INSOLVENCY REGIMES, ZOMBIE FIRMS AND CAPITAL REALLOCATION

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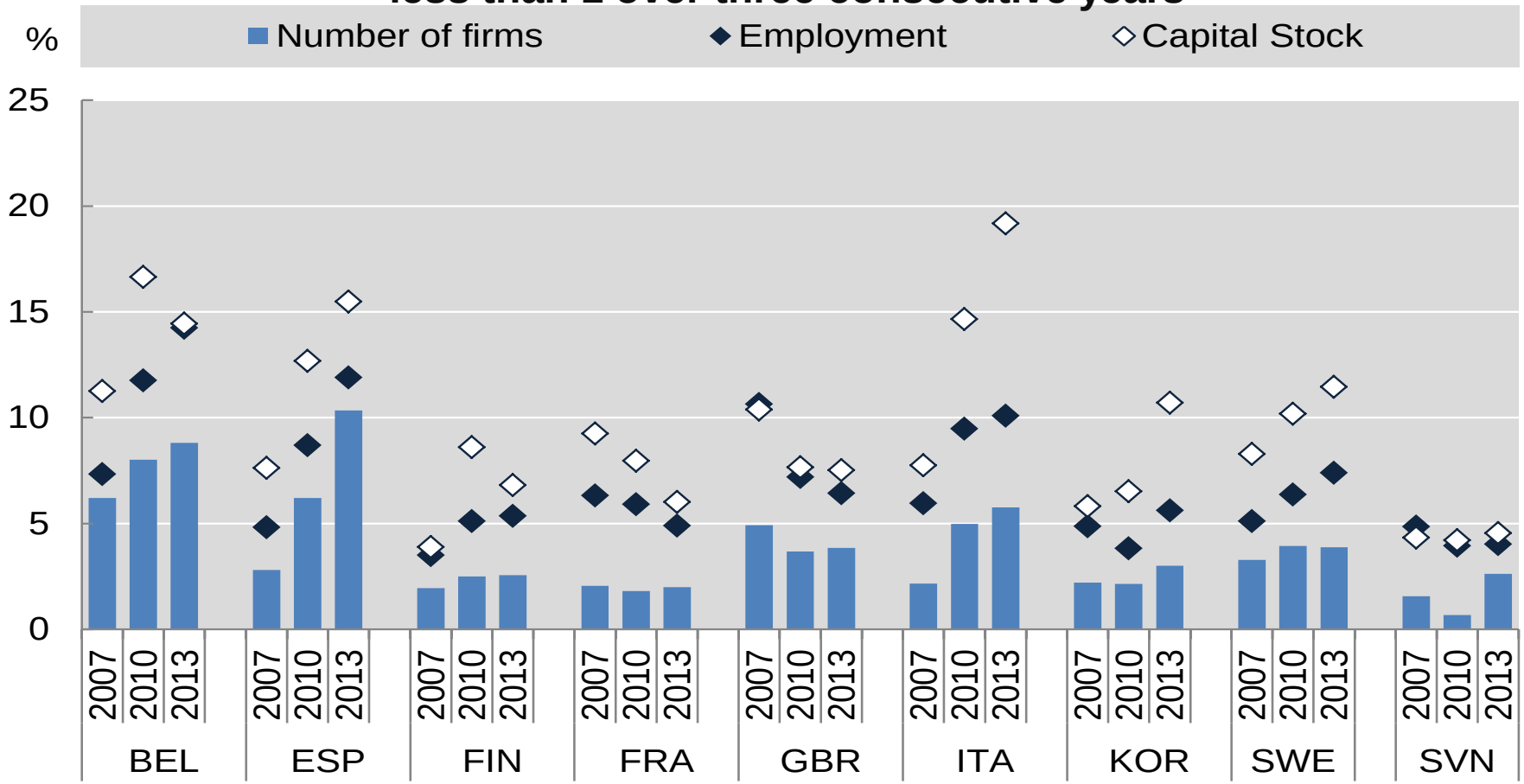
OCDE
DES POLITIQUES MEILLEURES POUR UNE VIE MEILLEURE

Motivation: *productivity growth has slowed, what can policy do?*

- Productivity growth has slowed across the OECD. ***What can policy do?***
- Micro dimensions to the aggregate slowdown suggest that **insolvency regimes** may be relevant:
  - **Rising productivity dispersion** (Andrews et al, 2016; Decker et al, 2017)
  - **Declining efficiency of reallocation** (Gopinath et al; 2017; Decker et al 2017)
  - **Declining business dynamism**: less entry (Decker et al 2014; Criscuolo et al 2014) and more **zombie firms** (Acharya et al 2016; Adalet McGowan et al 2017).

Motivation: *The rise of zombie firms*

Firms aged ≥10 years and with an interest coverage ratio* less than 1 over three consecutive years



Interest coverage ratio = (EBIT/Interest Payments)

Source: Adalet McGowan, M., D. Andrews and V. Millot (2017), "The Walking Dead? Zombie Firms and Productivity Performance in OECD countries", OECD Economics Department Working Paper No 1372.

