Government Subsidies, Credit Allocation and the Investment Cycle

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Outline

- Motivation for government participation in the financial sector

- Incentives for risk management—underwriting and pricing of credit in public and private banks

- Incentives for risk management—bad loan management

- Implications for credit allocation and the investment cycle

- What can and should policy do?

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Reasons for direct government participation

- To support competitive pricing and supply of credit

- Ensuring liquidity, payments and credit services in remote and unbanked areas

- Inculcating financially prudent behavior in broader segment of the population, increasing pool of savings that are available for investment in local economies and can support entrepreneurship and productivity growth

- Allocating savings to identified priority sectors and projects

- Grow domestic banks' share in intermediation of savings

Is direct government participation necessary to support these goals?

Doesn't appear to be so in theory, but often is the case in practice as indirect interventions targeting the same goals have had limited success at best. For example:

- Controlling the price and (aggregate) supply of credit

- Directing banks to open branches in remote areas to serve unbanked populations

- Directing credit supply to identified priority sectors and projects via regulation

- Making entry of foreign lenders conditional on divesting minimum stake in domestic branch or subsidiary to local partner bank

Is direct government participation necessary to support these goals?

Besides limited success, indirect measures have had to confront unintended consequences and costs

- Interest rate controls and directed credit allocation have tended to result in large welfare losses due to allocative distortions and increased bank vulnerability due to associated constraints on credit risk management

- Applied to industry and households, such interventions have fed leverage and debt overhang due to oversupply of credit on easy terms

- Over-riding prudent risk management to support broader social goals increases likelihood of banking sector distress → may require tax payer funded bail-out, especially if accompanied by debt overhang → very costly in terms of growth

- Foreign-owned banks may choose to remain outside domestic economy providing limited services (remittances, multi-national corporations from their home country) if they feel overly constrained by domestic partnerships and other government policies

So, in practice, governments often do both

- They own banks and participate directly in the financial sector
  - ➢ Deposit funded credit intermediation
  - ➢ Payments services
  - ➢ Investment banking and market making

- Constrain operations of privately owned financial institutions via statute and regulation
  - ➢ Requiring banks to maintain a minimum share of non-own funds in cash and government securities
  - ➢ Binding insurance companies to minimum government bond holding requirements
  - ➢ Imposing minimum credit rating requirements on pension funds' asset allocation which—especially in EMDCs—de facto translates into minimum government bond holding requirement

How can government ownership distort bankers' incentives and bank management?

By changing bankers' pecuniary incentives

- Performance assessment of public sector bankers can diverge significantly from one based on bank's financial performance

- Likely to distort credit risk management: (1) credit allocation; (2) credit pricing; (3) credit supply; and (4) collateral policy

- Can cause material deviations from treasury management if policy favoring credit expansion results in high leverage that is funded on short-term maturities from wholesale markets or in foreign currency

Important to bear in mind the mode through which government provides these incentives to public sector banks

- From a public sector bank's perspective, it is financially equivalent if ex-post government support, covering NPA related loss comes in the form of an *ex-ante* subsidy or an *ex-post* recapitalization

- But, governments can be expected to have a clear preference for giving *silent* subsidies covering public sector banks' losses from bad loans
  - ➤ Alternatively, publicly announced recapitalization must be implemented
  - ➤ This is politically costly for two reasons: (1) tax payer costs become publicly known; (2) and fungible public money is allocated to cover losses potentially related to mismanagement by government-owned institutions

- A consequence of governments' preference is that recognition of bad loans and loan losses can be delayed, in the worst case, by evergreening → greatly increase eventual loss

- Consequences can include: (1) excess credit growth on easy terms during upswings; (2) aggressive loan restructuring and evergreening during downswings; (3) amplification of investment and leverage cycles

Questions this paper seeks to address

- In such contexts, what differences should be expected between credit supply and its risk pricing by public sector banks (PSBs) and privately owned banks (PVBs)?

- What differences should be expected between PSBs' and PVBs' management of NPAs?

- What implications does this have for the supply of credit at PSBs and PVBs for new firms and projects entering the economy?

- What are the implications for the investment and business cycles and for financial stability risks?

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Static Model: Projects and Investment Choice

Projects

- Project described by (R, α)
  - ➤ R − (Net) return to project, if successful
  - ➤ α − Probability of success

- Investors need to borrow 1 unit of capital in order to execute project
  - ➤ Collateralized borrowing → outside opportunity to invest collateral and earn net return of r

- <u>Investment decision</u>: @ loan rate r_L, invest in project iff

$$\alpha(R + 1 - r_L) \geq (1 + r)$$
$$\Leftrightarrow \alpha(R + 1) - (1 + r) \geq \alpha r_L \qquad (1)$$

Static Model: Bank Lending

Banks
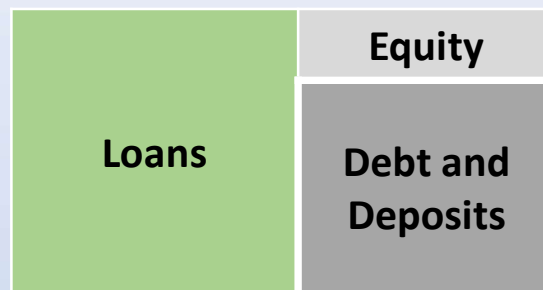
- Liabilities are paid their outside opportunity, r

  ➢ Depositors cannot invest directly into the firm (no capital markets)

  ➢ Equity is assumed to be a regulatory requirement of minimum own-funds or represents minority interest of investors who are constrained in a manner similar to depositors

- <u>Lending to projects nets</u>

  ➢ $r_L - r$, if project succeeds

  ➢ $-(l + r)$, otherwise; $1 - l =$ liquidation value of collateral in open market

  ➢ Under risk neutrality, with loan size L, bank nets: $(\alpha r_L - (1 - \alpha)l - r)L$

Static Model: PSBs vs. PVBs

How do PSBs differ? Government subsidizes loan losses up to loan size $\bar{L}$

- On NPAs, PSBs recover:
  - ➤ $1; up\ to\ L \leq \bar{L}$
  - ➤ $1 - l; beyond\ \bar{L}$

- Hence, PVBs' and PSBs' expected net returns from loan portfolio of size L
  - ➤ $\pi^{PV}(L) = (\alpha r_L - (1-\alpha)l - r)L$
  - ➤ $\pi^{PS}(L) = \begin{cases} (\alpha r_L - r)L; L \leq \bar{L} \\ (\alpha r_L - r)L - (1-\alpha)l(L - \bar{L}); L > \bar{L} \end{cases}$

- <u>Lending iff</u>
  - ➤ (PVBs) $r_L^{PV} \geq \frac{(1-\alpha)l+r}{\alpha}$ \hspace{2cm} (2)
  - ➤ (PSBs) $r_L^{PS} \geq \frac{r}{\alpha}$ up to $\bar{L}$; and r_L^{PV} beyond $\bar{L}$ \hspace{0.5cm} (3)

Static Model: Equilibrium

Equilibrium with credit requires a technical assumption: $r < \dfrac{R}{2}$

- Combining (1) and (3), a necessary and sufficient condition for PSBs to lend in equilibrium is:

  - $\alpha \geq \alpha^{PS} := \dfrac{2r+1}{R+1} \in (0,1)$ (4)

- For projects that satisfy (4), PSBs are willing to lend at a range of interest rates borrowers will accept. Zero profits assumption pins down PSBs' lending rate at:

  - $r_L^{PS} = \dfrac{r}{\alpha}$ ***up to an aggregate loan portfolio of size*** $\overline{L}$

- Additional credit demand could be met by PSBs and PVBs in combination, albeit at higher interest rates since the banks' loss-given-default are now identical:

  - $\alpha \geq \alpha^{PV} := \dfrac{2r+(1+l)}{R+(1+l)} \in \left(\alpha^{PS}, 1\right)$ (5)

  - $r_L^{PV} = \dfrac{r+(1-\alpha)l}{\alpha} > r_L^{PS}$ (6)

Static Model: Characterizing Equilibrium

Lemma 1. *In an economy with $\mathcal{B} < \bar{L}$ firms, where the quality of projects is sufficiently high ($\alpha > \alpha^{PS}$) and where outside investment options are sufficient poor ($r < \frac{R}{2}$), all firms will borrow from PSBs alone at a rate of interest $r_L^{PS} = \frac{r}{\alpha}$. If the economy has a larger number of firms than the government subsidy, $\mathcal{B} > \bar{L}$, then:*

*(a) $\bar{L}$ firms chosen randomly with probability $\frac{\bar{L}}{\mathcal{B}}$ each will borrow from PSBs at the rate r_L^{PS}, **and conditional on $\alpha > \alpha^{PV}$**, PSBs and PVBs will each serve half of the remaining $\mathcal{B} - \bar{L}$ firms at the rate $r_L^{PV} > r_L^{PS}$.*

(b) If, on the other hand, $\alpha \in \left(\alpha^{PS}, \alpha^{PV}\right)$, the remaining $\mathcal{B} - \bar{L}$ firms will be rationed out of the credit market.

Corollary 1. *In the equilibrium characterized by lemma 1, PSBs have larger balance-sheets than PVBs and, where both are actively lending, PSBs charge a lower (weighted average) lending rate by lending to a subset of borrowers at a subsidized rate.*

Static Model: Extension to Economy with Heterogeneous Project Quality

<u>High and low quality projects</u>:

- $\alpha^{PS} < \alpha_L < \alpha^{PV} < \alpha_H$

    ➤ $\mathcal{L} - \#$ (low quality projects); $\mathcal{B} - \mathcal{L} - \#$ (high quality projects)

- Borrowers and banks have no means of separating themselves besides through loan pricing preferences.

    ➤ We identify conditions under which: (i) PSBs offer two rates, a lower rate preferred by both project types; (ii) a higher rate at which type *H* are willing to borrow, but type *L* are not

    ➤ $\alpha_H \in \left(\alpha^{PV}, \frac{\overline{\alpha}(r+l)}{r+\overline{\alpha}l} \right)$; $\overline{\alpha} := \omega_L \alpha_L + (1-\omega_L)\alpha_H$; $\omega_L := \frac{\mathcal{L}}{\mathcal{B}}$; $\alpha_L \in \left(\alpha^{PS}, \frac{1}{R} \right)$

    ➤ For sufficiently lousy outside option; i.e., small enough $\frac{r}{R}$; $\alpha^{PV} < \frac{\overline{\alpha}(r+l)}{r+\overline{\alpha}l}$ and $\alpha^{PS} < \frac{1}{R}$

- Let banks offer the following menu:

    ➤ PSBs offer $r_L^{PS} = \frac{r}{\overline{\alpha}} < \frac{r}{\alpha_L}$ up to portfolio size $\overline{L}$

    ➤ Beyond $\overline{L}$, PSBs offer $r_L^{PV} = \frac{r+(1-\alpha_H)l}{\alpha_H}$, which is also the rate at which PVBs offer loans

Static Model: Equilibrium with Heterogeneous Borrowers

We have the following extension of the previous results:

Lemma 2. *Assume $\frac{r}{R}$ sufficiently small; $\alpha_H \in \left(\alpha^{PV}, \frac{\overline{\alpha}(r+l)}{r+\overline{\alpha}l}\right)$; $\alpha_L \in \left(\alpha^{PS}, \frac{1}{R}\right)$. With competitive credit supply, there exists a unique equilibrium which may involve credit rationing, wherein:*

(a) $min\left\{\frac{\overline{L}}{\mathcal{B}}, 100\right\}$ percent of firms of both types borrow at the rate r_L^{PS} from PSBs.

(b) All of the remaining $(\mathcal{B} - \mathcal{L})\frac{\mathcal{B}-\overline{L}}{\mathcal{B}}$ firms with the high-quality projects borrow from PVBs and PSBs at a higher rate $r_L^{PV} := \frac{r+(1-\alpha_H)l}{\alpha_H}$. Of these firms, $\frac{(\mathcal{B}-\mathcal{L})\frac{\mathcal{B}-\overline{L}}{\mathcal{B}}}{2}$ each are served by PSBs and PVBs.

(c) The remaining $\frac{\mathcal{B}-\overline{L}}{\mathcal{B}}\mathcal{L}$ firms with low quality projects are rationed out of the credit market.

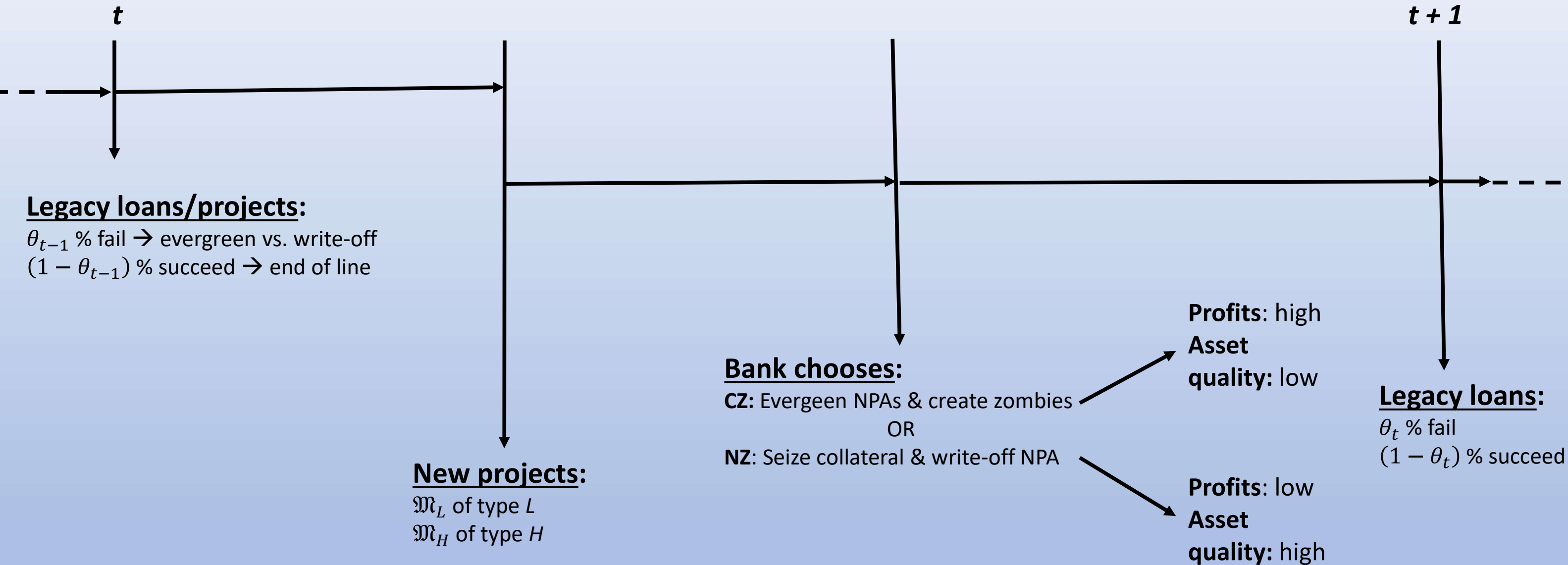**Corollary 2.** *The following observations are immediate consequences:*

(a) PSBs have a larger balance-sheet and lend at a lower weighted average lending rate than PVBs.

