EACES Doctoral Award 2022

Ph.D. thesis: Bank Performance & Stability

Natalia Kryg
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PhD Supervisor: Prof Julia Korosteleva
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Overview

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3. Contributions

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SECTION 1

1. Research objectives and scope

Chapter Two:

- Increasing focus on the effectiveness of 'development aid' across MDB community
- Project selection vs. allocation of scare financial resources
- Project success vs. project performance factors
- EBRD's mandate – non-financial success

Chapter Three:

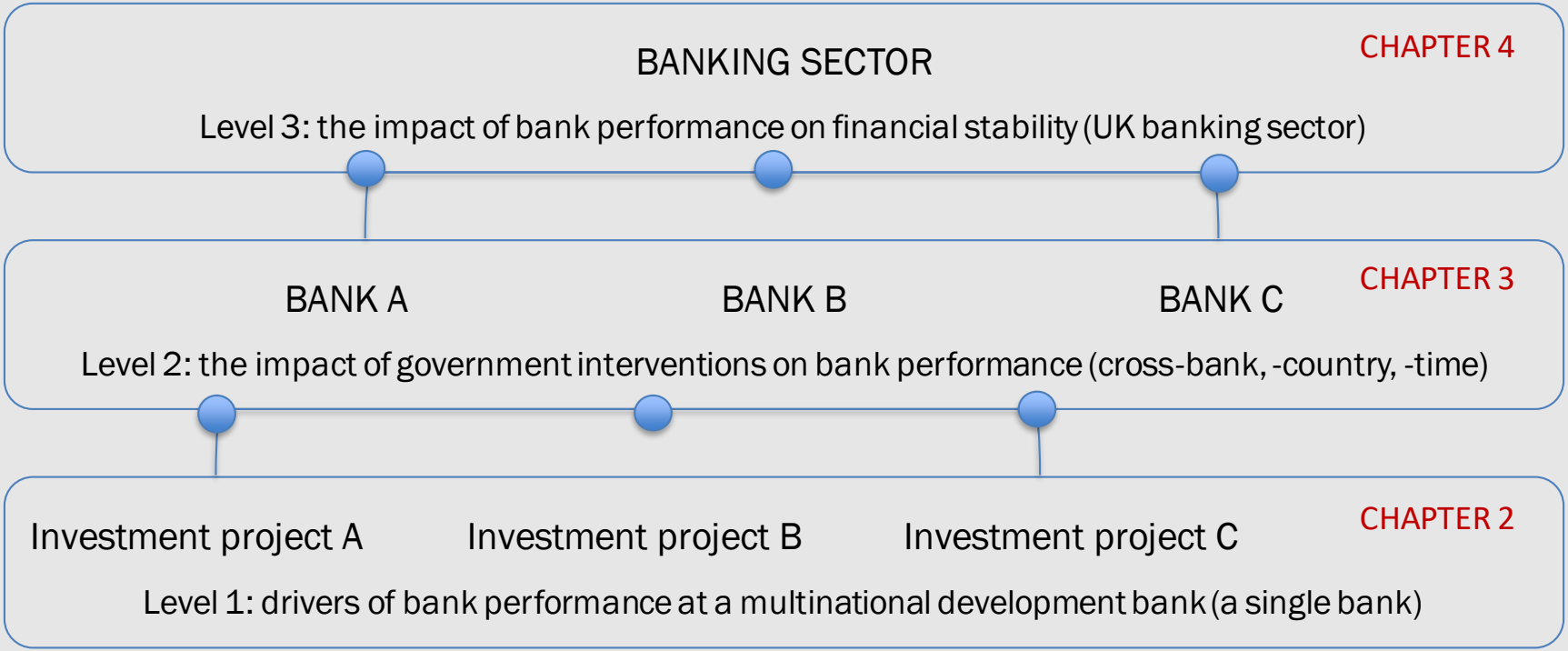
- Troubled banks in the context of a systemic banking crisis
- Government interventions into banks; the risk of moral hazard vs. contagious effects between banks; new bank resolution frameworks
- The effectiveness of government interventions in improving the performance of the troubled banks

Chapter Four:

- Systemic risk to the financial stability caused by the troubled banks
- The role of NPLs
- Government interventions and their wider impact in the banking sector
- Calibration exercise based a computable general equilibrium model

2. Structure of my thesis

Figure 1: Bank performance and stability – a joined conceptual framework (p. 14).



Source: Author (2020).

