ESBies: Rationale, Simulations and Theory

Marco Pagano
University of Naples Federico II, CSEF & EIEF

(joint with Markus Brunnermeier,
Sam Langfield, Stijn van Nieuwerburgh,
Ricardo Reis and Dimitri Vayanos)

ESRB First Annual Conference

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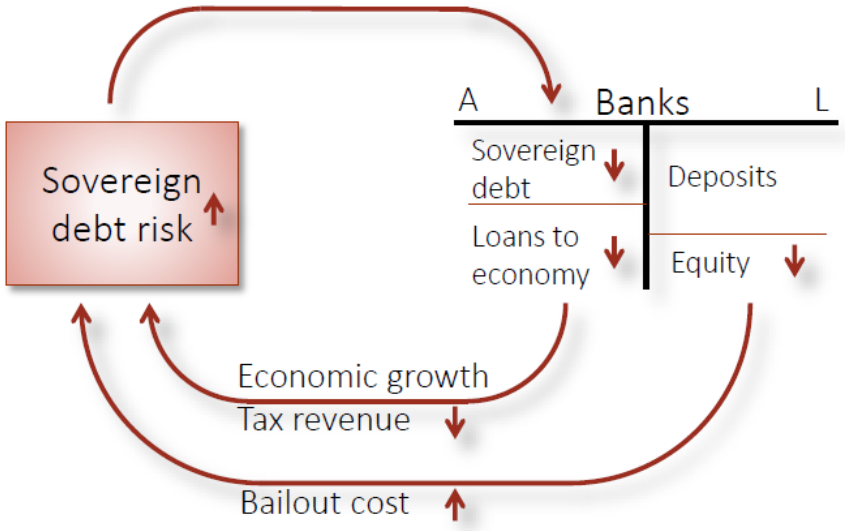
Outline

- Rationale: Which policy issues would ESBies address?
- Simulation: How safe can ESBies be? How much would they increase the supply of safe assets?
- Theory: Can ESBies be expected to affect sovereign default probabilities?

1. Rationale: current challenges

1. Diabolic loop between sovereign & banking risk



- Can be avoided if banks hold a safe asset (not sensitive to sovereign risk)

2. Cross-border flight to safety

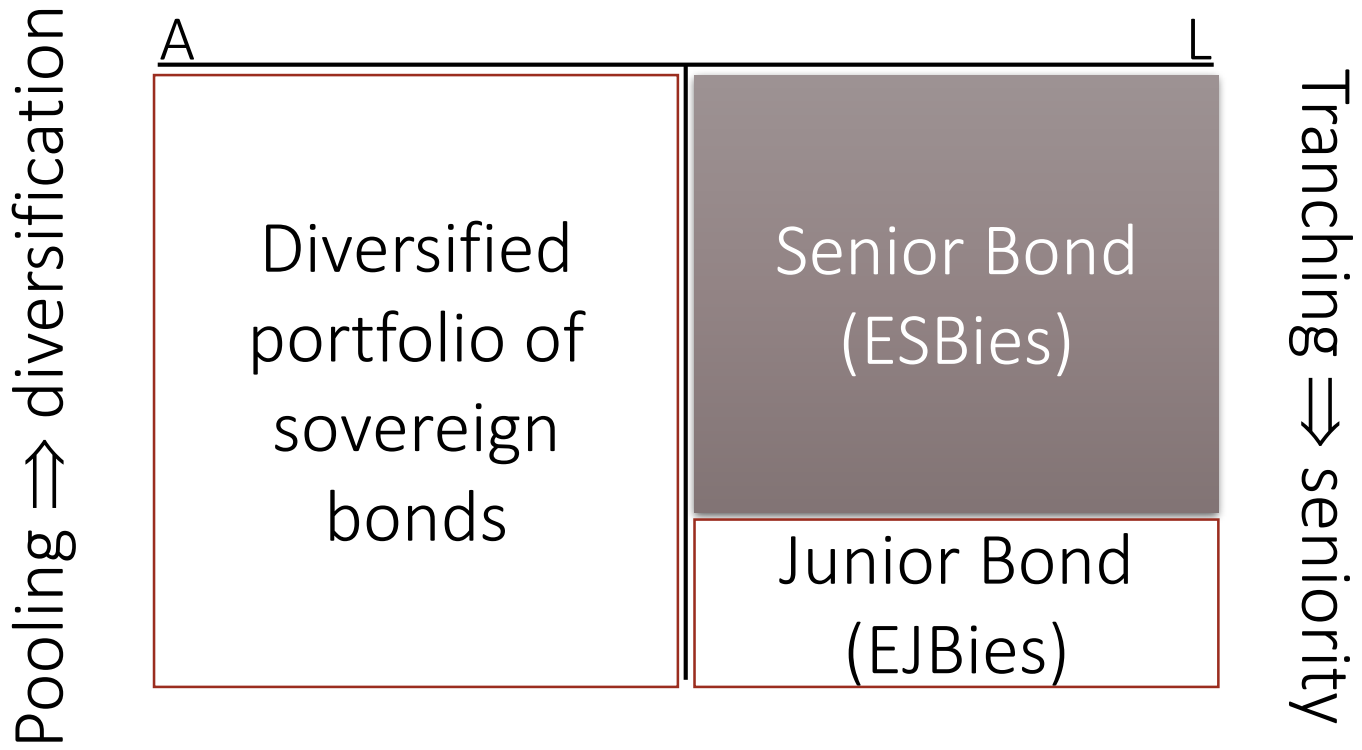
- Asymmetric supply & scarcity of safe asset