(b) The type-L borrowers who enjoy access to the loan market at cheaper borrowing rates would be rationed out altogether in the credit market equilibrium in the absence of implicit government guarantees that cover PSB losses in the event of their default.

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Timeline of the economy

t

t + 1

Legacy loans/projects:
θ_{t-1} % fail → evergreen vs. write-off
$(1 - \theta_{t-1})$ % succeed → end of line

New projects:
$\mathfrak{M}_L$ of type *L*
$\mathfrak{M}_H$ of type *H*

Bank chooses:
CZ: Evergeen NPAs & create zombies
OR
NZ: Seize collateral & write-off NPA

Profits: high
Asset quality: low

Profits: low
Asset quality: high

Legacy loans:
θ_t % fail
$(1 - \theta_t)$ % succeed

Zombie Lending

- Zombie projects / zombies: projects that fail and are kept alive by evergreening

- Following conditions characterize the decision to create a zombie loan/project
  - ➤ Necessary to evergreen in order to avail of subsidy covering loan loss (**+ for bank**)

  - ➤ Can charge higher rate, since zombie is locked into incumbent external financing relationship – practically, bank can charge up to R per unit lent **(+ for bank)**

  - ➤ Loss of collateral (**deadweight loss**)

- Two key assumptions
  - ➤ $\alpha_z \in \left(0, \alpha^{PS}\right)$ – likelihood of zombie succeeding is less than new projects of either type
  - ➤ $r < l$ – return on equity is lower than discount on collateral sold in market (loss given default)

Zombie Lending Incentives: PSBs

- Banks' decision making over time has a recursive structure which simplifies dynamic choice problem

    - $V_{t,NEW}^{PS}$ − Value function corresponding to choosing new project @ t
    - $V_{t,Z}^{PS}$ − Value function corresponding to choosing to zombie lend @ t
    - $\alpha_N = \overline{\alpha}$ − Likelihood of success of new project (assuming loan portfolio size is less than $\overline{L}$)

- **PSBs prefers to take the government subsidy and zombie lend @ t iff**:

$$\alpha_z\left(r_{L,z}^{PS} + \beta V_{t+1,NEW}^{PS}\right) + (1-\alpha_z)\beta V_{t+1,Z}^{PS} > -l + \alpha_N\left(r_L^{PS} + \beta V_{t+1,NEW}^{PS}\right) + (1-\alpha_N)\beta V_{t+1,Z}^{PS}$$

iff:

$$\alpha_z r_{L,z}^{PS}\left(1 - \beta(1-\alpha_N)\right) + (l-r)\left(1-\beta(1-\alpha_z)\right) > \beta V_{t+1,NEW}^{PS}\left(\alpha_N\left(1-\beta(1-\alpha_z)\right) - \left(1-\beta(1-\alpha_N)\right)\right)$$

   which is always the case

   - LHS is positive since $l > r$
   - RHS is dominated by $\beta^2 V_{t+1,NEW}^{PS}(\alpha_z - \alpha_N) < 0$ (*replace $\alpha_N < 1$ by 1 in first term of RHS*)

Zombie Lending Incentives: PSBs vs. PVBs

PVBs: we show that they prefer to lend only to new, type *H* projects, writing off zombie loans as they occur, if $l < \frac{1}{R+1}$

Proposition. *If zombie projects enjoy sufficiently low productivity; i.e., $\alpha_z < \alpha^{PS}$ and loss-given-default on bad loans exceeds the return on bank funding, then under the government subsidies offered to PSBs, (but not PVBs):*

(a) defaulting borrowers always prefer to evergreen their existing bad loans.

(b) PSBs always prefer to evergreen bad loans over lending to new borrowers notwithstanding productivity differentials. They may charge any rate $r_{L,z}^{PS} \in \left(r_L^{PS}, R\right)$ on such loans.

(c) If the loss-given-default on bad loans satisfies $l < \frac{1}{R+1}$, then no feasible interest rate (i.e., less than or equal to R), can induce PVBs to prefer evergreening bad loans and creating zombie projects over lending to new high productivity borrowers. PVBs will prefer evergreening only if this condition is violated.

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Dynamics of Equilibrium Loan Portfolios of PSBs and PVBs

- Two assumptions
  - PSBs' lending capacity in a given period is less than loan demand from new projects—$\bar{\mathcal{L}}^{PS} \in (\mathfrak{M}_L, \mathfrak{M}_L + \mathfrak{M}_H)$
  - PVBs' lending capacity in a given period is less than loan demand from new high quality projects—$\bar{\mathcal{L}}^{PV} < \mathfrak{M}_H$

- Equilibrium loan portfolios in period t
  - PSBs will evergreen loans to $Z_{t-1}(1 - \alpha_z) + PS_{t-1}^H(1 - \alpha_H) + PS_{t-1}^L(1 - \alpha_L) = Z_t$ at a rate $r_{L,z}^{PS} \in (r_L^{PS}, R)$ and offer the remaining loans of $\bar{\mathcal{L}}^{PS} - Z_t$ to new projects at the rate r_L^{PS}
  - PVBs will write-off its portfolio of old NPAs amounting to $PV_{t-1}^H(1 - \alpha_H) = min\{\bar{\mathcal{L}}^{PV}, (1 - \omega_L)(\bar{\mathcal{L}}^{PS} - Z_{t-1})\}(1 - \alpha_H)$ at a loss of $PV_{t-1}^H(1 - \alpha_H) * l$ and offer loans to the remaining new type H projects not served by PSBs at rate r_L^{PV}; i.e., to $min\{\bar{\mathcal{L}}^{PV}, (1 - \omega_L)(\bar{\mathcal{L}}^{PS} - Z_t)\}$

- Rationing and investment in the dynamic equilibrium
  - So long as $min\{\bar{\mathcal{L}}^{PV}, (1 - \omega_L)(\bar{\mathcal{L}}^{PS} - Z_t)\} = (1 - \omega_L)(\bar{\mathcal{L}}^{PS} - Z_t)$, all new type H projects will get funding
  - However, given PSBs' lending capacity, zombie lending → rationing of type L projects will occur
  - Rationing → less investment → How does rationing evolve over time?