3. Contributions

Chapter Two:

- A novel database that delivered unique findings to the field of literature that is heavily focused on World Bank's studies - cross-institutional validity, project selection bias, client-related factors, policy implications
- Contribution to the field of literature on the social impact objectives alongside traditional goals of profit maximization
- Operational lessons learnt for EBRD and other MDBs – project selection and design, country strategy design

Chapters Three:

- A novel bank-level database on bank interventions bringing empirical contribution into the unsettled field of literature on the effectiveness of bank interventions
- Comparative nature of the analysis across different types of interventions in a cross-country context and over long time period – useful findings to the policy makers

Chapter Four:

- First ever application of a well-known model of financial stability in the context of government interventions into troubled banks – policy implications through certain trade-offs
- The use of bank NPLs as the trigger behind government interventions

SECTION 2

Chapter Two

Drivers of a bank's investment performance at a multinational development bank

1. Theoretical framework (1/2)

- Three related fields of literature:
  1. development aid effectiveness based on the project performance of MDBs (solo or comparative perspective)
  2. general project management literature
  3. applied econometrics: selection bias controls and moderated mediation

- Few 'facts':
  - The earliest research dates back to 1960s – 'golden tri-angle' of time, budget, project quality
  - Impossibility of creating a universal checklist for project success (Westerveld, 2003)
  - 'project success criteria' vs. 'project success factors' (Cooke-Davies, 2002)
  - The approach of grouping factors and investigating their interactions (Belassi and Tukel, 2006)

1. Theoretical framework (2/2)

Project-related factors

- Project size (project complexity)
- Financing instrument (debt /equity)
- Repeat project (framework; novelty)
- Associated technical co-operation (TC)
- Co-financing with other MDBs
- Project timeline-related factors
- Disbursement (ratio and no.)
- Number of transition objectives
- Country and region
- Sector

Client-related factors

- Client risk rating (at entry, at completion, change)
- Type of client (state or private)
- Client's financials at signing, and completion) (for sub-sample only)

Country-related controls

- Macroeconomic and reform/political environment :
  - GDP per capita (growth)
  - Inflation
  - FDI inflows/Outflows
  - Domestic private credit/GDP
  - CPIA transparency index
  - ICRG Government stability, Corruption, Bureaucratic indices
- No. of EBRD projects per sector/country (EBRD presence in the country/sector)

Indirect effects

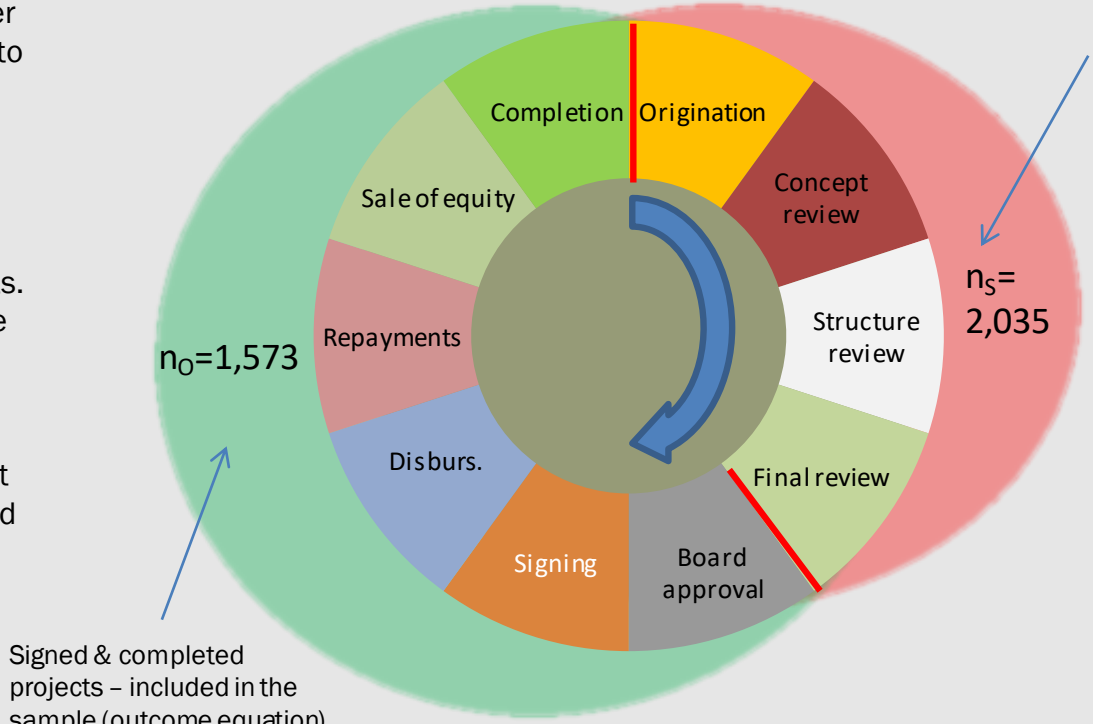
2. Methodology (1/3)

- Sample:
  - approx. **1,600 EBRD investment projects**; 2003 – 2016; all countries (n=35); all sectors
- Regression methods:
  - **binary probit models** with(out) interaction terms; vce robust with clusters on country and year of exit
- Selection bias controls:
  - currently no universal tool providing solution to the project selection bias (Stolzenberg and Relles, 2011) (see slide 12)
  - a pull of over **2,000 cancelled, rejected or suspended** investment projects
  - **Heckman two-stage model:** binary DV, inverse Mills ratio, selection bias due to unobservables, exclusion restriction variable
- Rodman (2009) conditional mixed process (CMP) module to estimate the selection model with a wider range of country control variables in both equations
- **Indirect effects:**
  - interaction terms and moderated mediation modelling (see slide 13)
- Treatment of **endogenous regressors** without good instruments ('project size'):
  - Lewbel's instrumental variable estimation using heteroscedasticity-based instruments (Lewbel, 2012)