Motivation: *zombie firms and aggregate productivity*

- Key paper: Caballero, Hoshi and Kashyap (2008), "Zombie Lending and Depressed Restructuring in Japan," *American Economic Review* 98(5).
- In a companion paper, we apply and extend this methodology to 13 countries. Controlling for cyclical shocks, a higher **share of industry capital sunk in zombie firms** is associated with:
  - Weaker investment and employment growth by the "typical" non-zombie firm, especially young firms
  - Higher productivity dispersion and barriers to entry
  - Weaker dynamic capital reallocation: the responsiveness of capital growth to (lagged) firm MFP (Decker et al 2017)
- **Insolvency regimes** can bring debtors and creditors to the table to deal with financial distress in an orderly fashion. *Do they matter for zombie congestion?*

Our contribution: *new policy indicators that are relevant for productivity*

- Insolvency regimes + productivity: cross-country research is constrained by the limitations of insolvency regime indicators.
- New OECD indicators show that **insolvency regime design varies**, implying cross-country differences in:
  - Personal costs associated with entrepreneurial failure
  - Barriers to corporate restructuring
  - Preventative and streamlining measures
- Insolvency regime design is **relevant** for understanding cross-country patterns in two sources of productivity weakness:
  - Capital stock sunk in zombie firms
  - Dynamic capital reallocation
- Policy implication: corporate restructuring as a means to higher productivity growth?