Dynamics of Investment in Equilibrium

- Investment is a function of rationing of new projects that arises in equilibrium due to zombie lending

  - Zombies invest less than new firms since the share of new borrowing diverted to paying interest-in-arrears rises over time

  - If zombie lending rises over time as a share of the banking sector's loan portfolio, then rationing of new firms will increase due to crowding out by zombies which will lower aggregate investment

- The zombie loan portfolio grows over time → investment falls over time

  - <u>Period 0</u>: $Z_0 = \left((1 - \alpha_L)\omega_L^{PS} + (1 - \alpha_H)\left(1 - \omega_L^{PS}\right) \right) \bar{\mathcal{L}}_0^{PS}$

  - <u>Period 1</u>:

$$Z_1 = \left((1 - \alpha_z) - (1 - \alpha_L)\omega_L^{PS} - (1 - \alpha_H)\left(1 - \omega_L^{PS}\right) \right) Z_0 + \left((1 - \alpha_L)\omega_L^{PS} + (1 - \alpha_H)\left(1 - \omega_L^{PS}\right) \right) \bar{\mathcal{L}}_0^{PS}$$

$$> \left((1 - \alpha_L)\omega_L^{PS} + (1 - \alpha_H)\left(1 - \omega_L^{PS}\right) \right) \bar{\mathcal{L}}_0^{PS} = Z_0$$

  - <u>Period t</u>: By induction

$$Z_t = \left((1 - \alpha_z) - (1 - \alpha_L)\omega_L^{PS} - (1 - \alpha_H)\left(1 - \omega_L^{PS}\right) \right) Z_{t-1} + \left((1 - \alpha_L)\omega_L^{PS} + (1 - \alpha_H)\left(1 - \omega_L^{PS}\right) \right) \bar{\mathcal{L}}_0^{PS}$$

$$> \left((1 - \alpha_z) - (1 - \alpha_L)\omega_L^{PS} - (1 - \alpha_H)\left(1 - \omega_L^{PS}\right) \right) Z_{t-2} + \left((1 - \alpha_L)\omega_L^{PS} + (1 - \alpha_H)\left(1 - \omega_L^{PS}\right) \right) \bar{\mathcal{L}}_0^{PS} = Z_{t-1}$$

Dynamics of Productivity in Equilibrium

- Defining average productivity

  ➢ Given risk neutrality, expected average productivity of a project of type $\tau \in \{Z, L, H\}$ can be defined as $\alpha_\tau R$

- Average productivity of projects funded by

  ➢ <u>PVBs</u>: remains invariant over time since they finance only new, type *H* projects

  ➢ <u>PSBs</u>: decreases over time since the share of zombies in PSBs' loan portfolio is rising in equilibrium

  ➢ <u>Banking sector</u>: falls over time (proof is in the paper)

- Hence, we have established

Dynamics of Productivity in Equilibrium

Proposition. *In any equilibrium with lending of the dynamic economy where investment is financed by the banking sector, government subsidies result in:*

(a) an increasing accumulation of zombie projects/ firms with access to credit markets via evergreening of loans by their incumbent PSB lenders.

(b) since this increase in zombies comes at the expense of lending to new investment projects with higher productivity, such zombie lending results in a decrease in average productivity and investment in the economy.

(c) in general, government subsidies to PSBs results in lending to projects that would otherwise be economically unviable.

Predictions of the theoretical model

- PSBs have larger balance-sheet growth during upswings supported by loan risk pricing offered at more favorable terms than PVBs

- NPA restructuring is higher at PSBs resulting in a wider gap between recorded NPAs and broader measures of stressed assets that includes restructured credits

- Provisioning coverage can be expected to rise faster for PVBs when credit cycle turns

- Capital expenditure / investment in the real sector should be inversely proportional to the stressed assets ratio and will be higher, the greater is the share of zombie loans in banks' portfolios