- Price of German debt ↑
- Price of Italian/Spanish/Greek debt ↓

Safe asset: desired features

- Union-wide safe asset in sufficiently large supply
  - at least as safe as the German Bund
  - more liquid than the German Bund
- No joint liability
- No downside risk: costless return to status quo
- No EU treaty change
- Other features:
  - Monetary policy tool
  - Euro-area risk-free benchmark yield curve

ESBies



- Proposed by Euronomics (2011)
  - Brunnermeier, Garicano, Lane, Pagano, Reis, Santos, Van Nieuwerburgh & Vayanos

2. How safe, how much? Simulations…

- Brunnermeier, Langfield, Pagano, Reis, Van Nieuwerburgh & Vayanos (ESRB WP no. 21 2016) use simulations to assess:
  - how safe ESBies would be under different assumptions about the subordination level (= tranching point)
  - how large their supply would be
- Define as "safe" debt whose 5-year expected loss rate is less than 0.5%: equivalent to AAA
- Model is simulated over 10 million draws

Simulation scenarios

- Benchmark scenario
  - Stage 1: macro states
    - 5% crisis state
    - 25% mild recession
    - 70% good state
  - Stage 2:
    - Default probabilities calibrated on credit ratings & CDS spreads

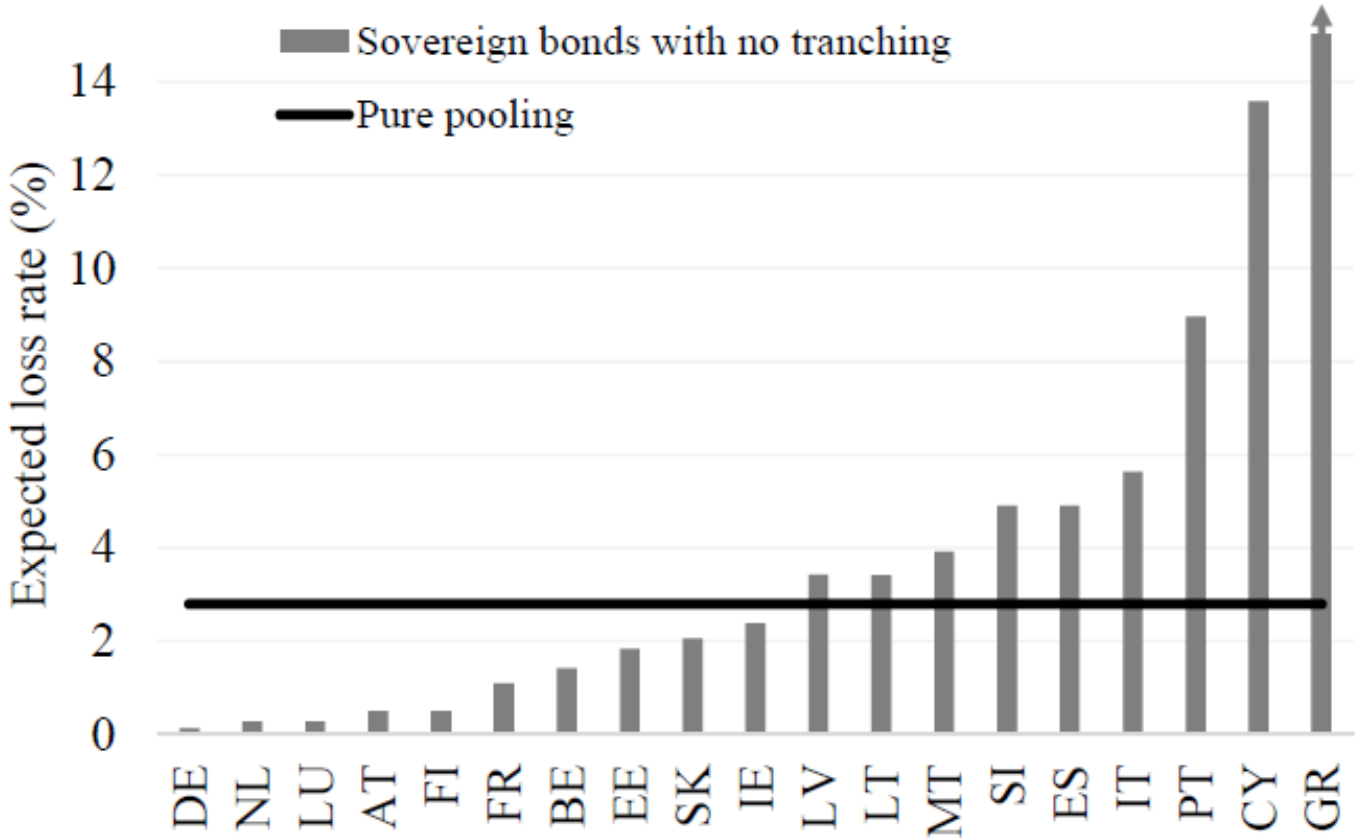
Table 1: Simulation inputs

	(1) Rating	(2) Debt/GDP	(3) Weight	(4) pd1	(5) pd2	(6) pd3	(7) lgd1
Germany	1	71	28.16	5	0.5	0	40
Netherlands	1	65	6.61	10	1	0	40
Luxembourg	1	21	0.18	10	1	0	40
Austria	1.5	86	3.21	15	2	0	45
Finland	1.5	63	2.02	15	2	0	45
France	3	96	21.25	25	3	0.05	60
Belgium	3.5	106	3.93	30	4	0.1	62.5
Estonia	4.5	10	0.03	35	5	0.1	67.5
Slovakia	5	53	0.66	35	6	0.1	70
Ireland	6.5	94	1.80	40	6	0.12	75
Latvia	7	36	0.17	50	10	0.3	75
Lithuania	7	43	0.25	50	10	0.3	75
Malta	7.5	64	0.07	55	11	0.4	78
Slovenia	9	83	0.37	60	15	0.4	80
Spain	9	99	10.77	60	15	0.4	80
Italy	9.5	133	16.52	65	18	0.5	80
Portugal	12	129	1.77	70	30	2.5	85
Cyprus	13.5	109	0.19	75	40	10	87.5
Greece	19	177	2.01	95	75	45	95
Average	4.58	91		31.30	8.07	1.12	59.47

- Adverse scenarios with higher default correlations
- Compare “status quo” with (i) “pure pooling”, (ii) country-level tranching, and (iii) ESBies (“pooling & tranching”)

5-year expected loss rates: status quo

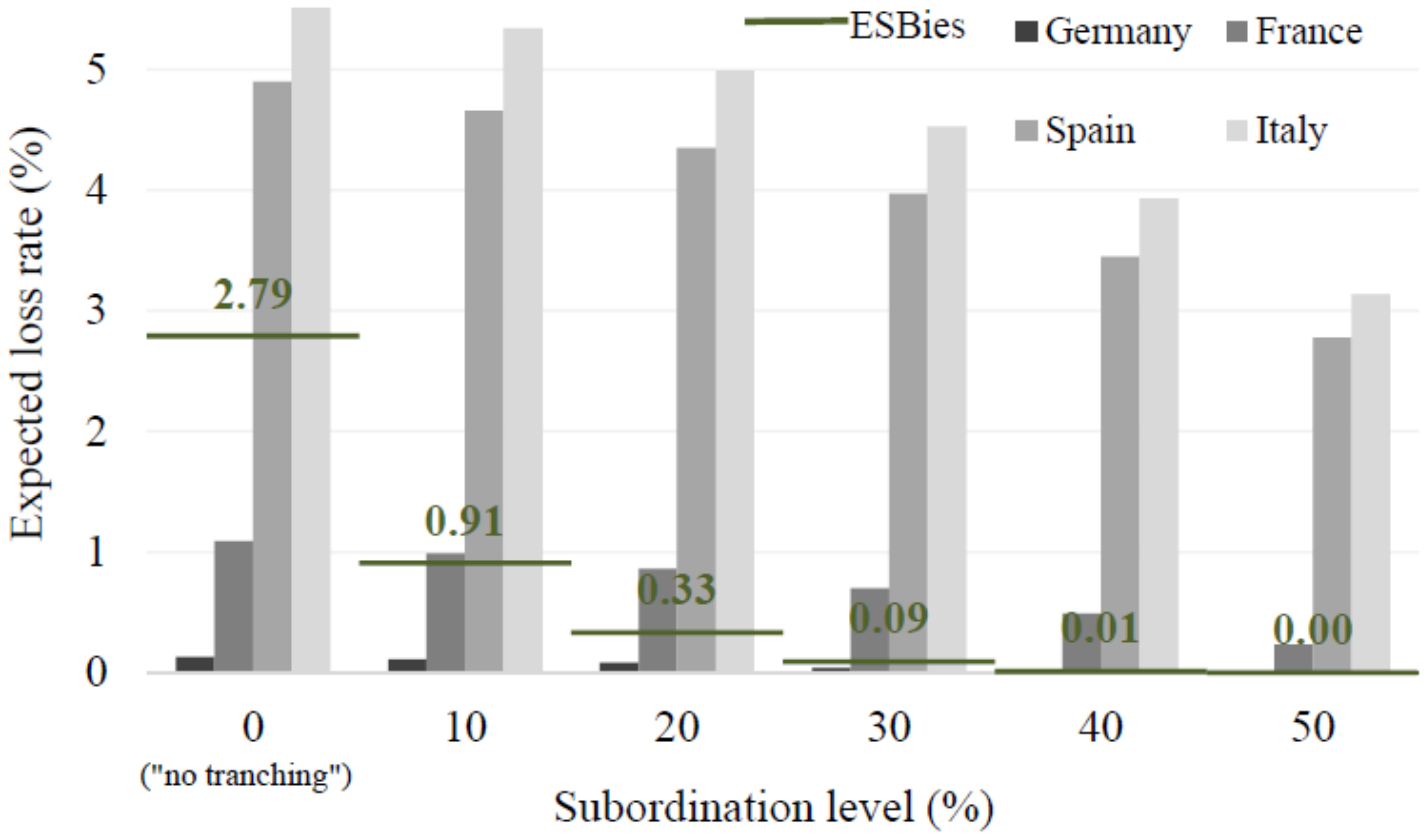
Figure 4: Untranched bonds' five-year expected loss rates



No safe assets using only diversification ("pure pooling").