NEW OECD INDICATORS OF INSOLVENCY REGIMES

Existing indicators of insolvency regimes

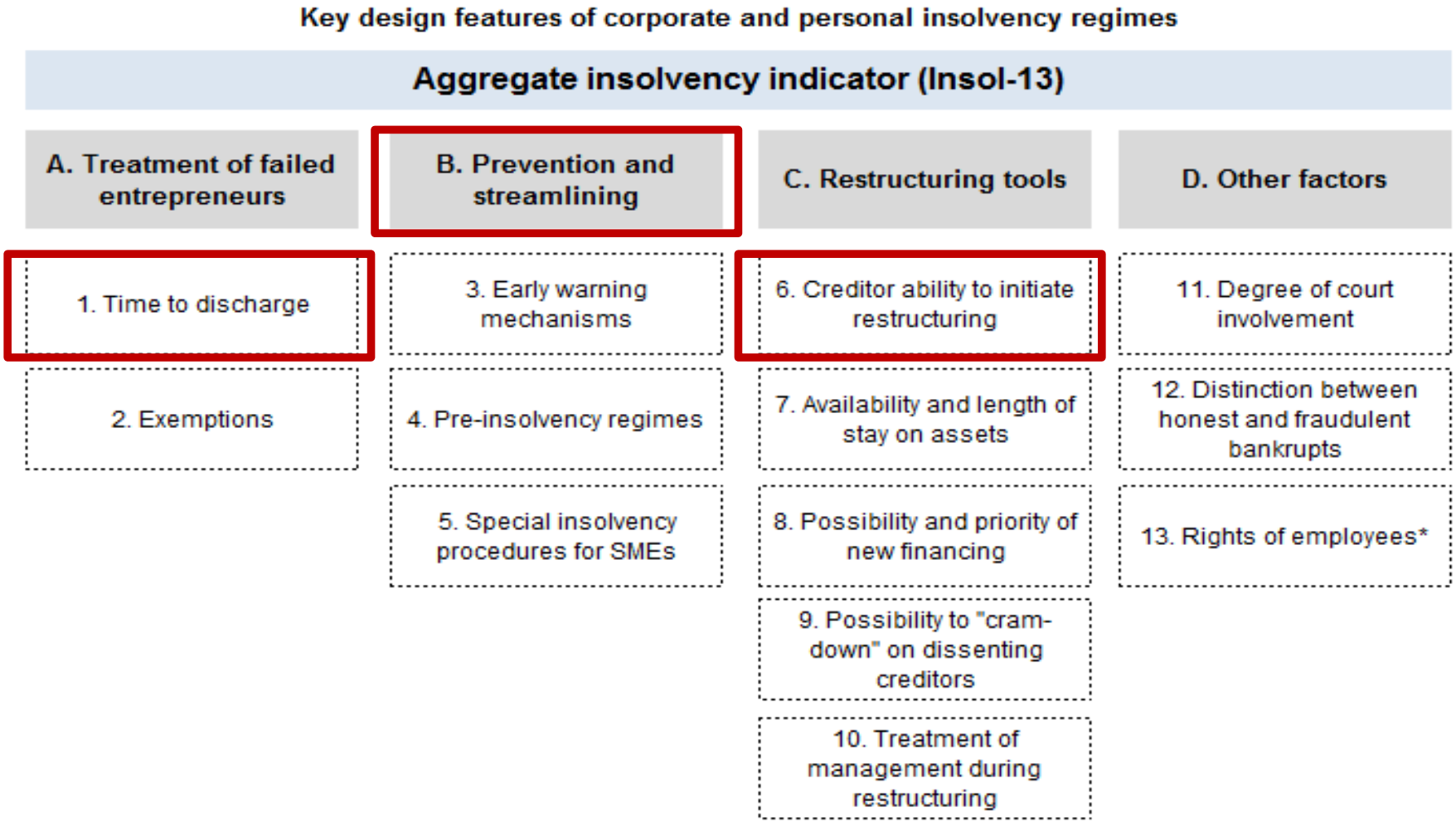
World Bank Doing Business

- Only refer to corporate insolvency and formal proceedings
- Outcome-based indicators ("cost to close a business") are based on a stylized case study → hotel as debtor, tangible assets, only one creditor. **No clear policy lever.**

OECD questionnaire and indicators

- Corporate & personal insolvency: *entrepreneurs often use personal finances prior to incorporation or lenders require them to post personal collateral*
- Based on international best practice and existing literature
- Focus on specific design features → clear policy levers
- Focus on ex-post efficiency; abstracts from quality of resolution
- **Increasing in the extent to which the regime delays the initiation of and increases the length of proceedings**

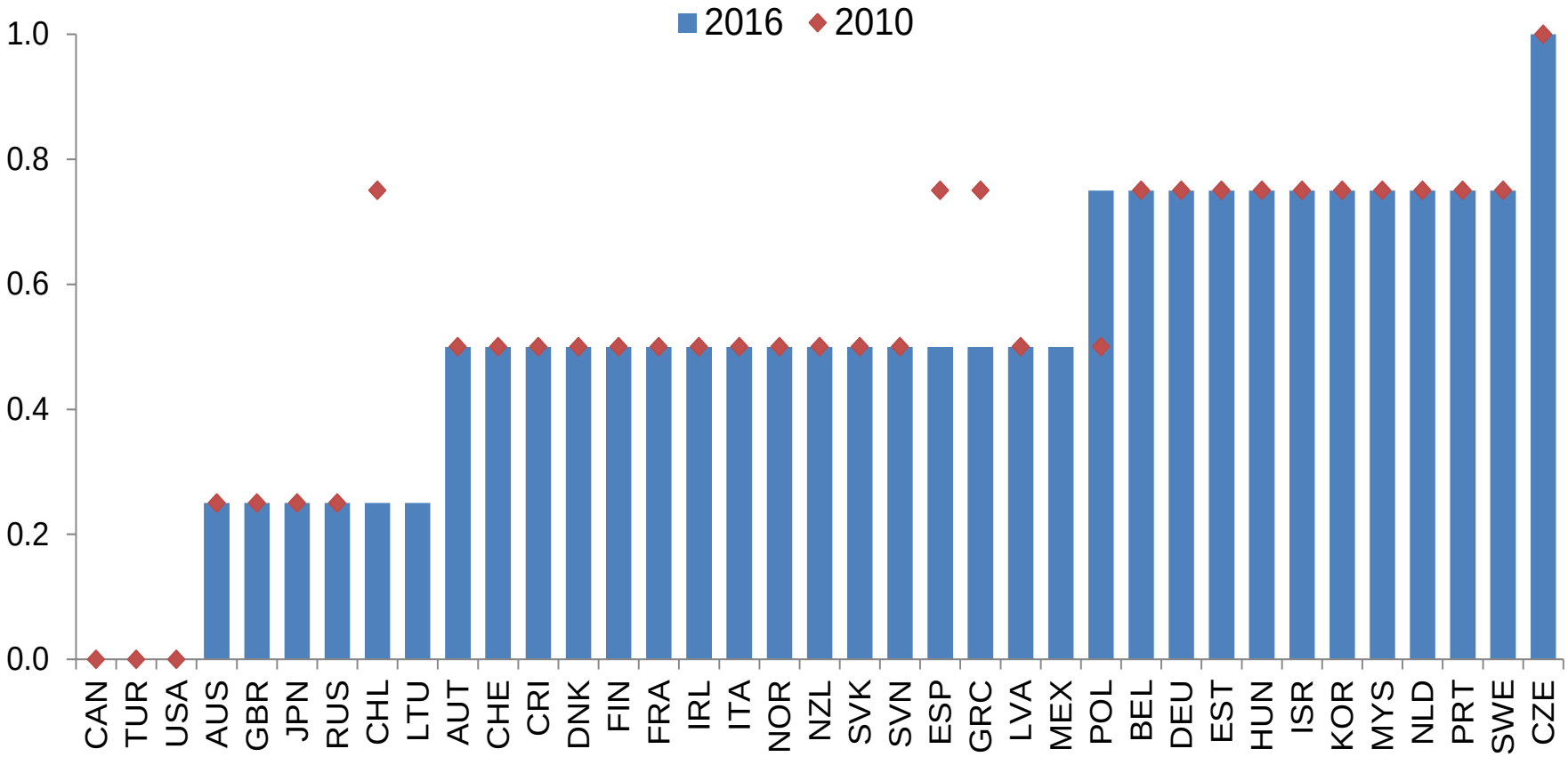
New cross-country indicators of insolvency regimes