Illustrating the theory: Recent Indian Credit Cycle

Figure 1. Performance of Indian Banks, 2008—Present
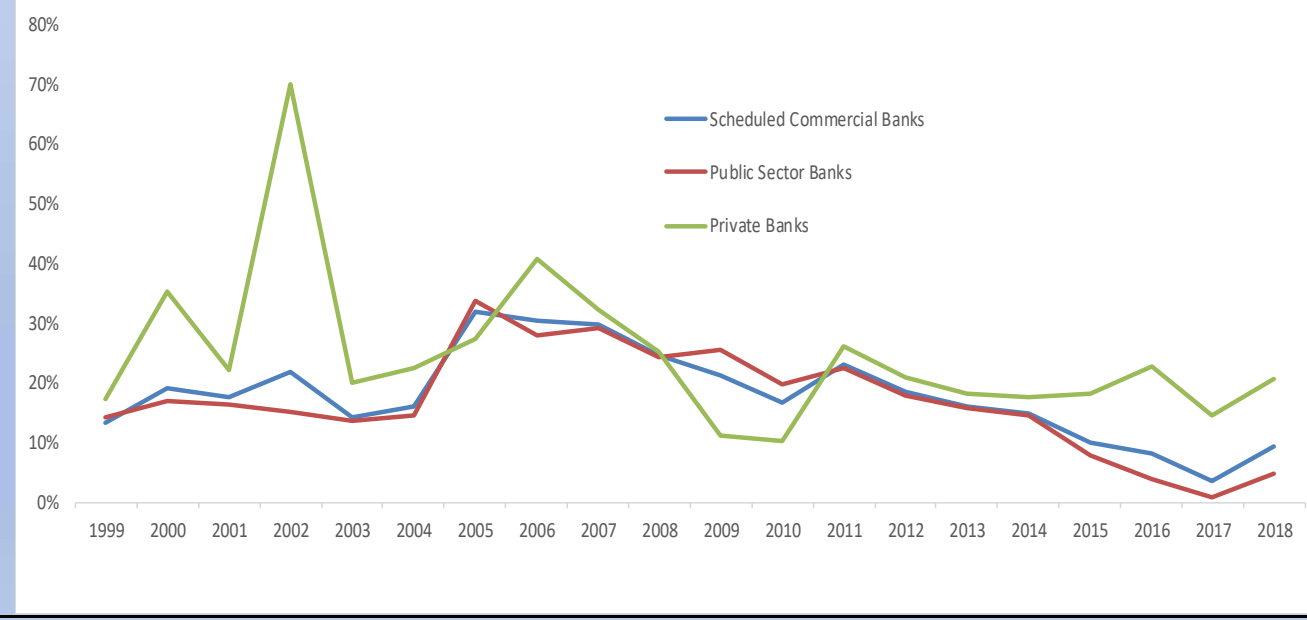
(A) Stressed Advances (in percent)
(B) Gross NPA ratio (in percent)
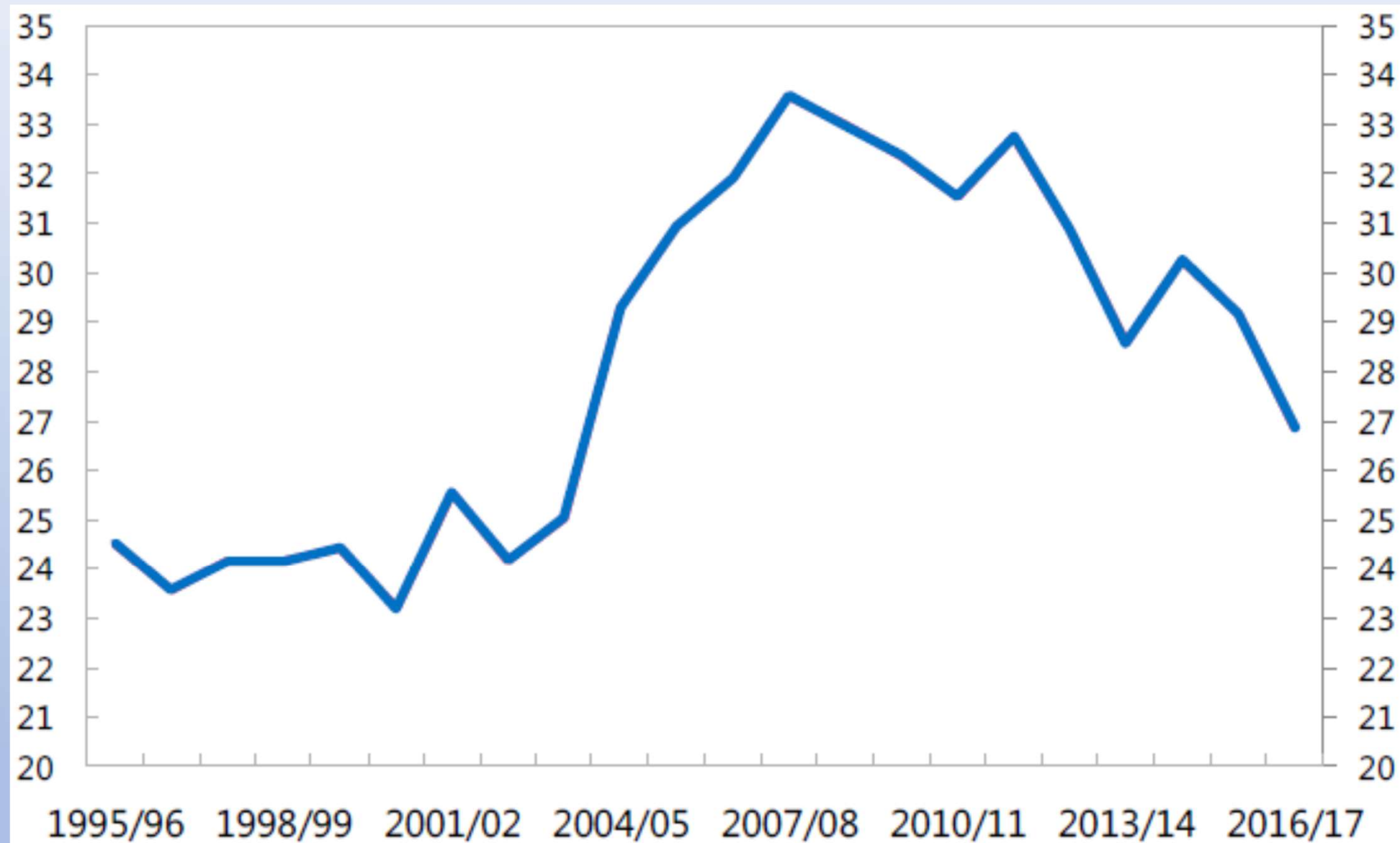(C) Provision coverage ratio (in percent)
(D) Growth in advances (annual, in percent)
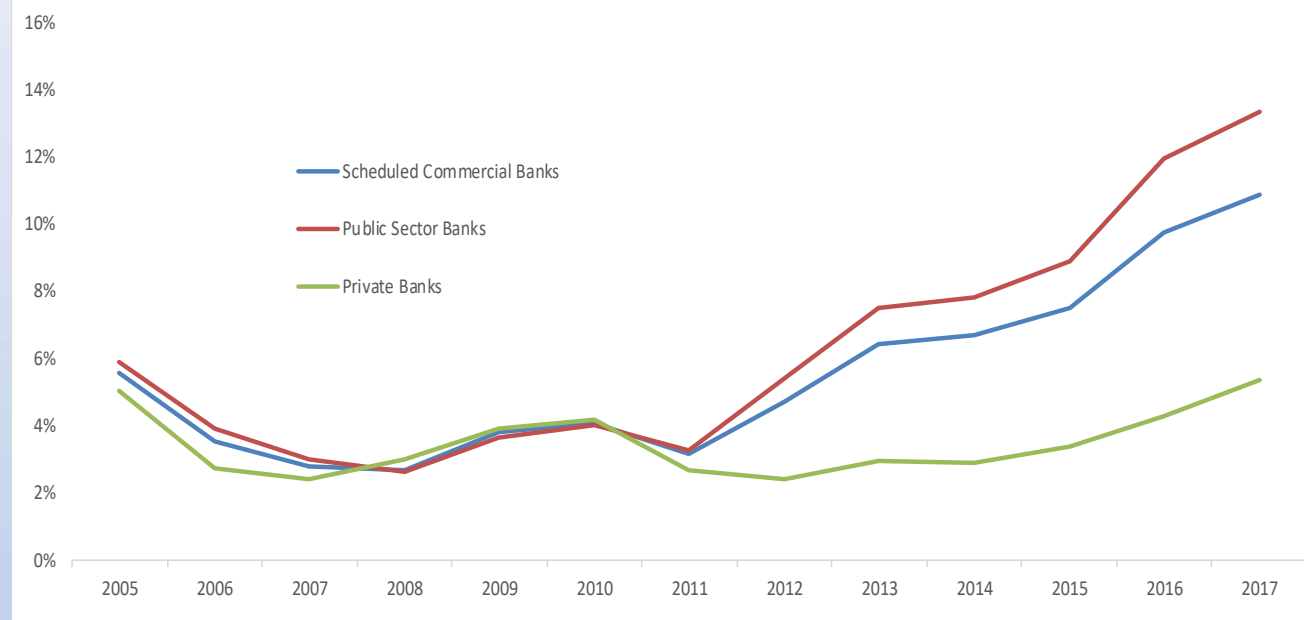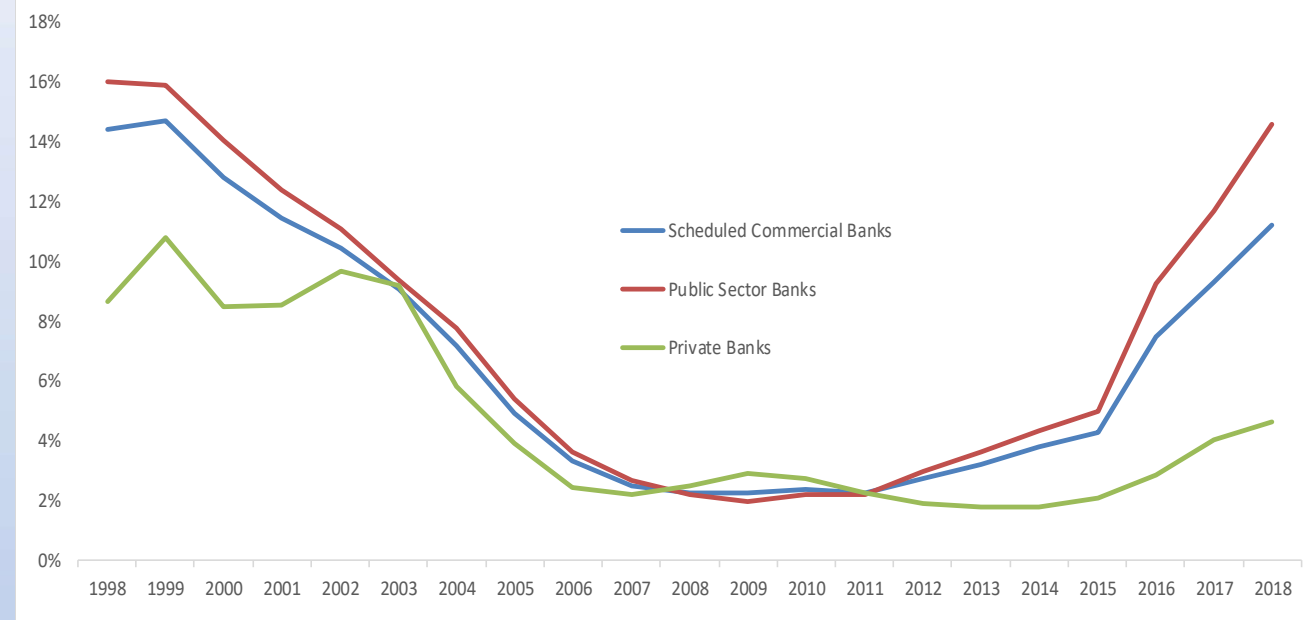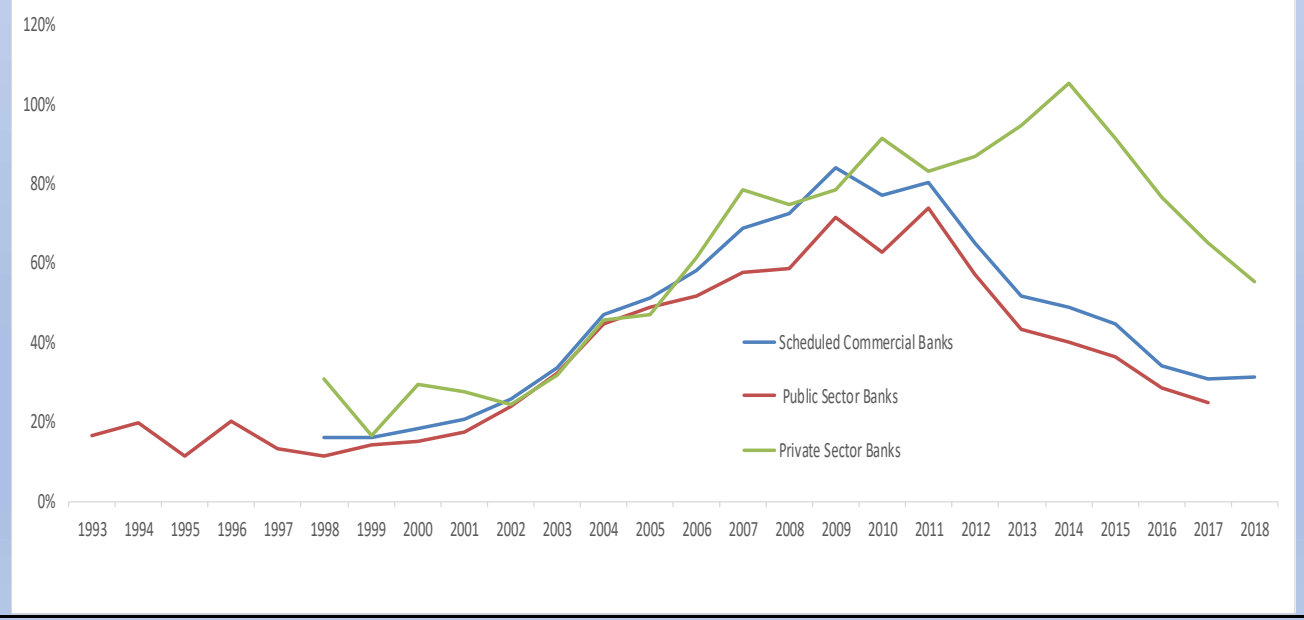
Sources: RBI and authors' calculations.