2. Methodology (2/3)

- Controls for selection bias in order to produce robust results – risky to only look at the projects signed and approved by the Board and not controlling for the rejected projects – **upward bias**
- Analysed over 2,000 rejected, cancelled and suspended projects. Econometrically controlled for the selection bias using **Heckman method**
- **Exclusion restriction** variables (project expired date, the time b/t expire and concept review, expired project dummy)

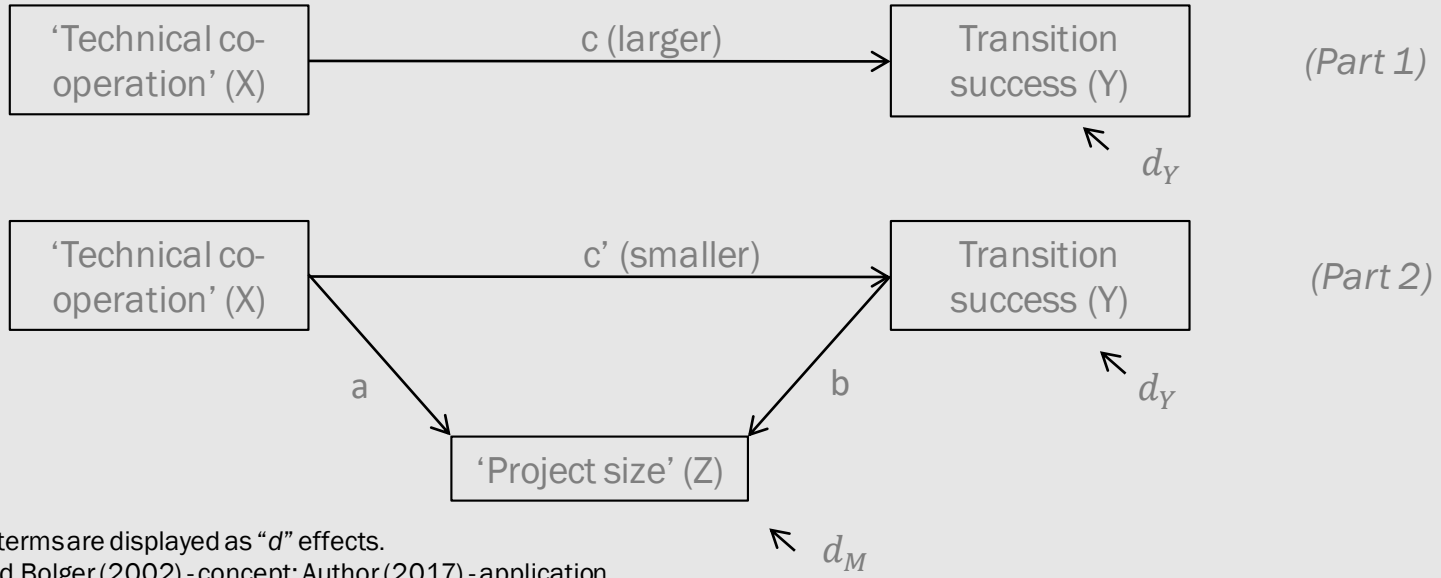
Figure 6: Potential sources of selection bias in EBRD project lifecycle (pg. 59).



2. Methodology (3/3)

- Mediation analysis helping to identify **intermediate variables** ('a moderator variable') that lie in the casual pathway between the treatment and the outcome
- **Conditional indirect effect** (Judd and Kenny, 1981)

Figure 7: Applied path models showing total effect (Part 1) and mediated effect (Part 2) of X ('technical co-operation') on Y ('probability of full transition success') (pg. 74).

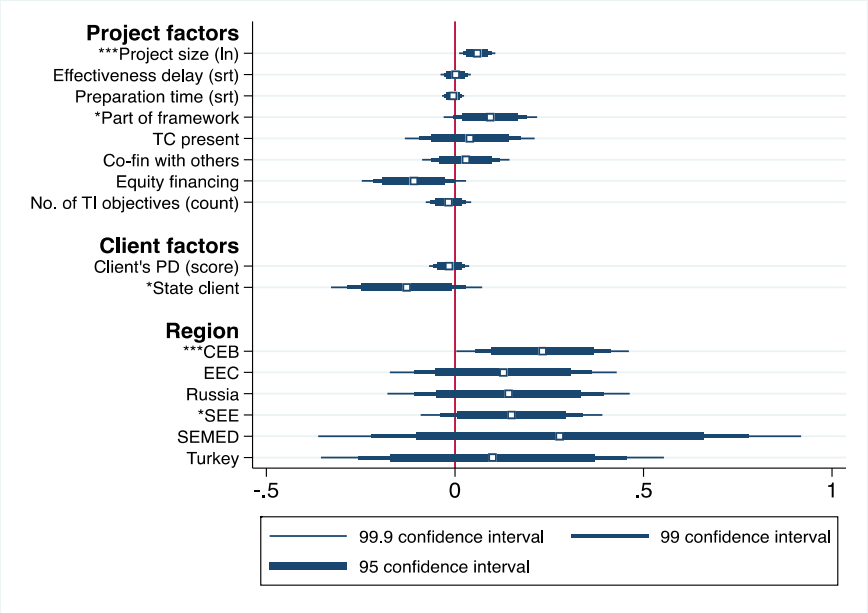


Notes: Residuals terms are displayed as "*d*" effects.
Source: Shrout and Bolger (2002) - concept; Author (2017) - application.