5-year expected loss rates: senior tranches

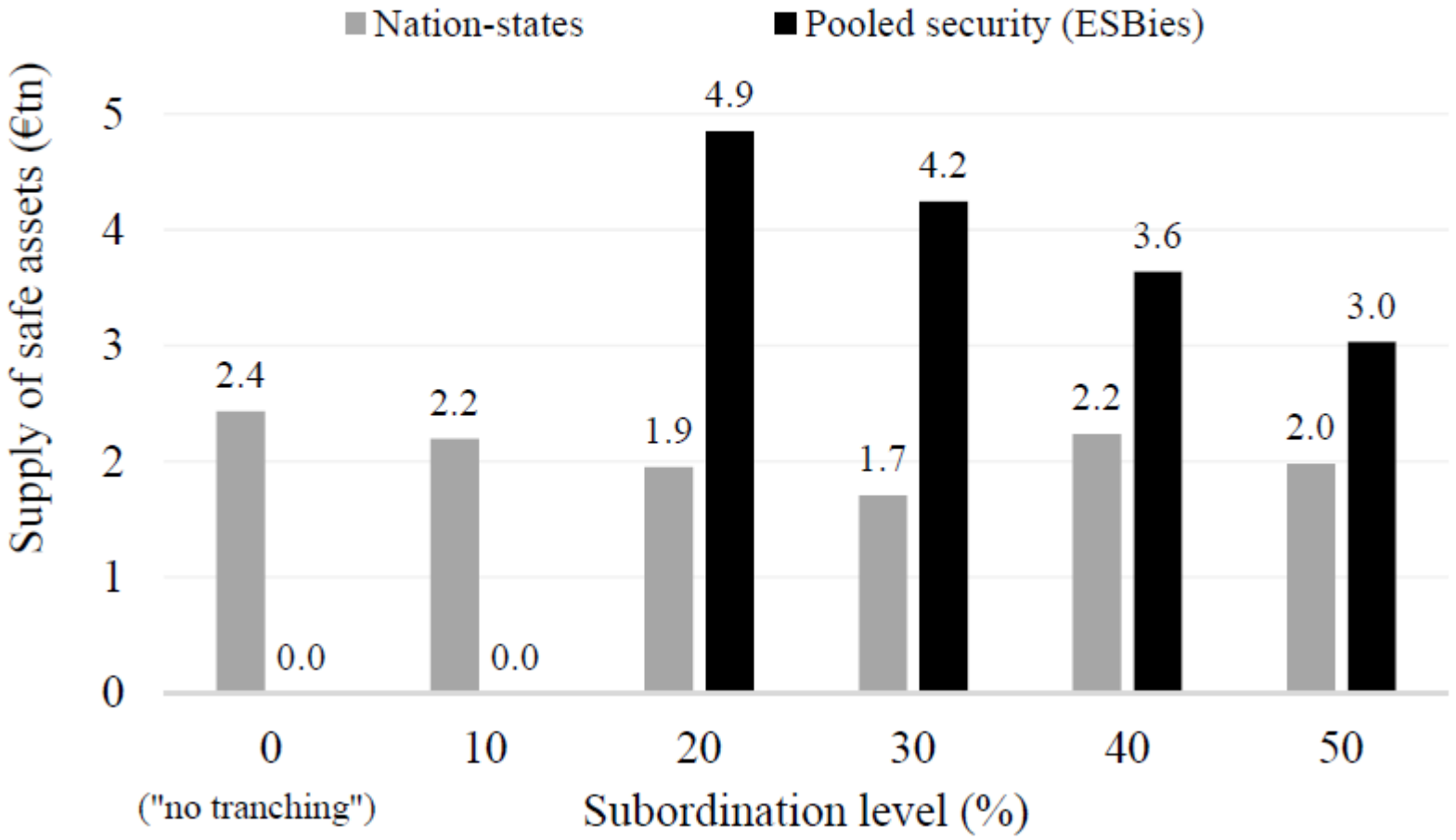
Figure 5: Senior tranches' five-year expected loss rates by subordination level