Illustrating the theory: Recent Indian Investment Cycle

Figure 2. India: Gross Fixed Capital Formation, 1995/96--Present

Source: Das and Tulin (2017).

# Extending the theoretical model … some thoughts

- Our paper is focused on government subsidies that PSBs enjoy through-the-cycle by virtue of being owned by the provider of this benefit

- However, in the event of a banking crisis, particularly one that implicates systemic banks—public *and* private—and hence, threatens a recession, government subsidies are extended beyond PSBs, covering most systemic banks and often, others
  - During GFC, this was seen in the U.S. (*arranging private purchases*: Bear Stearns, Countrywide, WAMU; *federal bail-outs*: AIG, GSEs; *conventional monetary policy*: zero rates; *UMP*: asset purchases and swaps with banks, MMFs, etc.) and Ireland (nationalization for majority and capital injections for others)
  - During Eurozone sovereign debt crisis (*UMP*: ECB-OMT; *limited fiscal measures*: stressed economies)
  - During GFC and Eurozone crisis, in small open AEs (*General government guarantees of bank liabilities + asset repurchases / liberalized collateral rules for secured lending*: some Nordic countries)

- This sets the stage for bank incentives for zombie lending explored in this paper to extend to private banks, since for several operations, full NPA recognition and write-off:
  - was inconsistent with underlying assumptions (asset purchases assume liquidity, not solvency problems)
  - would expose sovereign (and tax payer) to loss and expensive debt restructuring and recovery
  - result in markets questioning credibility where domestic fiscal space was limited

Illustration: Subsidies in a Crisis (Stressed Euro Area Banks; 2009-12)

- In Europe, public authorities' assistance to crises-hit banking sectors can be separated into two phases: (i) 2007-09 (sub-prime crisis and GFC); (ii) 2010 onward (sovereign debt crisis)

- In countries that were relatively less impacted by the sovereign debt crisis (non-GIIPS): direct recapitalization (consistent with full NPA recognition and write-off) were an important component
  - ➤ Government support was mainly required during 2007-09
  - ➤ All 3 components (direct recap, asset purchases and CB monetary policy) were important
  - ➤ Direct recapitalization (consistent with NPA recognition and write-off provided 1/3 of the overall support

- In the countries hit hard by the sovereign debt crisis (GIIPS)
  - ➤ Direct recapitalization was less than 8% during 2007-09 and less than 20% during 2009-12
  - ➤ Most of the support came through ECB monetary policy accommodation (OMT)