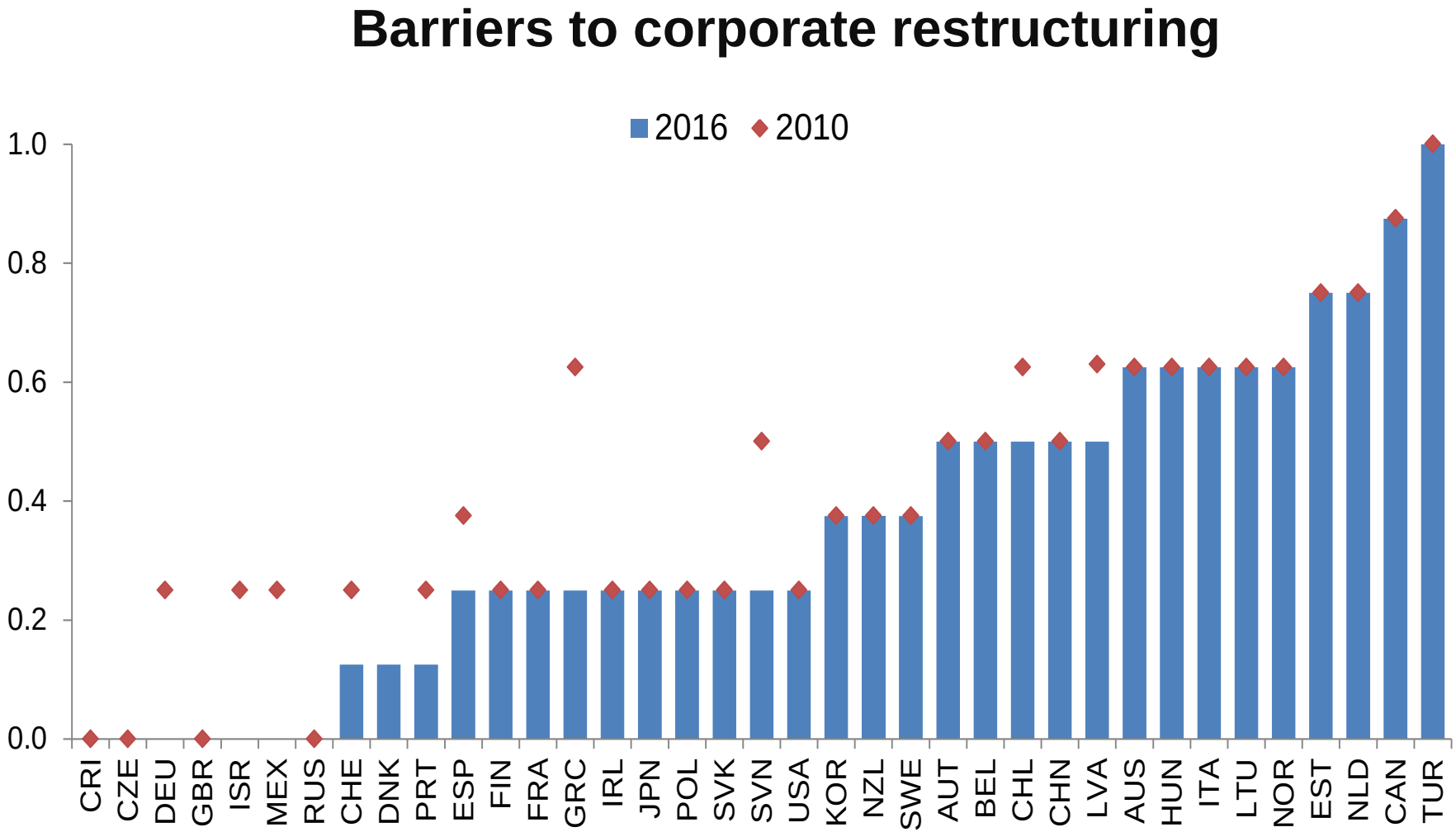
Equal weights assigned to each feature for the composite indicators