ESBies benefit from tranching more than national sovereign debt

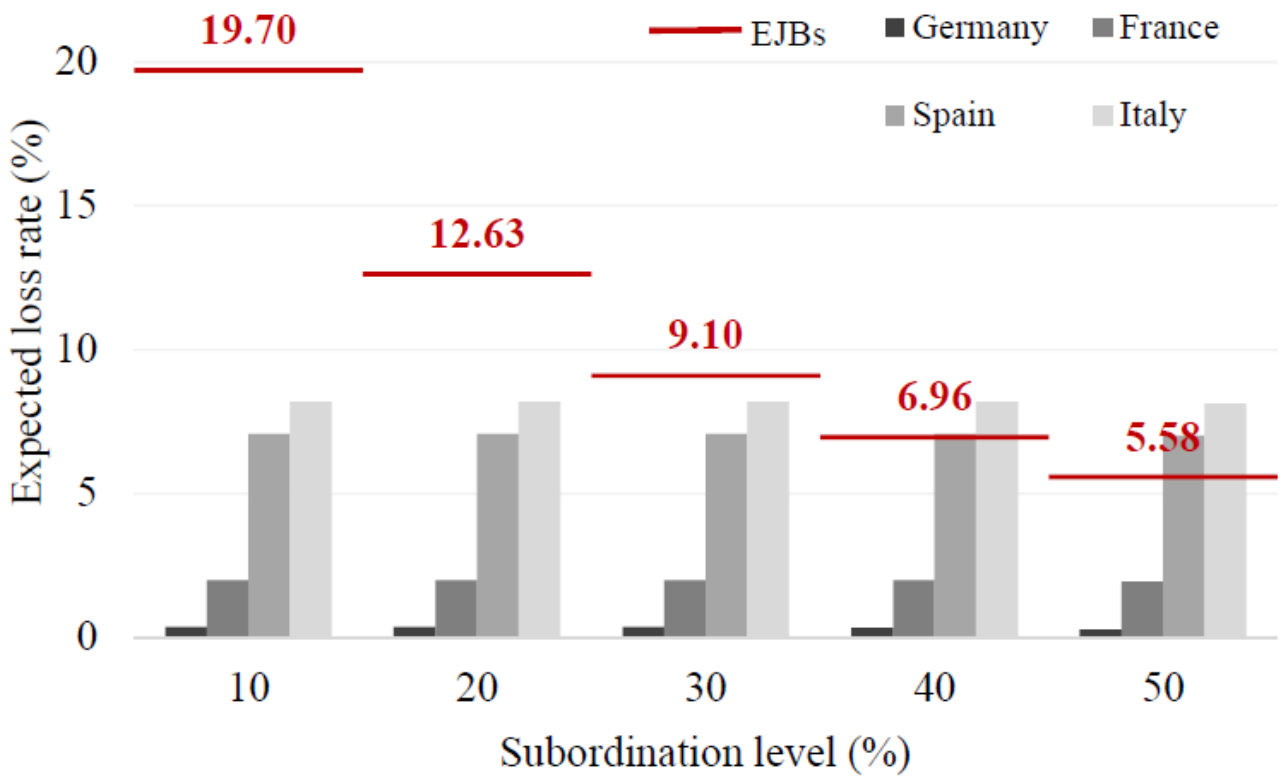
Supply of safe assets: national tranching vs. ESBies

Figure 6: Supply of safe assets



5-year expected loss rates: junior tranches

Figure 7: Junior tranches' five-year expected loss rates by subordination level



Compares with Portugal (8.97%), basket of IT, PT, CY, GR (9.32%)

3. Can ESBies weaken the diabolic loop?

- So far, MM neutrality: ESBies just reallocate risk, do not reduce it
- In the simulations all correlations were taken as given
- But if banks held (some) ESBies, they would bear less capital losses in case of domestic sovereign repricing

  $\Rightarrow$ the diabolic loop parameter region would shrink

  $\Rightarrow$ ESBies can reduce

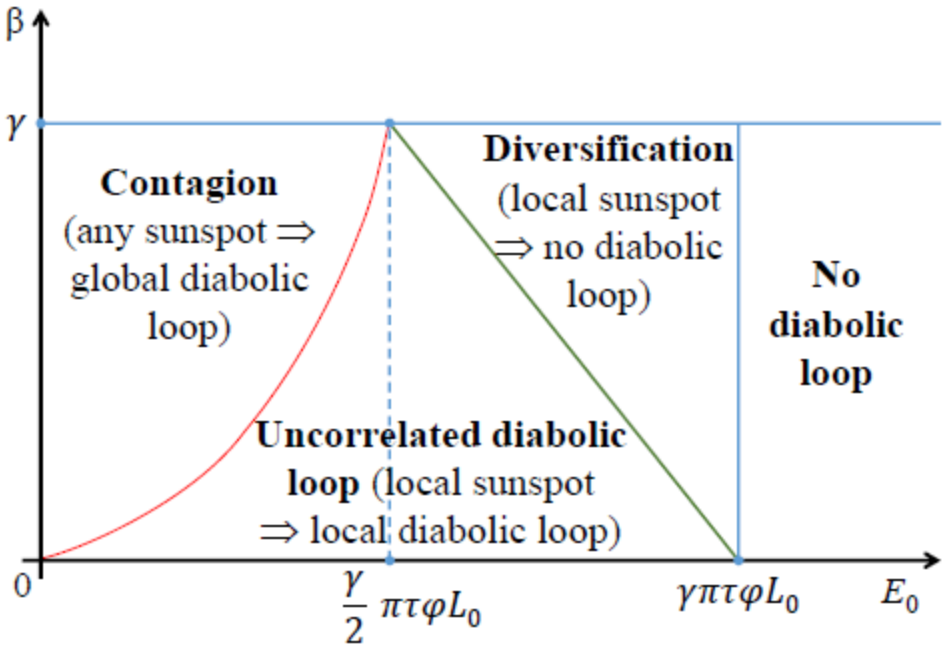
  - the probabilities of sovereign defaults
  - their correlation across sovereigns
- To see this, consider how a diabolic loop may arise in a multi-country setting

