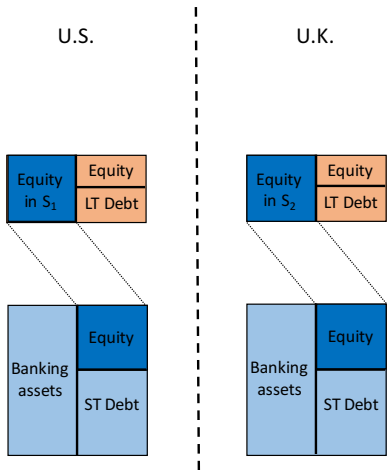
U.K.



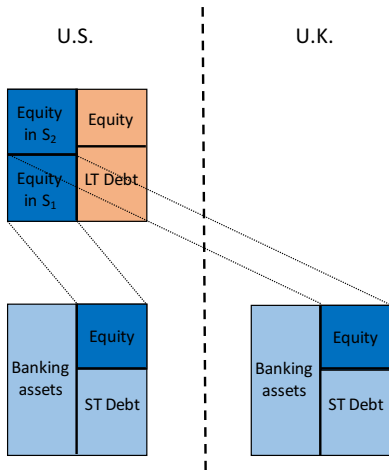
Two Approaches: MPOE and SPOE

Multiple Point of Entry (MPOE):

Loss-absorbing capital in each jurisdiction



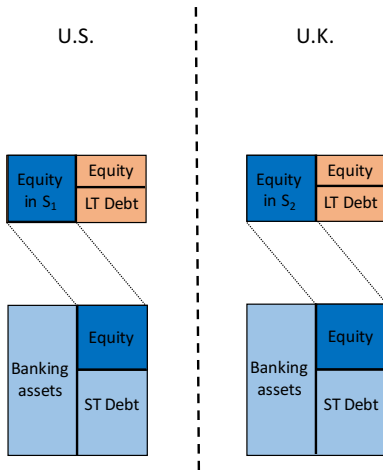
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Two Approaches: MPOE and SPOE

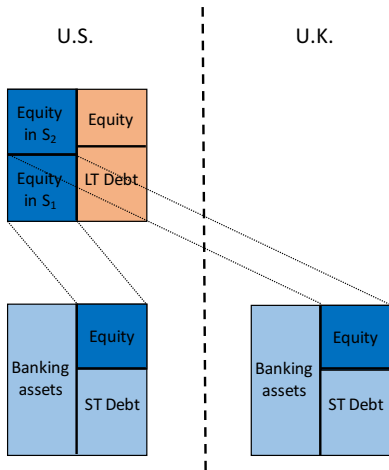
Multiple Point of Entry (MPOE):

Loss-absorbing capital in each jurisdiction



Single Point of Entry (SPOE):

Loss-absorbing capital shared



Preview of Results

- (1) **Minimum TLAC requirement** is necessary under SPOE and MPOE
 - ▶ otherwise banks may rely on ST debt, making resolution impossible
- (2) **Benchmark:** SPOE efficient under **supra-national regulator**
 - ▶ SPOE facilitates cross-jurisdictional transfers (co-insurance)
 - ▶ reduces required TLAC and allows more banking services
- (3) **Status quo:** Resolution by **national regulators** leads to inefficiency:
 - ▶ Ex-ante failure to set up SPOE (expected transfers too asymmetric)
 - ▶ Ex-post incentives to ring-fence (required transfers too large)

In these cases, **MPOE preferable** (more robust)

- ▶ constrained optimal: hybrid with some, but not all TLAC shared

Model Setup: Primitives

Three dates: $t = 0, 1, 2$

A **global financial institution** has **two subsidiaries**

- ▶ subsidiaries operate in separate jurisdictions $i = 1, 2$
- ▶ e.g., global bank with operations in U.S. and U.K.