Cross-country differences in the design of personal insolvency regimes

Personal costs to failed entrepreneurs



Barriers to corporate restructuring also vary significantly across countries



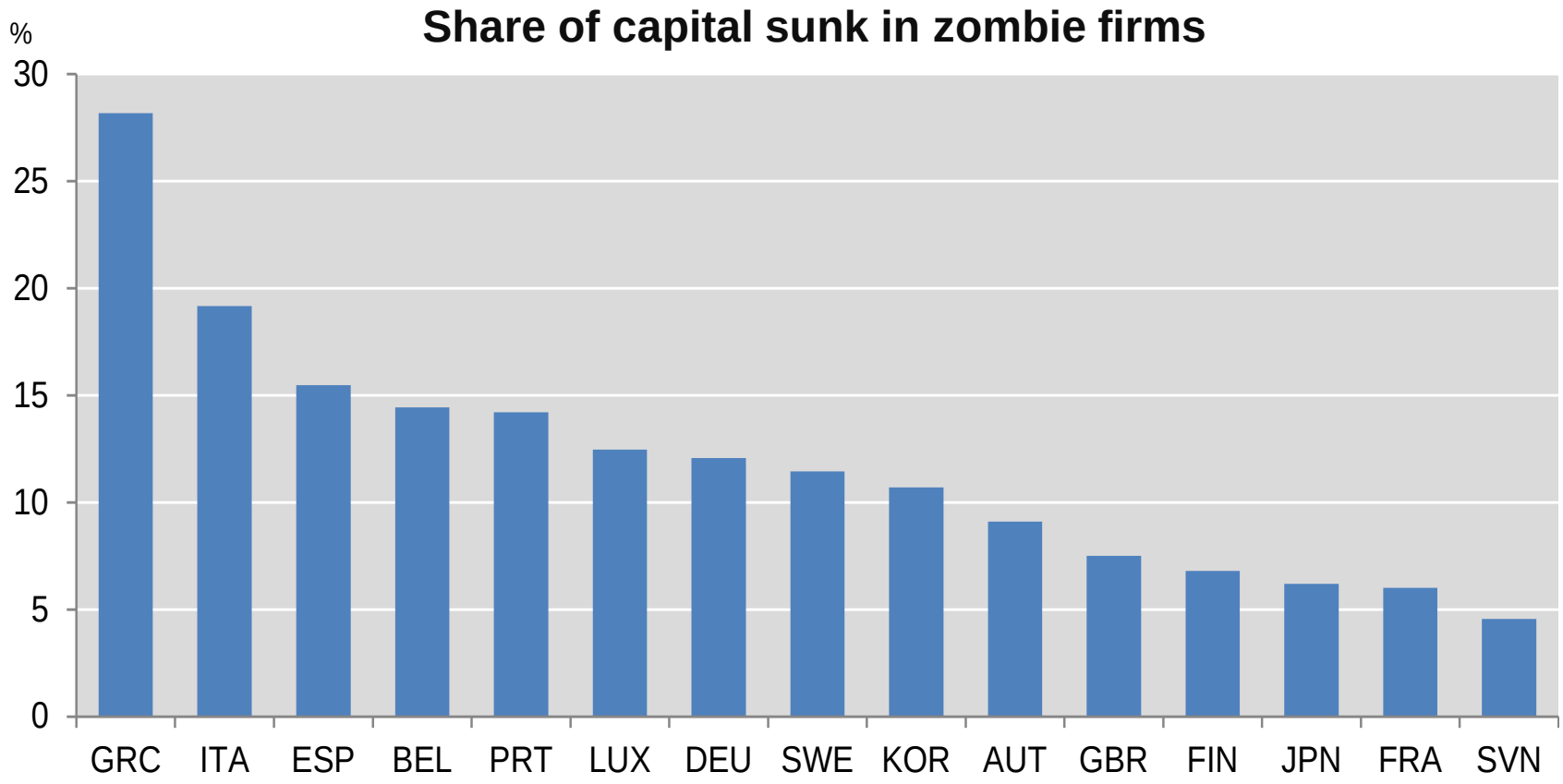
INSOLVENCY REGIMES, ZOMBIE FIRMS AND CAPITAL REALLOCATION

Firm level dataset – ORBIS

- Largest firm-level dataset of firms worldwide; revenue, employment, assets, profits and financial conditions
- Cleaning & filtering following Kalemli-Ozcan et al (2015) and Gal (2013); representativeness checks (i.e. apply weights based on business register; cty*ind*year*size)
- Capital stock (book values, implied gross investment then applying PIM); revenue MFP – Solow and Wooldridge (2009)
- Unconsolidated accounts → lowest level of aggregation
- Sample restricted to 14 countries with best coverage in 2013: AT, BE, DE, ES, FI, FR, GB, GR, IT, JP, KR, PT, SE, SI; NACE Rev 1.1 15-74, exc. 65-67

Zombie congestion varies significantly across countries

Firms aged ≥10 years and with an interest coverage ratio<1 over three consecutive years , 2013



Source: Adalet McGowan, M., D. Andrews and V. Millot (2017), "The Walking Dead? Zombie Firms and Productivity Performance in OECD countries", OECD Economics Department Working Paper No 1372.