Modes of Public Support to Banking Sector in the Eurozone (2007-12)
(in billions of Euro)
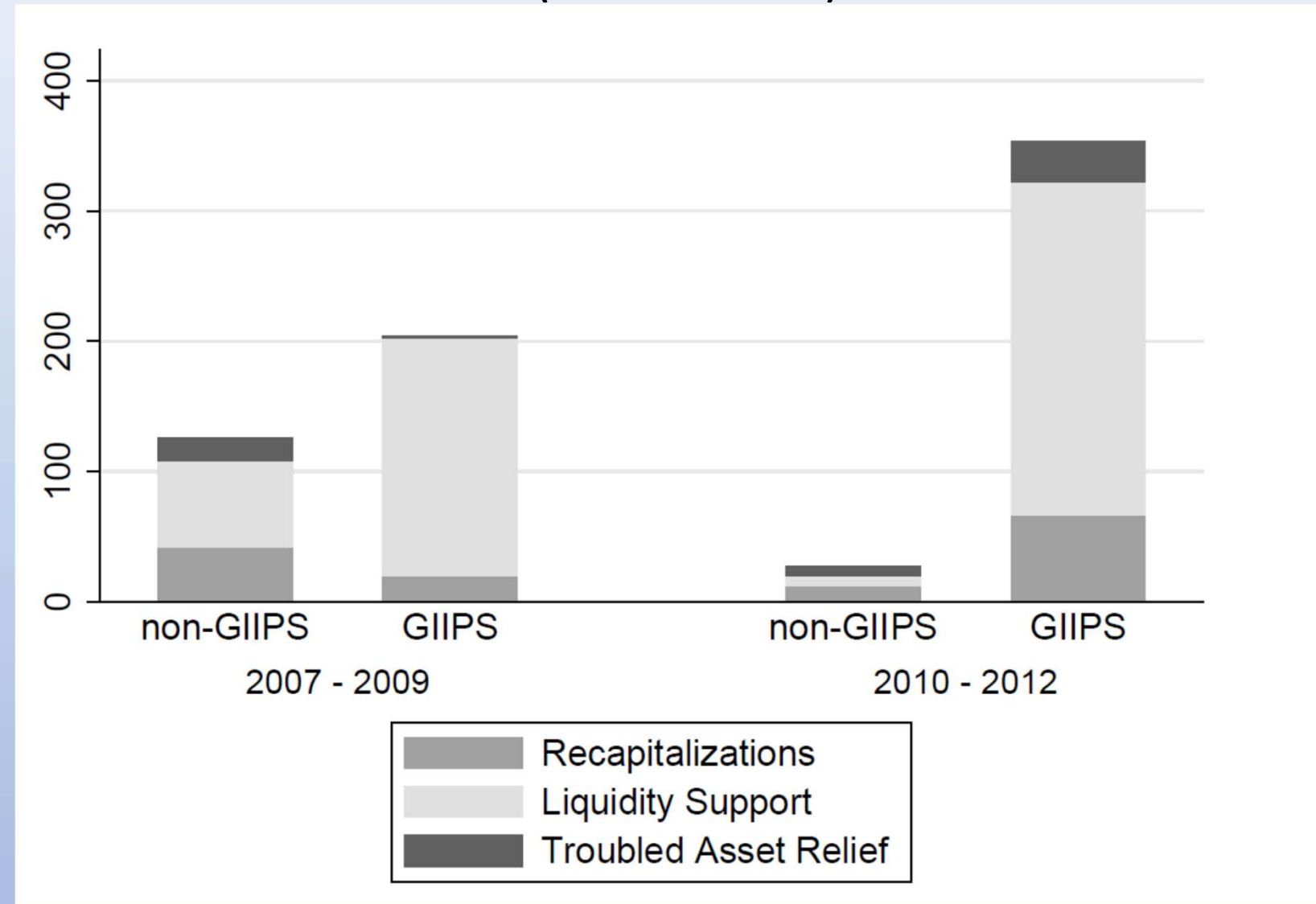
Source: Acharya, Steffen, Steinrucke (2018), *Kicking the Can Down the Road*

Illustration: Subsidies in a Crisis (Stressed Euro Area Banks; 2009-12)

- ECB-OMT increased MtM value of Eurozone member sovereign bonds → benefitted stressed countries' banks the most → indirect recap

- However, limited fiscal space meant limits to scale of recapitalization of vulnerable banks → incentives to evergreen defaulting borrowers remained strong

  This was clearly necessary and essential in those countries where general government guarantees were extended to cover all liabilities of systemic banks (e.g., Ireland)

  - Banks who benefitted most through OMT extended loans most aggressively, but to pre-existing, not new borrowers
  - They did so at relatively low rates; i.e., passed on benefits of ECB-CMP (zero short-term rates) to existing borrowers making it possible for them to continue paying interest by using part of the new loan (since for distressed corporates, interest coverage ratios were less than one)
  - Capex / investment and productivity (growth) continued to remain insipid during this time

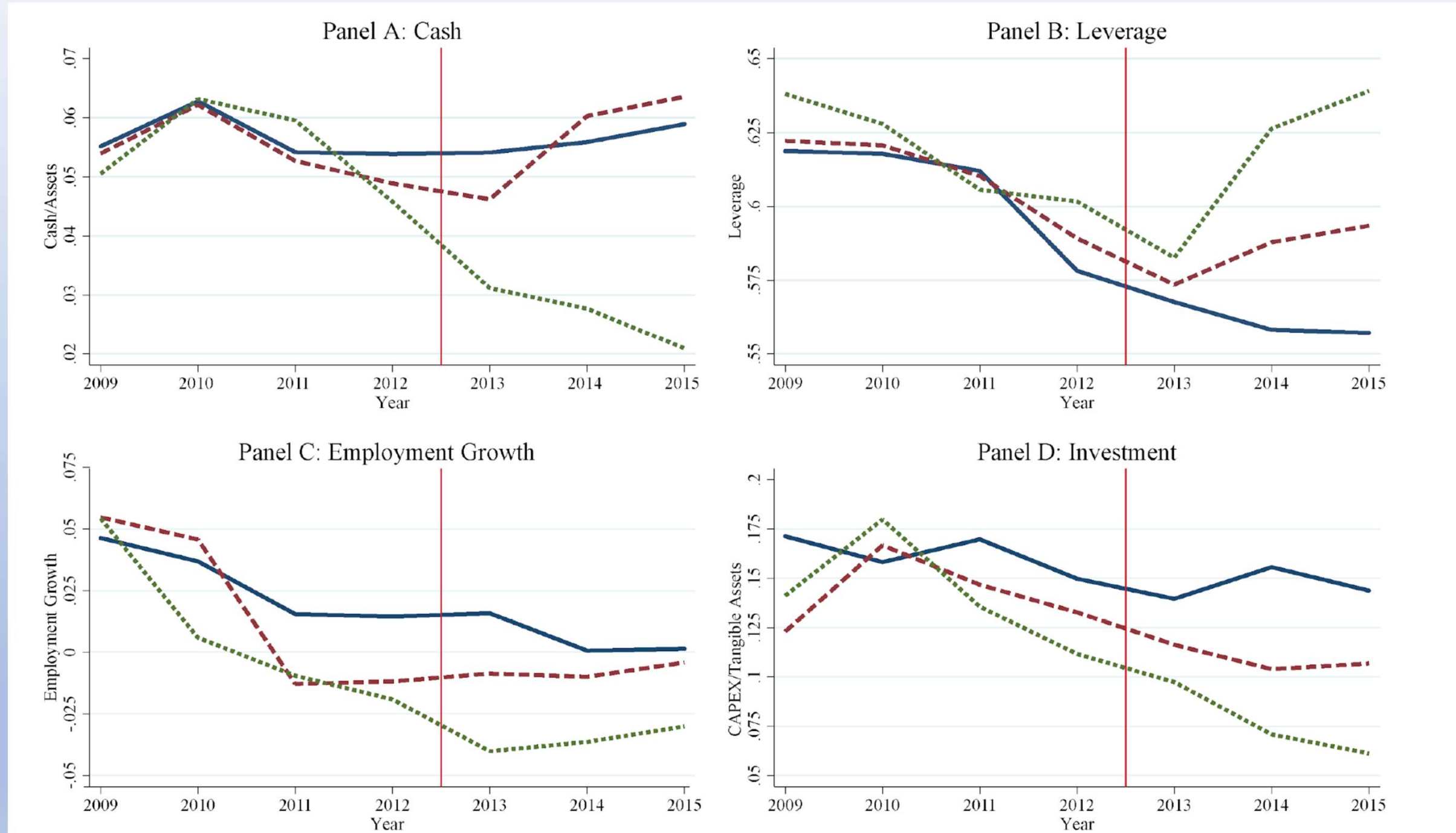# Illustration: Subsidies in a Crisis (Stressed Euro Area Banks; 2009-12)