Diabolic loop with 2 countries: pooling only

- Two symmetric countries, each subject to independent sunspots with probability *p*
- In each country, banks hold $\alpha\underline{S}$ domestic sovereign debt and $\beta\underline{S}$ of a pooled security formed by a 50-50 mix of the two sovereign bonds: total sovereign portfolio $\gamma\underline{S} = (\alpha + \beta)\,\underline{S}$
- Raising β has two opposite effects:
  - *diversification* effect
  - *contagion* effect

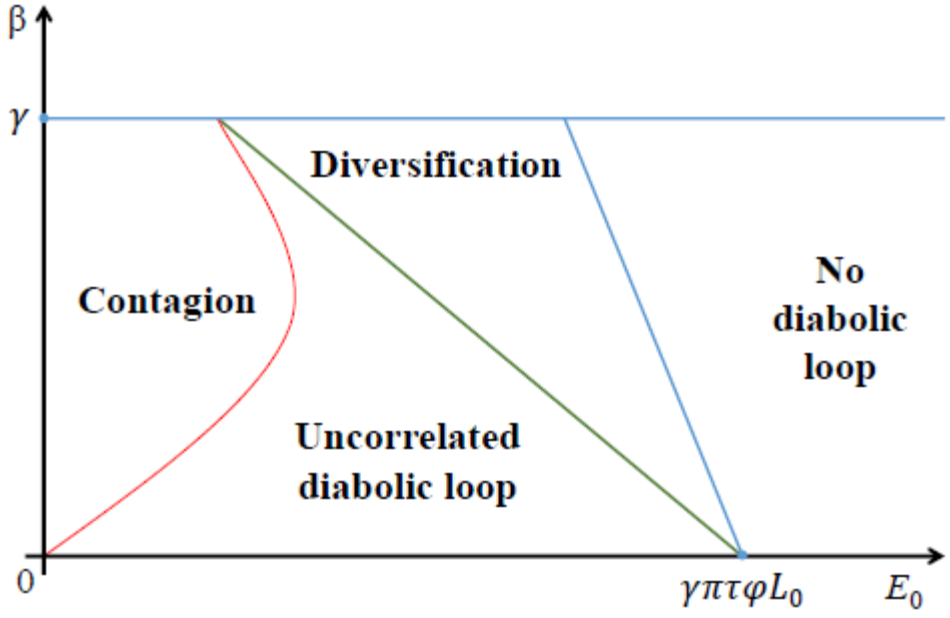
Contagion cost vs. diversification benefit

- β = degree of "international diversification" of bank sovereign portfolios
- Here tranching point = 0 (only pooling)

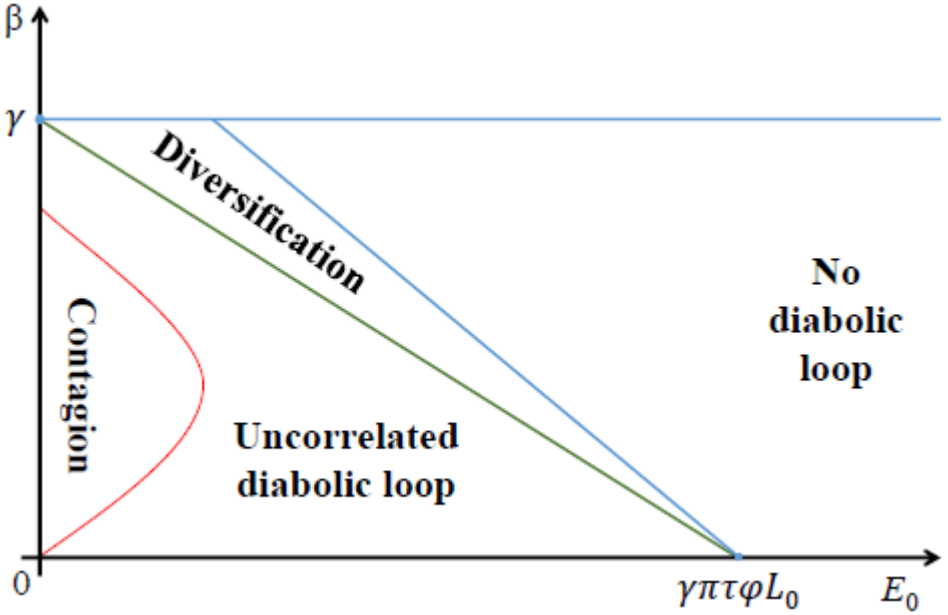


ESBies better at addressing diabolic loop

- Low tranching point:



- High tranching point:



Intuition: tranching shifts default risk to junior bond holders outside of the banking sector

Note: in region with no diabolic loop, also EJBs are safe!