Methodology

- Rajan & Zingales (1998): firms operating in industries with "naturally" higher firm turnover should be more exposed – and thus disproportionally affected – by insolvency regimes.

$$ZKS_{cs} = \alpha + \sum_j \beta_1^j Insol_c^j * Exp_s + \sum_k \beta_2^k Pol_c^k * Exp_s + \delta_c + \delta_s + \varepsilon_{cs}$$

  - *ZKS* is the share of capital sunk in zombie firms in industry *s* and country *c* in 2013
  - *Insol* refers to different features of the insolvency regime in 2010
  - *Exp* is the industry exposure to policies (firm turnover rates for the US)
  - *Pol* refers to other national level policies (PMR, EPL, Rule of Law)
  - δ_c and δ_s are country and industry fixed effects

Predictions: $\beta_1 > 0$ → High barriers to restructuring should disproportionately raise zombie congestion in industries with higher firm turnover relative to low firm turnover industries

Zombie capital shares and insolvency regimes

Dependent variable: zombie capital shares					
	(1)	(2)	(3)	(4)	(5)
Personal costs to failed entrepreneurs*Turnover	0.01420***			0.01095***	0.01426***
	(0.004)			(0.004)	(0.004)
Lack of prevention and streamlining*Turnover		0.00418*		0.00095	0.00012
		(0.002)		(0.003)	(0.002)
Barriers to restructuring*Turnover			0.01296***	0.00745*	0.00879*
			(0.004)	(0.004)	(0.005)
Number of observations	558	558	558	558	558
AdjR2	0.319	0.306	0.314	0.321	0.320
Administrative burdens on start-ups*Turnover	NO	NO	NO	NO	YES
Rule of Law*Turnover	NO	NO	NO	NO	YES
EPL including CD*Turnover	NO	NO	NO	NO	YES
Country Fixed Effects	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES

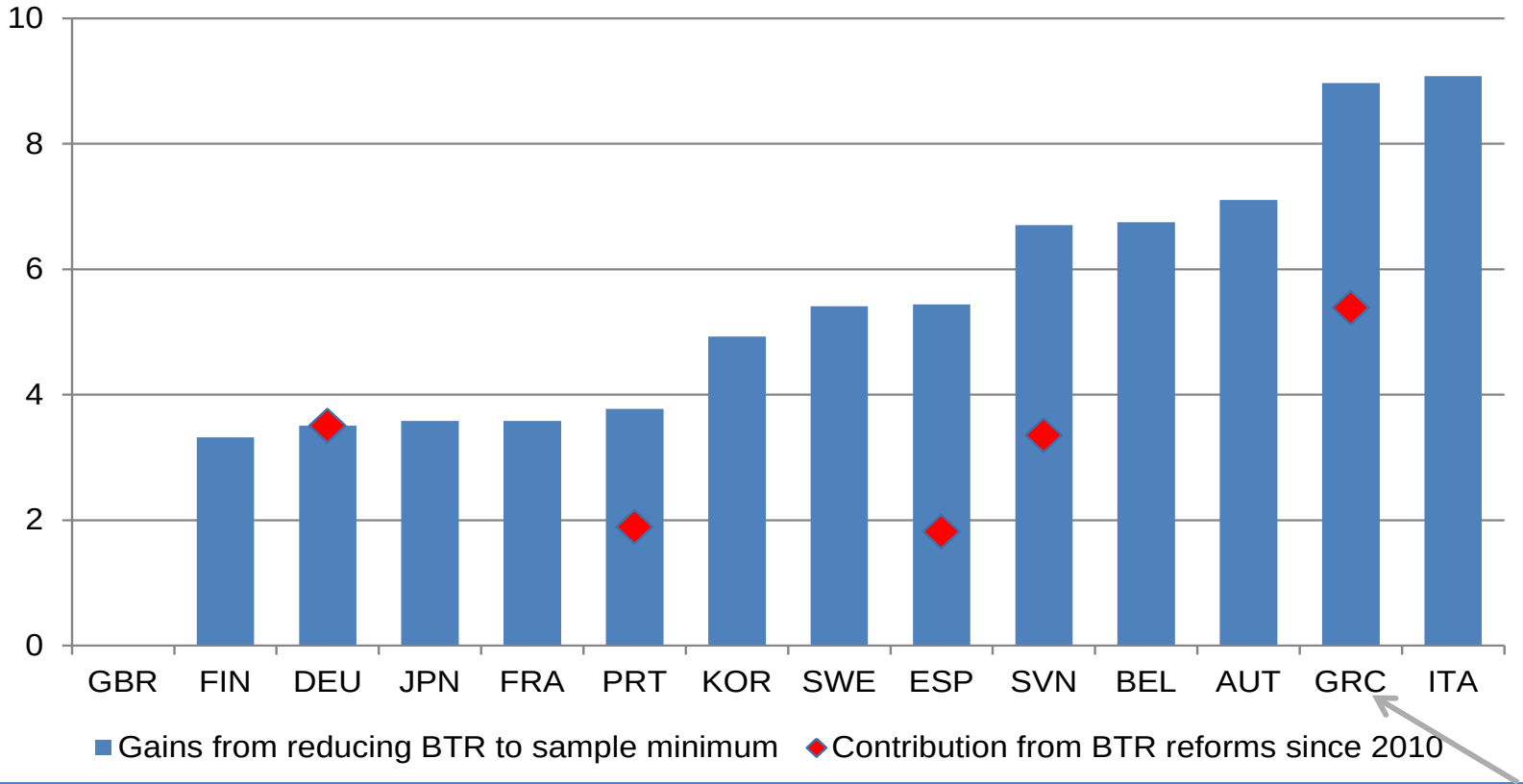
14 countries (AUT, BEL, DEU, ESP, FIN, FRA, GBR, GRC, ITA, JPN, KOR, PRT, SWE and SVN) in 2013