Asset weighted share of zombie firms (2009-16)
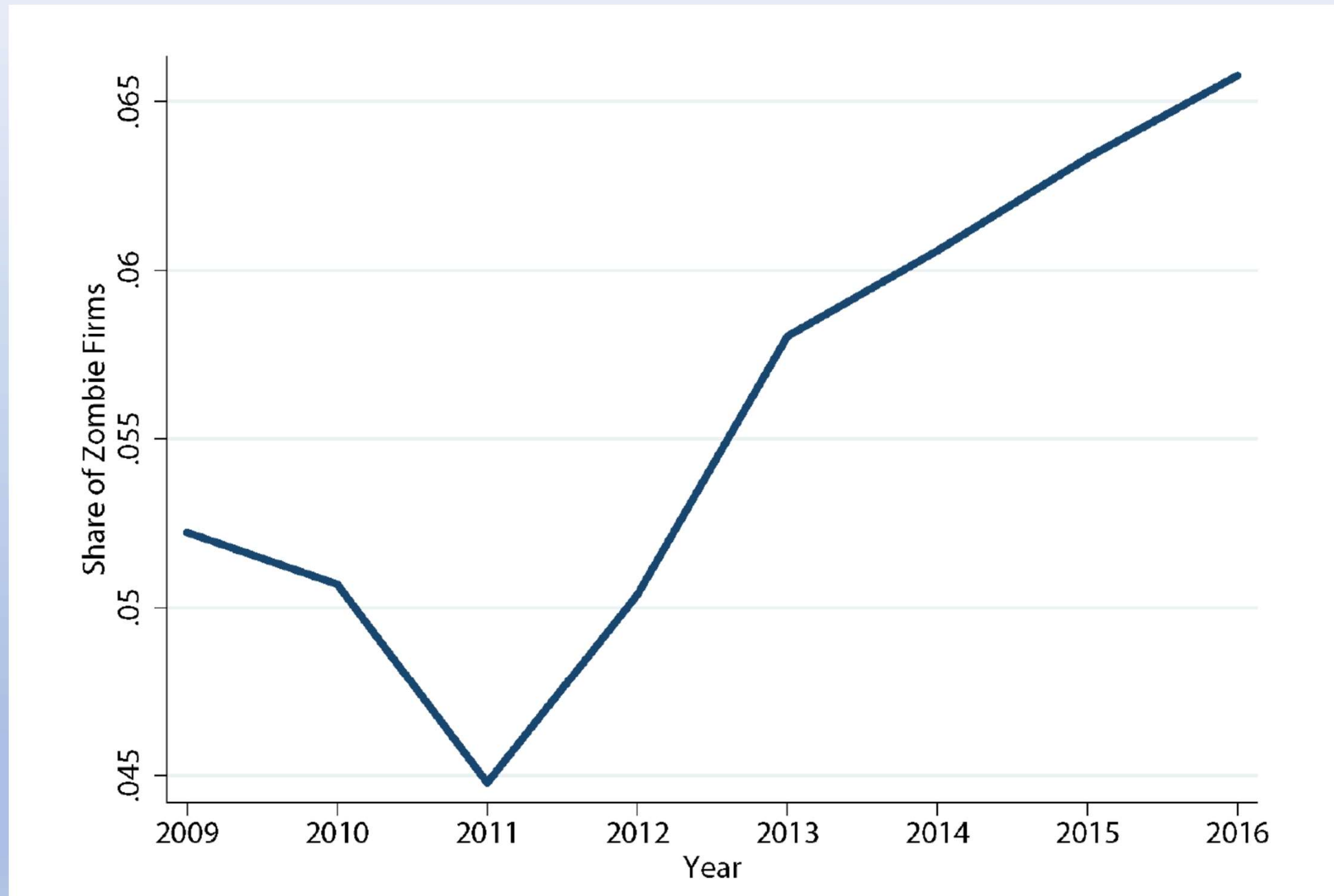
Source: Acharya, Crosignani, Eisert, and Eufinger (2019), *Zombie Credit & Disinflation: Evidence from Europe*

Illustration: Subsidies in a Crisis (Stressed Euro Area Banks; 2009-12)

Relative performance of zombie firms in Eurozone (2009-15)

Source: Acharya, Eisert, Eufinger, and Hirsch (2019), *Whatever It Takes: Real Effects of UMP*, Rev. Fin. Studies.

Panel A (Liquidity) shows the evolution of cash holdings-to-total assets

Panel B (Leverage) shows the evolution of leverage-to-total assets

Panel C shows evolution of employment growth rates

Panel D (Investment) shows evolution of capex-to-tangible assets.

Blue line: High-IC ratio firms

Red line: Low-IC, Non-Zombie Firms

Green line: Zombie Firms

Red vertical line: OMT announcement

Literature

- India: relative performance of PSBs and PVBs and bank zombie lending
  - D'Souza (2001), Berger et. al. (2008); Cole (2009), Acharya and Kulkarni (2012, WE); Acharya (2017); RBI FSR (various issues)

- Bank incentives for earnings management (similar to zombie lending via evergreening)
  - Milbradt (2012 RFS); Begley et. al. (2017 RFS)

- Distressed banks and zombie lending
  - Peek and Rosengren (2005 AER); Andrews and Petroukalis (2017 WP); Kwon et. al. (2015 *RevEconDyn*); Acharya et. al. (2019, RFS); Acharya et. al. (2019 WP); Acharya and Plantin (2019 WP); Blattner et. al. (2019 WP)

- Real effects of zombie lending
  - Caballero and Hammour (1994 AER, 1996 JDE); Caballero et. al. (2008 AER); Kwon et. al. (2015); McGowan et. al. (2017 WP); Acharya et. al. (2019 RFS); Tracey (2019 WP).

Outline

- Motivation for government participation in the financial sector

- Incentives for risk management—underwriting and pricing of credit in public and private banks

- Incentives for risk management—bad loan management

- Implications for credit allocation and the investment cycle

- What can and should policy do?

Policy: Banking Supervision

- Supervisors must be allowed a level-playing field across banking sector
  - Inspections may reveal evergreening early in the game
  - What are the tools available to supervisors to address this?

- Supervisory tools that operate on pecuniary incentives will be less effective when applied to PSBs
  - Fines are passed onto governments + managerial contracts at PSBs typically demonstrate less pay-for-performance sensitivity, incentive effects are smaller

- Do supervisors have the power to remove / replace management and board at both PSBs and PVBs? If not, then incentives will diverge

- Do supervisors have the power to pull the license of both, PSBs and PVBs? If not, then incentives will diverge

Policy: Government Participation in the Financial Sector

- Imposing social goals on a commercially oriented organization may lead to third-best outcomes
  - ➤ PSBs will tend to be more susceptible to financial incentives to restructure and evergreen NPAs
  - ➤ Given their ownership by government, they will also benefit from flight-to-safety during periods of stress (when their balance-sheets and profitability may be in worse shape due to greater zombie lending, which also constrains their lending capacity to new projects)
  - ➤ This engenders the misperception that their policy of zombie creation via evergreening is growth friendly in view of market confidence in them being visibly stronger during times of stress

- Where governments own banks with hands-off management and commercially run, they can receive handsome stream of profits which can support budgets for social goals (e.g., Nordea, DNB-NOR)

- For non-commercial goals, governments can, instead, participate in the financial sector through specialized / development finance institutions
  - ➤ whose non-commercial orientation is clear and transparent, and
  - ➤ which are directly financed through the budget