Conclusions

- Key feature: exploit synergy of pooling and tranching
  - Pooling has diversification benefit but contagion cost
- For given PDs and LGDs, ESBies would
  - more than double the supply of euro safe assets
  - be at least as safe as German Bunds
- EJBies about as risky as Portuguese sovereign bonds
- If banks were encouraged to replace domestic sovereign debt holdings with ESBies, their introduction would break the bank-sovereign diabolic loop:
  - ESBies even safer
  - EJBies less risky

ESBies: Implementation

Markus Brunnermeier, Sam Langfield, Stijn van Nieuwerburgh, Marco Pagano, Ricardo Reis and Dimitri Vayanos

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Overview

- Definitions of safe assets
- Sovereign debt and banks
  - Conflicting views
- Regulation of ESBies & ESBies Handbook
- Transition phase

Definitions of Safe Asset

1. Safe = risk-free for a particular horizon
   - E.g. holders are infinitely risk averse — Caballero & Farhi
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   Holmstrom & Gordon

3. Safe = "Good friend analogy"
   - Safe for random horizon
   - Appreciates in times of crisis

   Brunnermeier & Haddad

Safe = "Safe Asset Tautology"

- Safe because perceived to be safe (multiple equilibria)
- Bubble

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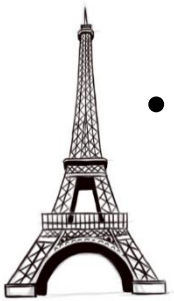
Gov. debt as safe asset vs. contingent debt

- "French view"
  - Almost never default (straitjacket commitment)
  - use banks as hostage
    If default, detrimental
    - Destroys banks and economy



"Rhine-divide"

- "German view"
  - Default in tail events
    - "Safety valve"
  - Banks as insurance providers

- ***No risk weights***
- ***Risk weights*** on risky s-debt

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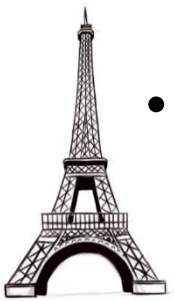

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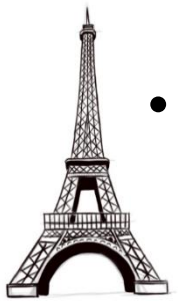

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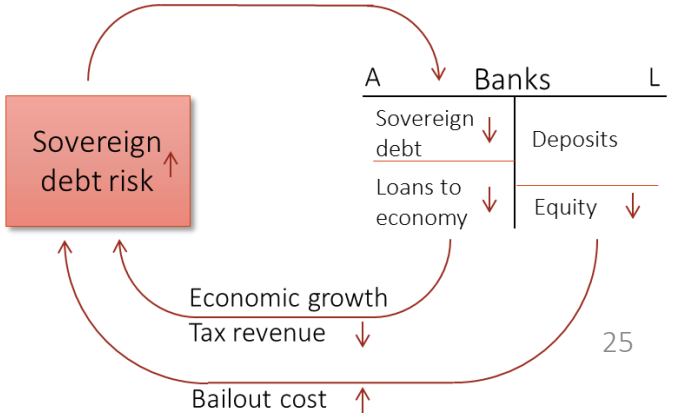
- ***Risk weights*** on risky s-debt
- Lowers interest rate ➡ chance to get out of crisis
  - Overlooks 2nd diabolic loop
    sovereign debt holdings increase
    ➡ less credit to real economy
    ➡ lower tax revenue
  - Extreme event becomes more likely
    - invalidates argument



… for more eco-philosophical differences

"French"

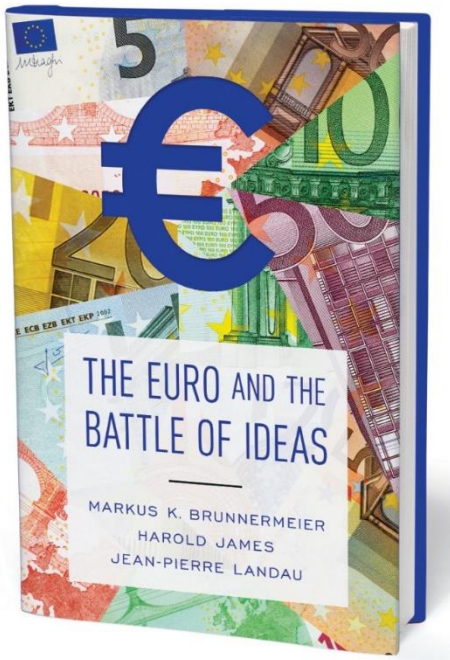
"German"

"Rhine-divide"

Book:
"The Euro and
the Battle of Ideas"

(with Harold James

Jean-Pierre Landau)



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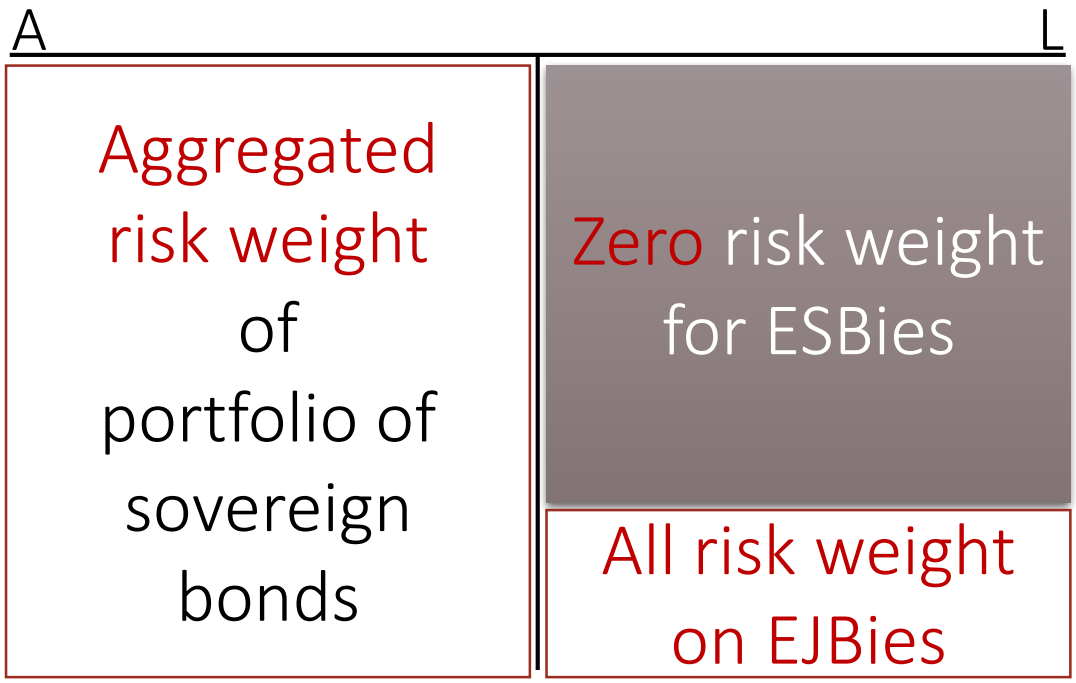
Regulation