Results are robust to:

- Outlier & leverage control: dropping **one country at a time** and using the Stata **robust regression** routine
- Using **different definitions** of zombies based on interest coverage ratio (different age and persistence thresholds).
- Using **more exogenous** measures of zombie firms in a smaller sample of countries; i.e. firms receiving subsidised credit (Caballero et al, 2008).
- Using SDBS weights to address ORBIS **representativeness issues**.
- Using **2016** insolvency regime indicators
- Excluding firms which are part of a **multinational group**

Reforms to insolvency regimes can reduce zombie congestion

Reduction in zombie capital share (ZKS) associated with reducing barriers to restructuring (BTR) to sample minimum level (%)



In 2013, the ZKS in Greece = 27%. Reforming BTR to best practice could reduce the ZKS by 9%pts, with recent reforms potentially accounting for 5%pts of these gains.

Other results: channels and extensions

Corporate restructuring as a key channel

- Higher barriers to restructuring are associated with a lower likelihood that zombies subsequently return to better financial health and (marginal) non-zombies avoid turning into zombies

Insolvency regimes & dynamic capital reallocation

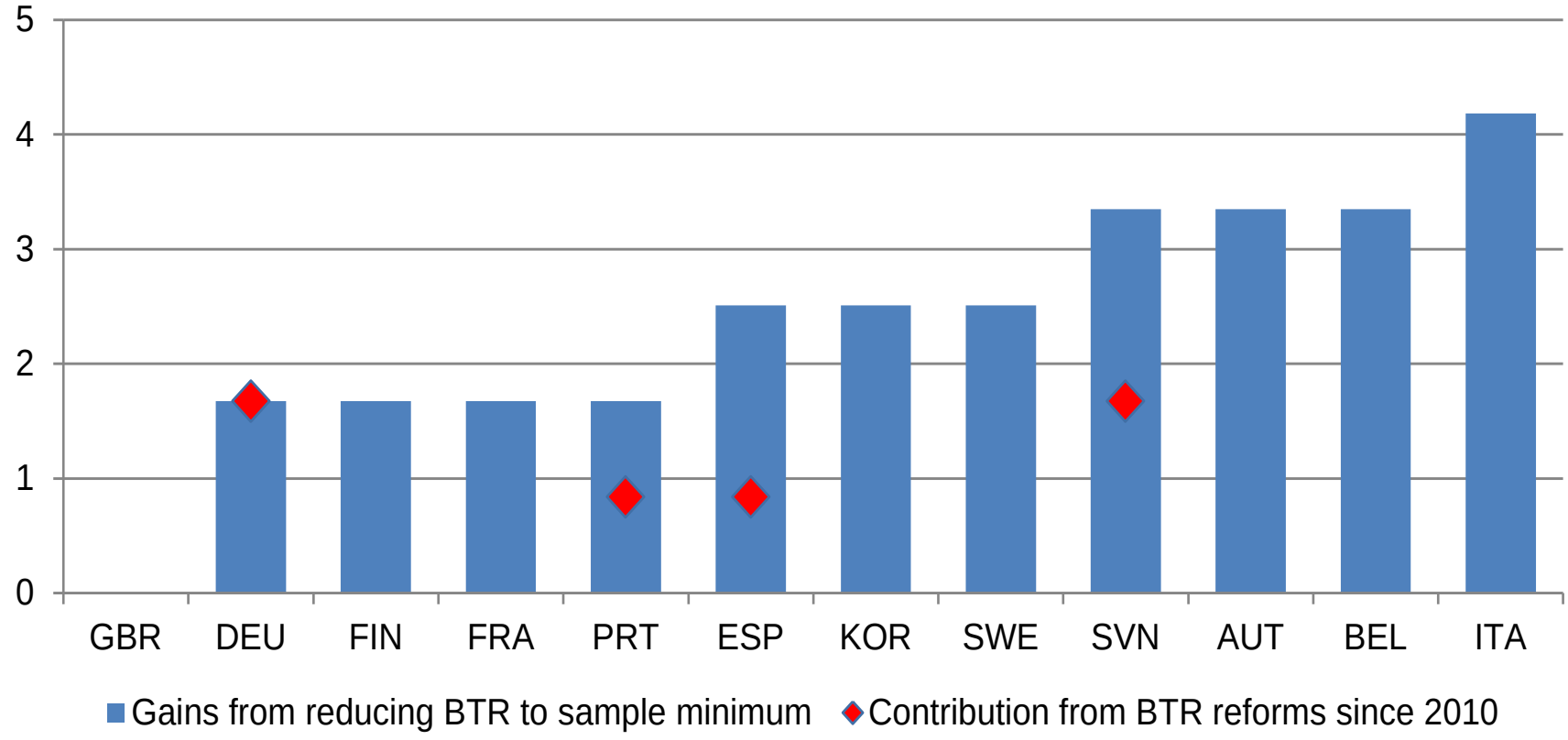
- Canonical models of firm dynamics predict that conditional on firm size, firms with higher (lagged) MFP should grow more quickly (see: Foster et al 2016; Decker et al 2017).
  - On average, we find that more productive firms attract more capital.
  - But higher barriers to restructuring are associated with a lower likelihood that capital flows to more productive firms in industries with high firm turnover relative to other industries