3. Results (1/2)

- No evidence of selection bias
- Two sets of main results – Fig. 8 & 9

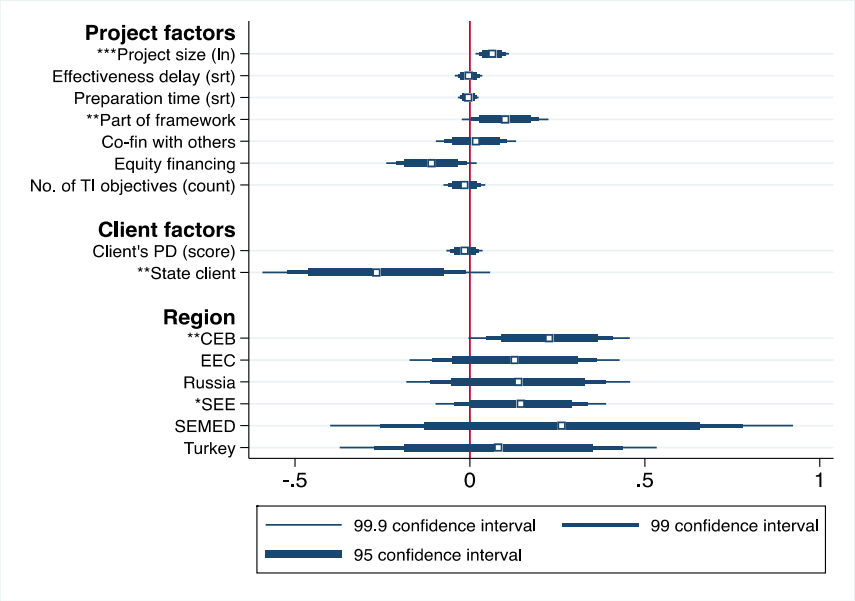
Figure 8: Average marginal effects based on Model 1 (pg. 82)



Source: Author's calculations (2018).

Notes: This chart plots the coefficients from Model 1. The dependent variable is the probability of project success which is plotted on the x-axis. The following coefficients are omitted from graphical display: sectors, country-level controls, constant, signing years dummies. Confidence intervals are plotted as per legend description. Statistical significance is indicated at the beginning of the variable name as follows: *p<0.05, **p<0.01, ***p<0.001.

Figure 9: Average marginal effects based on Model 2 (with interaction terms) (pg.84)



Source: Author's calculations (2018).

Notes: This chart plots the coefficients from Model 2. The dependent variable is the probability of project success which is plotted on the x-axis. The following coefficients are omitted from graphical display: sectors, country-level controls, constant, signing years dummies, TC dummy (due to large standard errors), interaction terms. Confidence intervals are plotted as per legend description. Statistical significance is indicated at the beginning of the variable name as follows: *p<0.05, **p<0.01, ***p<0.001. .

3. Results (2/2)

- In-depth assessment of all of the potential indirect effects through moderated mediation modelling showed that:
  - 22% of technical co-operation mediated through project size
  - 19% of 'effectiveness delay' (i.e. time between project signing and first disbursement) mediated through client's ownership (state)
  - 17% of framework impact ('repeat' project) mediated through project size

- Additional model ran via the Lewbel's (2012) method to address endogenous bias issue:
  - **No change** in the majority of the coefficients as reported earlier, but …
  - **Some signs of endogeneity** displayed by 'project size' – current results go against theoretical hypothesis (i.e. larger project size -> lower success due to higher degree of risk)

4. Future research

- Financial project success and trade-offs/complementarities between financial and non-financial success
- A wider range of country level variables with greater year-on-year variation
- Endogenous nature of 'project size' - alternative solution or a good instrument - 'planned project size' – already collected and tested
- Expanded and updated database – up to YE 2019; 2,200 investments, new variables, new methods
- Still no data on HR – the role of project leader/banker – data issues within EBRD
- Alternative exclusion restriction variables for selection bias equation; IV method
- Project financials – BvD – tried and failed – limited coverage
- More detailed, country-level assessments of the success factors
- Ongoing co-operation with other MDBs on joined research – colleagues from World Bank and IFC

Chapters Three & Four

The impact of government interventions on bank performance

1. Update

- The content of the chapters 3-4 published as UCL Centre for Comparative Studies of Emerging Economies Working Paper & EBRD Working Paper. Currently under journal submission.
- Ongoing work on two follow-up papers: (i) extension of the empirical dataset; (ii) application of the financial fragility model in the context of Colombian banking sector

For more details :