- Risk weights for risk, but safe asset is needed
- Exposure limits disadvantage small countries
  - Diversify simply holding large countries' debt

- How to regulate ESBies? "Look through principle"



Why would anyone buy EJBies?

- Modigliani-Miller fails
  - EJBies are less risky than what simply “repacking” would imply
  - Less endogenous risk since diabolic (doom) loop is reduced

- Embedded leverage
  - Build sovereign portfolio and lever it up 70% debt, 30% equity
  - EJBies allow investor to borrow at the
    - Safe asset interest rate (of ESBies)
    - Big advantage!

ESBies' Handbook

- Allocation of "arbitrage margin"
  - Accrues in a fund that supports EJBies in case of sovereign debt restructuring

- Market liquidity
  - "low debt level problem"
    - Baltic states: Debt/GDP is far below 60% ➡ No remaining debt
  - "small country problem"
    - Belgium, ... ➡ Small float of gov. debt

ESBies' Handbook

- Standardization of ESBies
  - Same subordination/tranching point
  - Same portfolio shares
    - GDP weight moving average (to avoid procyclicaclity)
    - k% rule to keep some sovereign debt afloat
  - No maturity mismatch or "time tranching"
- Coordination of national debt issuances (DMOs)
  - Issuance of similar maturity
    - to reduce maturity mismatch
  - Time of issuance (or frequent issuance)
    - to reduce warehousing risk and enable TBA securitization
  - No countries issues bonds senior to ESBies
- ESBies issuer can always buy on secondary market
    - To avoid being squeeze

ESBies issuer: public or private (or both)

- Public issuer:
  ESM, ECB/Eurosystem, EIB, … ?
  - Danger: ensure independence of political interference
  - Legal challenge
  - Lower fee
- Private issuer:
  - Arm's length relationship
    - important in times of sovereign debt restructuring
  - Can do subtranching of EJBies
  - Issuer needs to be vetted and certified
  - Counterparty credit risk
    - bankruptcy remote
  - Counterparty legal risk
    - all ESBies are issued under the same law and same legal jurisdiction
  - Counterparty moral hazard:
    - no selection, no monitoring, but governance in case of restructuring

ESBies governance during restructuring

- ESBies issuer does not get votes (or veto power)
  - no concentration of power
  - Ensures arms length relationship

- Second "look through principle"
  - "votes" are distributed to ESBies and EJBies holders according to their share
  - Balance – conflict of interest
    - EJBies holders prefer to hold out (gamble for resurrection)
    - ESBies holders might be "pro-restructuring" – but not obvious

      - More pronounced between holders with different maturity (same as in sovereign debt)

Transition phase: Introducing ESBies

- No downside risk – revert to square one
- Stage 1: Limited experimentation
  - Asset purchase in secondary market and only later in primary market
- Stage 2: Swap – auction mechanism
  - Submit multi-dimensional demand schedules & clear markets

$$\begin{pmatrix} x^{Bund} \\ x^{OAT} \\ x^{BTP} \\ \vdots \end{pmatrix} = f \begin{pmatrix} P^{Bund} \\ P^{OAT} \\ P^{BTP} \\ \vdots \end{pmatrix}$$

  - Like "bundle auctions" for spectrum rights
- Stage 3: phase in new regulatory risk weights
  - Some front-running by market is ok
- Role of the ECB
  - Conduct MoPo (esp. OMO) with ESBies
  - Haircut-rules for ESBies

Conclusion: Details and Implementation

- What's a safe asset?
  - Good friend analogy & safe asset tautology
- Banks' sovereign risk holdings
  - Conflicting views/ideologies
  - 2nd diabolic loop

- Regulation – for ESBies "look through principle"
- EJBies' embedded leverage advantage
- ESBies Handbook
  - Standardization of ESBies (70:30, portfolio weights, …)
  - Harmonizing national debt issuance (maturity, frequent issuances, …)
- ESBies issuer: public or certified private?
- Governance structure in case of sovereign debt restructuring.
- Transition phase in 3 stages:
  1. Experimental phase
  2. Multi-dimensional Auction
  3. Grandfathering of risk weights for old holdings