Each subsidiary runs its own banking operation

- ▶ fixed initial **setup cost** F at date 0
- ▶ banking operation generates **cash flow over two periods**

Model Setup: Cash Flow at Date 1

Cash flow at date 1 has **aggregate** and **diversifiable risk**

Aggregate risk:

- ▶ both subsidiaries receive $C_1 \in \{C_1^H, C_1^L\}$ with probability $\{p_1, 1 - p_1\}$
- ▶ perfectly correlated

Diversifiable risk:

- ▶ one subsidiary receives additional cash flow Δ
- ▶ Δ realizes in jurisdiction i with probability θ_i (and $\theta_1 + \theta_2 = 1$)

Further assumptions:

- ▶ C_1^H high enough to meet short-term liabilities irrespective of Δ
- ▶ C_1^L may be insufficient, creating a role for resolution

Model Setup: Cash Flow at Date 2

Cash flow at date 2 characterizes **continuation or franchise value**

- ▶ $C_2 \in \{V, 0\}$ with probability $\{p_2^i, 1 - p_2^i\}$

Continuation value is subject to **private information**:

- ▶ $p_2^i \in \{0, 1\}$ private information to subsidiary i , market expectation \bar{p}_2
- ▶ makes it costly for high type $p_2^i = 1$ to raise funds against V

Early liquidation inefficient:

- ▶ within jurisdiction: liquidation payoff $L < \bar{p}_2 V$
- ▶ across jurisdictions: spillover cost S

Continuation value subject to **economies of scale/scope**:

- ▶ separation of subsidiaries reduces V to λV , $\lambda \leq 1$
- ▶ **interpretation**: joint cash management, other shared services
- ▶ can pay $\tilde{F} > F$ to set up redundant systems (s.t. $\lambda = 1$)

Model Setup: Financing

F raised through a **combination of ST debt, LT debt, and equity**

Short-term debt:

- ▶ issued by the operating subsidiary (“banking activity”)
- ▶ face value R_1 due at date 1
- ▶ safe short-term debt yields social benefit γ in addition to cash flows
- ▶ reduced form for social benefits of banking (liquidity transformation)

Long-term debt and equity (TLAC):

- ▶ issued by the holding company
- ▶ long-term subordinated debt R_{LT} due at date 2
- ▶ outside equity stake α_0

Issuance by holding company guarantees **structural subordination**

Model Setup: Regulators

There is a national regulator in each jurisdiction

- ▶ reflects regulatory status quo

National regulator can invoke resolution when:

- ▶ local operating subsidiary unable to pay R_1
- ▶ regulator in other jurisdiction has invoked resolution

Main friction: Regulators have **national interests**

- ▶ regulators care only about their own jurisdiction
- ▶ compare to benchmark of supra-national regulation

The Need for Required TLAC

MPOE/SPOE requires sufficient **loss-absorbing capital (TLAC)**

- ▶ need **sufficient equity** or **LT debt** that can absorb losses
- ▶ idea: completely **protect runnable operating liabilities** R_1

Will banks issue sufficient TLAC? Trade-off:

- ▶ **no TLAC** (relying completely on R_1): exposes bank to **inefficient liquidation** and **banking benefit** γ lost
- ▶ but **TLAC is costly**: claims against V issued at a **discount**

Solve for **optimal financing** in **pooling equilibrium**

- ▶ no separation possible: low type can costlessly mimic high type
- ▶ equilibrium financing depends on high type's choices (as in Bolton and Freixas, 2000)

The Need for Required TLAC

TLAC becomes relevant when $F > (1 + \gamma)(C_1^L + \bar{p}_2 V)$

- ▶ can issue risk-free ST debt of face value $C_1^L + \bar{p}_2 V$
- ▶ Why? Can always repay C_1^L and roll over $\bar{p}_2 V$ at $t = 1$

Compare two funding structures:

(1) Sufficient TLAC:

- ▶ issue $R_1 = C_1^L + \bar{p}_2 V$ of safe ST debt
- ▶ raise $F - (1 + \gamma)(C_1^L + \bar{p}_2 V)$ via combination of R_{LT} and α_0

(2) No TLAC:

- ▶ raise F exclusively via risky short-term debt $R_1 > C_1^L + \bar{p}_2 V$

The Need for Required TLAC

Owner of operating subsidiary **relies exclusively on risky ST debt** when:

$$\bar{p}_2 < \bar{p}_2^*(\gamma, L)$$

Intuition:

- ▶ low \bar{p}_2 implies high dilution costs for high type
- ▶ high type prefers to rely on ST debt and risk bankruptcy

Inefficient from social perspective:

- ▶ inefficient liquidation with probability $1 - p_1$
- ▶ social benefit of risk-free ST debt γ lost

Minimum TLAC requirement necessary to complement SPOE/MPOE

- ▶ when TLAC falls short \Rightarrow disorderly liquidation or bailout

Supra-National Regulation and Regulatory Status Quo

Move to **comparison of MPOE and SPOE resolution**

Plan of attack:

First consider **benchmark case: Supra-national regulator**

- ▶ regulator maximizes joint surplus
- ▶ can commit to future transfers

Then consider **status quo: Self-interested national regulators**

- ▶ regulators maximize surplus in own jurisdiction
- ▶ cannot commit to future transfers

SPOE and MPOE under Supra-National Regulation

MPOE:

- ▶ Maximum amount of safe ST debt: $R_1^{MPOE} = C_1^L + \bar{p}_2 V$
- ▶ $F - (1 + \gamma)R_1^{MPOE}$ raised via LT subordinated debt or equity (TLAC)
- ▶ separation/redundancy costs of $\min[\tilde{F} - F, (1 - p_1)(1 - \lambda)\bar{p}_2 V]$

SPOE:

- ▶ Maximum amount of safe ST debt: $R_1^{SPOE} = C_1^L + \bar{p}_2 V + \Delta/2$
- ▶ $F - (1 + \gamma)R_1^{SPOE}$ raised via LT subordinated debt or equity (TLAC)
- ▶ no separation/redundancy costs

Net social benefit of SPOE: $\gamma\Delta + 2 \min[\tilde{F} - F, (1 - p_1)(1 - \lambda)\bar{p}_2 V]$

- ▶ allows for more banking services at same risk level
- ▶ facilitates economies of scale/scope

Nationally Interested Regulators: Ex Ante Analysis

Will national regulators agree to set up SPOE ex ante?

Ex ante benefit of SPOE:

- ▶ additional banking services: $\gamma\Delta/2$
- ▶ economics of scale/scope: $\min[\tilde{F} - F, (1 - p_1)(1 - \lambda)\bar{p}_2 V]$

Ex ante cost of SPOE: (from perspective of jurisdiction 1)

- ▶ with probability $(1 - p_1)\theta_1$, make transfer of $\Delta/2$
- ▶ with probability $(1 - p_1)\theta_2$, receive transfer of $\Delta/2$
- ▶ \Rightarrow net expected transfer of $(1 - p_1)(\theta_1 - \theta_2) \Delta/2$

Ex-ante IC for SPOE (taking into account both regulators):

$$|\theta_1 - \theta_2| \leq \frac{\gamma}{1 - p_1} + \frac{2}{\Delta} \min \left[\frac{\tilde{F} - F}{1 - p_1}, (1 - \lambda)\bar{p}_2 V \right]$$

\Rightarrow **fail to set up SPOE** when expected transfers **too asymmetric**

Nationally Interested Regulators: Ex Post Analysis

Will national regulators stick to planned SPOE ex post?

Ex-post IC for SPOE: required transfer smaller than cost of ring-fencing

$$\frac{\Delta}{2} \leq \bar{p}_2(1 - \lambda)V + S$$

SPOE breaks down ex post when realized transfers are **too large**

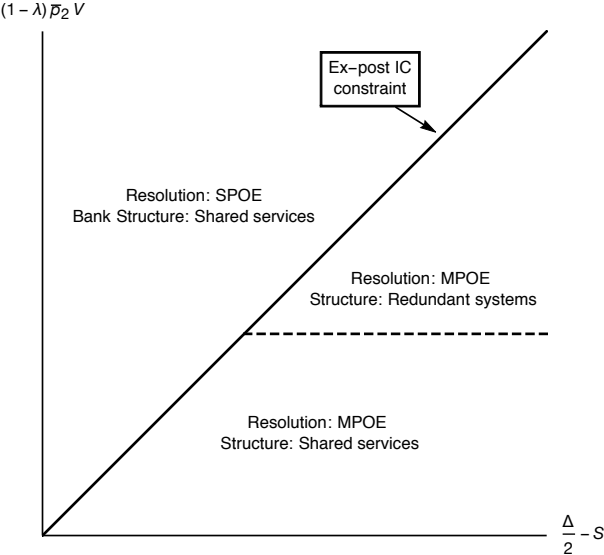
Gains from global banking and **spillover costs** facilitate SPOE

- ▶ shared services ($\lambda < 1$), e.g., joint cash mgmt, scope economies
- ▶ direct spillovers across jurisdictions S

When **IC violated**, preferable to set up **MPOE**

- ▶ requires more TLAC, but is more robust because no transfers required

Bank Resolution and Bank Structure



Constrained-Optimal Resolution when SPOE Fails

When SPOE is not ex-post incentive compatible:

- ▶ maximize cross-jurisdiction transfer subject to ex-post IC

$$T^* = \bar{p}_2(1 - \lambda)V + S < \Delta/2$$

- ▶ this allows banking activity (at each operating subsidiary) of

$$C_1^L + \bar{p}_2 V + T^* < C_1^L + \bar{p}_2 V + \Delta/2$$

Essentially a hybrid model:

- ▶ limit transfers via “contributable resources” (i.e., Δ)
- ▶ corresponding increase in “prepositioned resources” (i.e., TLAC)

Conclusion

Model of **resolution of global banks** via “liability reconstruction”

- ▶ focus on **MPOE vs. SPOE**

SPOE efficient in principle, but **national regulators** limit applicability

- ▶ ex ante: **asymmetry of expected transfers** matters
- ▶ ex post: **size of realized transfers** matters

Constrained optimal resolution often a **hybrid**

Novel link between resolution, organizational structure, and nature of business risks

- ▶ SPOE requires cross-jurisdictional complementarities
- ▶ corporate structure and resolution mechanism have to match

Discussion of Proposed Resolution Rules

What constitutes a “resolution entity” is flexible

- ▶ cooperation via appropriate resolution boundary

Internal TLAC within a given resolution entity

- ▶ pre-allocates TLAC to intermediate holding companies
- ▶ similar to constrained optimal resolution, but may not be enough
- ▶ perhaps need external TLAC also at intermediate holding co level

Fed proposal seems to go beyond ensuring IC

- ▶ internal TLAC almost as high as external TLAC
- ▶ eliminates diversification benefit of SPOE

Why is there a LT debt requirement?

Bank Incentives under SPOE and MPOE

Moral hazard: Each subsidiary has to exert effort to generate Δ

- ▶ **effort:** Δ received with probability θ_i
- ▶ **no effort:** Δ received with probability $\theta_i - \varepsilon$, but private benefit B

For simplicity, assume that **TLAC is an outside equity stake** α_0

How does IC differ between MPOE and SPOE?

- ▶ under SPOE, Δ no longer accrues to inside equity holder in low state
- ▶ but SPOE can allow to retain a larger inside equity stake

$$\text{IC under MPOE:} \quad (1 - \alpha_0^{MPOE}) \Delta > \frac{B}{\varepsilon}$$

$$\text{IC under SPOE:} \quad (1 - \alpha_0^{SPOE}) p_1 \Delta > \frac{B}{\varepsilon}$$

Bank Incentives under SPOE and MPOE

Symmetric case ($\theta_1 = \theta_2 = 1/2$):

- ▶ SPOE resolution leads to reduced incentives relative to MPOE when

$$\frac{\Delta}{2} < (1 - p_1)(C_1^H - C_1^L)$$

Asymmetric case ($\theta_1 \neq \theta_2 = 1/2$):

- ▶ easier to sustain incentives under SPOE relative to MPOE the larger the asymmetry of probabilities $|\theta_1 - \theta_2|$

Break-Even Conditions with Sufficient TLAC

1. Set safe $R_1 = C_1^L + \bar{p}_2 V$.

2. R_{LT} must satisfy:

$$p_1 [\bar{p}_2 R_{LT} + (1 - \bar{p}_2)(C_1^H + \theta\Delta - R_1)] + (1 - p_1)\theta\Delta = F - \underbrace{(1 + \gamma)R_1}_{\text{raised via safe } R_1}$$

3. Profit to bank:

$$\begin{aligned}\Pi_{TLAC} &= p_1 [C_1^H + \theta\Delta + V - R_1 - R_{LT}] \\ &= \frac{1}{\bar{p}_2} [p_1 C_1^H + (1 - p_1)C_1^L + \theta\Delta + \bar{p}_2 V + \gamma(C_1^L + \bar{p}_2 V) - F]\end{aligned}$$

Break-Even Conditions without TLAC

1. Finance entire investment with short-term debt R_1 :

$$p_1 R_1 + (1 - p_1)(C_1^L + \theta\Delta + L) = F$$

2. Profit to bank:

$$\begin{aligned}\Pi_{noTLAC} &= p_1 [C_1^H + \theta\Delta - R_1 + V] \\ &= p_1 C_1^H + (1 - p_1)C_1^L + \theta\Delta + p_1 V - (1 - p_1)L - F\end{aligned}$$

Then determine whether $\Pi_{TLAC} > \Pi_{noTLAC}$