1. Working paper versions:

https://www.ebrd.com/publications/working-papers/new-bank-resolution-mechanisms

https://discovery.ucl.ac.uk/id/eprint/10124480/

2. LSE Business Review article: "Bank resolution mechanisms: how to prepare for a birthday with an imperfect plan", November 2020:

https://blogs.lse.ac.uk/businessreview/2020/11/05/bank-resolution-mechanisms-how-to-prepare-for-a-birthday-with-an-imperfect-plan/

3. Policy implication podcast @ Kozminski University, November 2020:

https://www.kozminski.edu.pl/en/review/it-end-bailout-era-policy-implications-podcast-1

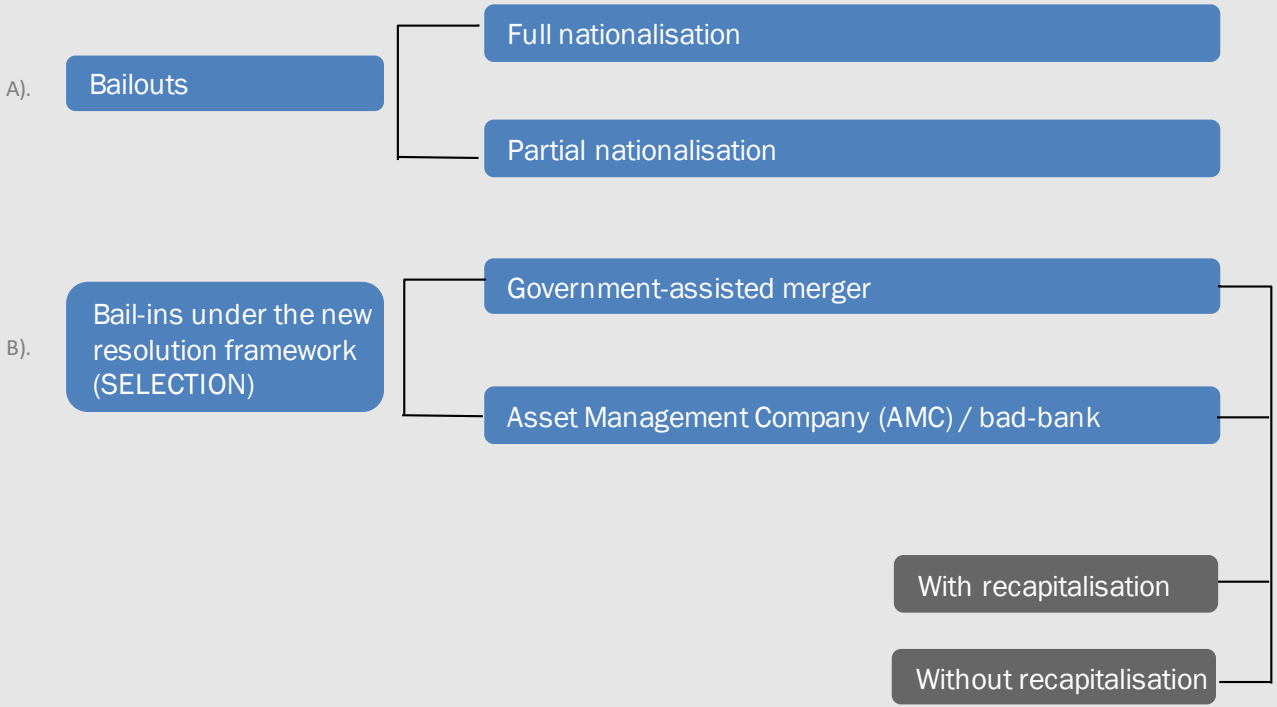
2. Research motivation

- **Regulatory changes** introduced after the 2007-08 global financial crisis – FSB (2011), BRRD (2014), 'Living Wills' by SIFIs (G20); specific requests for bank contingency plans in case of distress
- **Impact of C-19** health crisis and the policy response that followed -> army of zombie companies, NPLs accumulation
- The effectiveness of government interventions in improving bank performance – still <u>not clear</u> how they would work and when:
  - **Bailouts seen as 'dead tools'** due to moral hazard incentives and high budgetary costs vs. importance of early and timely intervention in limiting the contiguous effects of the crisis (e.g., Berger et al., 2020)
  - Important **role of governments in stimulating bank lending and NPLs restructuring** (e.g., Berger and Roman, 2015; Homar, 2016)
  - **Systemic risk** to the financial stability caused by the troubled banks and the ways to tackle it
  - <u>Mixed evidence</u> on the effectiveness of new resolution mechanisms

3. Key research questions

- How **successful** the new resolution mechanism can be in restoring banks from distress?
- Under **what circumstances** various resolution mechanisms can deliver the best results?
- Can they **tackle both idiosyncratic** as well as **systemic risk** in the banking sector?
- Are **bailouts** really that bad and can we **survive without them**?

4. Typology of bank resolution mechanisms



5. Related literature

- Systemic banking crisis with the **risk of contagion** between banks (Acharya, 2009); rapid rise in NPLs in the banking sector (e.g., Claessens et al., 2005)
- **Bailouts** being **unpopular** with general public due to the high **fiscal burden** and risk of **moral hazard** (e.g. Gropp et al., 2014, Dam and Koetter, 2012)
  - Effectiveness of bailouts: positive impact on bank performance (Hakenes and Schanbel, 2010), capital position (Berger and Bouwman, 2010; Duchin and Sosyura, 2011; Mehran and Thakor, 2011; Rose and Wieladek, 2012, Ding et al., 2012), lending (Puddu and Walchli, 2013; Giannetti and Simonov, 2013; Homar, 2016; Brei and Schclarek, 2013 or Davydov, 2018).
- **Empirical studies** on the effectiveness of new resolution mechanisms– mixed results. For example:
  - ⇩ Decline in bank liquidity (Berger et al., 2010); higher risk (Duchin and Sosyura, 2014)
  - ⇧ Higher lending (Li, 2013; Giannetti and Simonov, 2013); higher capital (Berger et al., 2010); lower risk (Hackenes and Schnabel, 2010)
- The **role of balance sheet restructuring** through recapitalisation of the failed bank.
  - Effective recapitalisation can limit the risk of moral hazard (e.g. Philippon and Shnabl, 2013)
  - The importance of institutional quality (functioning legal and bankruptcy system) required for effective recapitalisation process (Claessens et al., 2005)
- Beck et al. (2020) analyses the effect of higher **power of resolution authorities** on banks' resolutions and systemic risk. The resolutions are, however, **defined per country and bank-level**.

6. Research approach

PART 1 **Application of a financial fragility model** by Goodhart et al. (2005, 2006a)

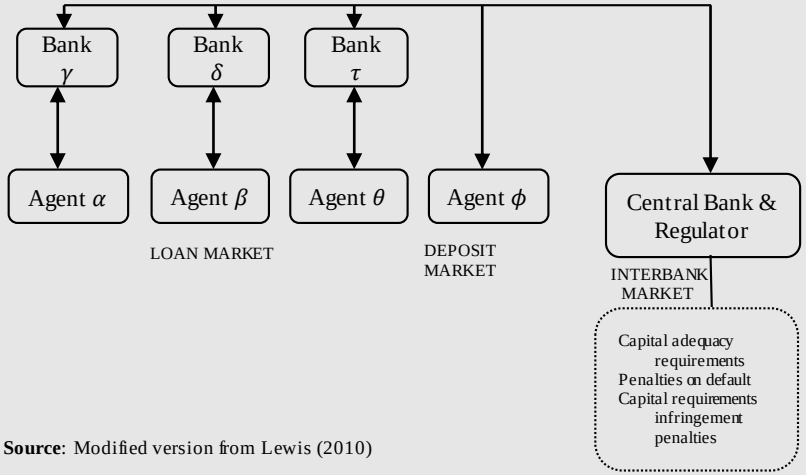
- Calibration exercise set up in order to analyse the impact of three resolution approaches on banks behaviour in the systemic context

PART 2 Follow-up **empirical assessment** that uses a novel bank-level database

- distressed banks from 39 countries during 39 different systemic banking crisis episodes between 1992 and 2017
- 255 intervened banks (89 nationalised, 69 sold-off, 97 “bad-banks” cases) compared with 708 non-intervened banks

7. Financial fragility model (Goodhart et al., '05,'06)

MODEL OVERVIEW

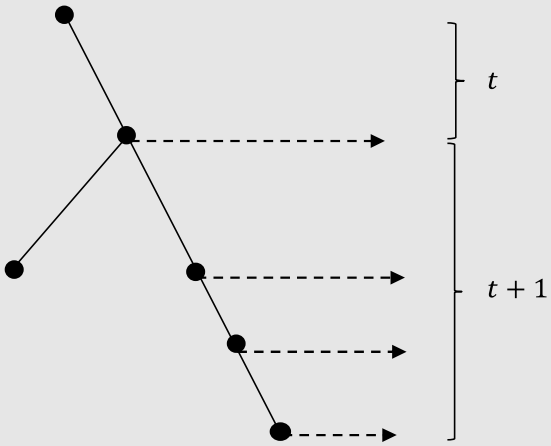


Source: Modified version from Lewis (2010)

- An application of a well-known **computable general equilibrium model**
  - Partially micro-founded GE model
  - 3 heterogenous banks, four private sector agents, Central bank, regulator
  - Incomplete market with money and endogenous default

8. Structure of the financial fragility model

MODEL TIME DIMENSIONS



1. Borrow and deposit in the interbank market (B)
2. OMOs (CB)
3. Borrow and deposit in the commercial bank loan and deposit market (B and H)

Nature decides which of the state $s \in S$ occurs

1. Settlement of loans and deposits (H and B)
2. Settlement of interbank loans and deposits (CB and B)
3. Default and capital requirements' violation settlement

All banks are wound-up

Source: Goodhart et al. (2005)

9. Model application

- **NPLs** as the driving factors behind the government intervention into failing banks
- Set up of the **calibration exercise** based on the UK data:

Resolution scenario	Banks set-up
1. No intervention (baseline scenario)	Bank γ: high NPLs; Bank δ: moderate NPLs; Bank τ: no NPLs
2. Bailout (nationalisation of Bank γ)	Bank γ: high NPLs – intervened; Bank δ: moderate NPLs; Bank τ: no NPLs
3. Bank sale (merger between Bank γ and Bank τ): Merger 1 (no capital injection); Merger 2 (instant capital injection)	Bank γ: high NPLs – intervened; Bank δ: moderate NPLs; Bank τ: no NPLs - intervened
4. 'Bad-bank' (Bank γ): Bad Bank 1 (gradual capital injection); Bad Bank 2 (instant capital injection)	Bank γ: high NPLs – intervened; Bank δ: moderate NPLs; Bank τ: no NPLs - intervened

10. Simulation results

- **No clear winner** among studied bank resolution mechanisms
- **Nationalisation** is the **least favourable** option while **merger and 'bad-bank'** mechanisms seem to deliver the **most positive results** for all banks in the economy, although **with few trade offs.**
- **Merger** as an **effective** tool **at the beginning of the crisis**, or in banks not severely impacted by the crisis. High importance of a **direct restructuring of a bank's balance sheet with rapid recapitalisation.**
- **Prolonging weak financial position of banks under Bad-Bank 1** scenario could provide them with the **incentive to engage in "zombie lending".** This is in line with empirical studies in this field (see e.g., Peek and Rosengren, 2000).
- Importance of **timely use of capital injection** in the right context – contiguous effects between banks; negative impact on lending rates if applied too late or when not needed.

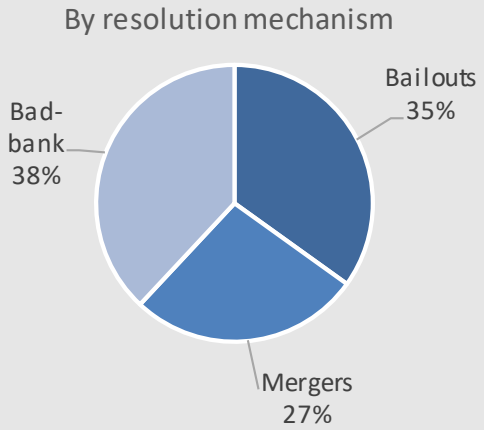
11. Empirical methodology

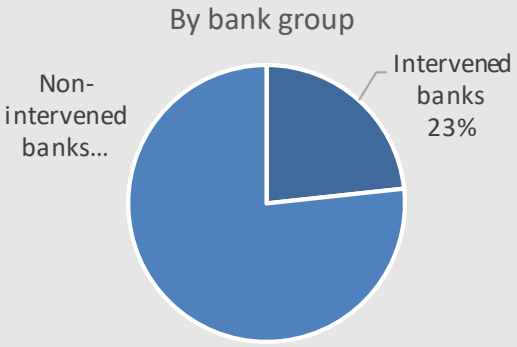
- Bank-level data from 39 countries, 215 intervened banks, 1992-2017
- Mapping of the systemic banking crisis episodes follows Laeven and Valencia (2013, 2018)
- **Peer selection** for the 215 intervened banks based on the pull of 5,064 non-intervened banks:
  - Hryckiewicz (2014) selection approach with country weights
  - Similar approach to propensity score matching
- 6 year before/after the intervention (robustness checks: 2 and 4 years)
- **4 dependent variables** to test the impact of government interventions on bank performance: asset quality (reserves-to-NPLs ratio), lending proxy 1 (loan growth), lending proxy 2 (loan ratio), bank capital (total capital ratio). *Also, bank credit default swaps (CDSs) under the latest extension of the analysis.
- **Difference-in-difference analysis based on a panel data:**
  - The semi-parametric DID estimator (Abadie, 2005) originated from Heckman et al. (1997):

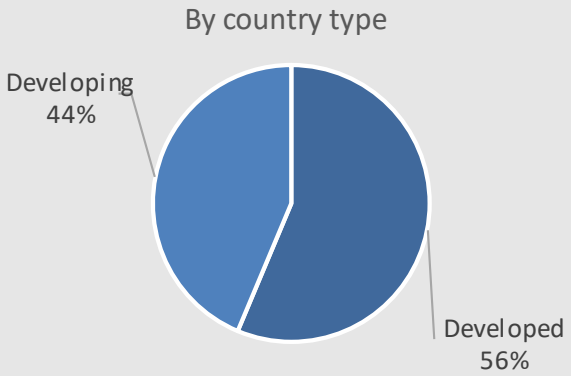
    $$ATET \equiv \mathbb{E}\,(y\_1t - y\_0t \mid d\_t = 1)$$

  - The estimator is a weighted average of the difference in the trend, Δy_t, across treatment groups. It reweights the trend for untreated participants based on the propensity score $\pi[\![(x]\!]\_b)$.
- The issue with the **dominance of US banks** in the sample (29%) – use of sampling weights vs. sub-sample splits
- Range of robustness checks

12. Sample distribution





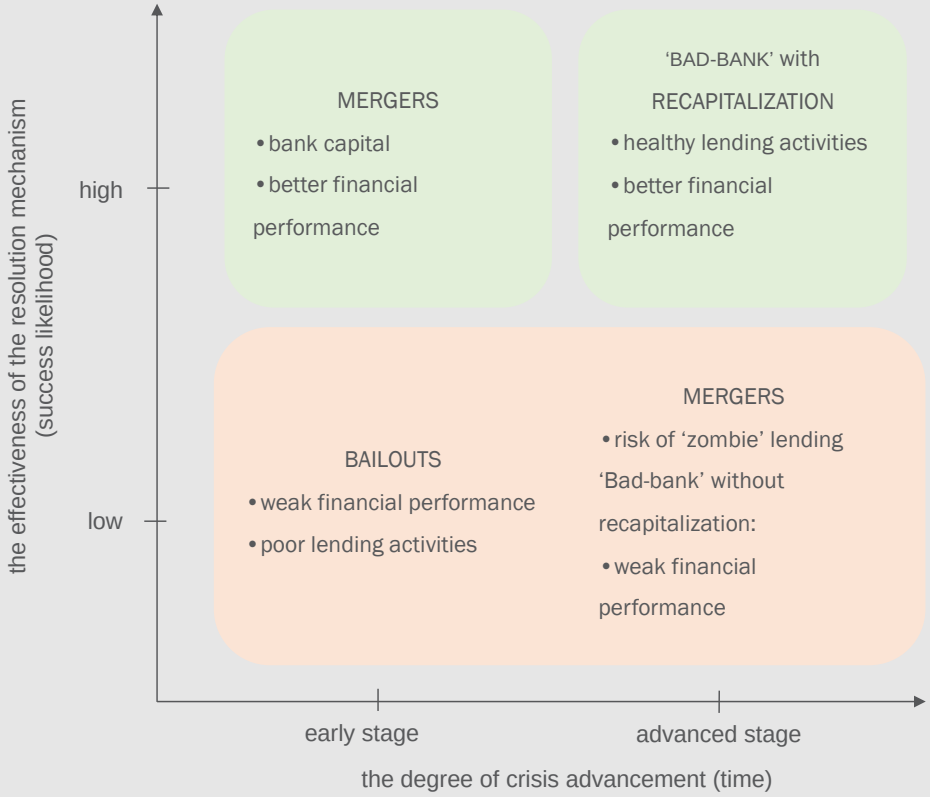


- Developed countries: Austria; Belgium; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France; Germany; Greece; Iceland; Ireland; Japan; Lithuania; Netherlands; Norway; Slovenia; Spain; Sweden; Switzerland; UK; USA
- Developing countries: Argentina; Colombia; Ecuador; Indonesia; Jamaica; Malaysia; Mexico; Nicaragua; Russia; South Korea; Thailand; Turkey; Ukraine; Uruguay; Venezuela

13. Results

- Reconfirmed that '**one-size-fits-all**' intervention approach is **suboptimal**
- **Bailout** is the **least favourable** option and not effective in fully restoring bank financial strength and, consequently, bank credit activity.
- **Pure capital injection not effective** in helping banks in distress **if not** accompanied by relevant **restructuring**, this is in line with literature (e.g., Brei at al., 2020).
- '**Bad-bank**' mechanisms seem to deliver the **most positive results** (e.g. the best results in capital and reserves-to-NPL ratios) particularly in the event of a severe crisis.
- **No consistent evidence** in support of a **merger**. Most effective at the beginning of a crisis (as documented by other scholars (e.g., Sheng, 1996) as well as our calibration exercise results).
- **Additional results based on the new set of regressions with bank CDS as a measure of systemic risk: 'bad-bank' mechanisms can help with tackling both bank's financial recovery and mitigation of a systemic risk. No stable evidence in favour of bailouts.*
- Results under robustness checks broadly in line with the main findings

13. Results


the effectiveness of the resolution mechanism
(success likelihood)
high
low
MERGERS
• bank capital
• better financial performance
'BAD-BANK' with
RECAPITALIZATION
• healthy lending activities
• better financial performance
BAILOUTS
• weak financial performance
• poor lending activities
MERGERS
• risk of 'zombie' lending
'Bad-bank' without recapitalization:
• weak financial performance
early stage
advanced stage
the degree of crisis advancement (time)

14. Concluding remarks

- We find that our results provide support for some of the new resolution measures assuming they are implemented in a timely manner.
- We argue that **"one-type fits all" does not hold**.
- We notice that in the **early stages of the crisis, mergers are effective** in resolving distressed banks without any additional financial support.
- However, **in the event of a severe financial crisis**, bank recapitalisation needs to be **accompanied with a deep asset restructuring.**
- Lack of appropriate restructuring of banks' high NPLs likely to "bite" bank capital. Uncertainty with asset quality encourages 'zombie lending'.
- **'Bad-bank'** mechanisms can **be effective in mitigating both the idiosyncratic** as well as **systemic risk.**
- **Policy implications:**
  - Contribution to the discussions on weak performance of European banks after 2008-10 financial crisis
  - Support towards new resolution mechanisms that have not yet been tested more widely
  - Call for more work on carefully tunning resolution mechanisms towards mitigating systemic risk