SPARES

Efficient insolvency regimes can foster productivity-enhancing capital reallocation

Gain to the efficiency of capital reallocation associated with lowering barriers to restructuring (BTR) to sample minimum level

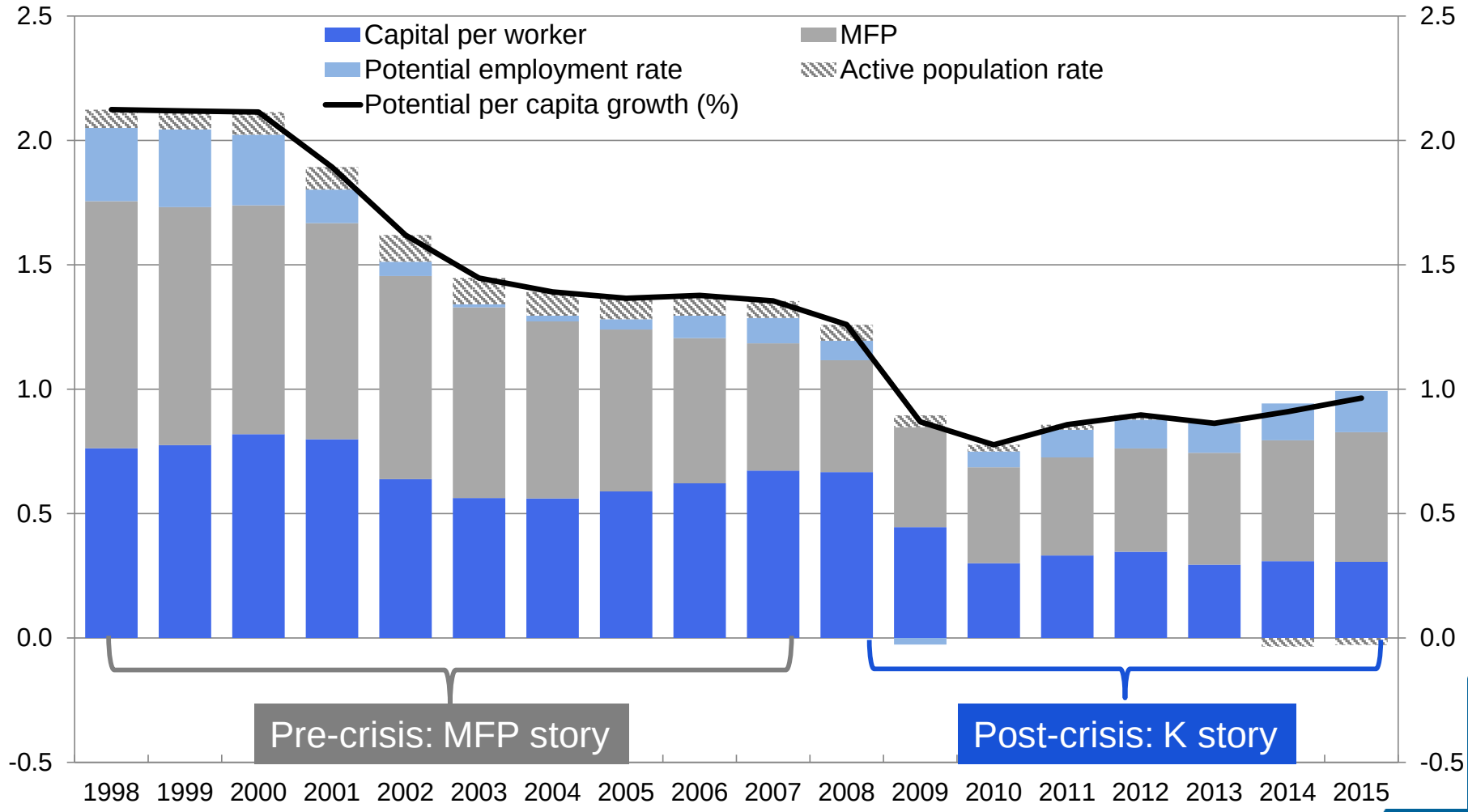
Diff. in capital growth between high & low MFP firms; high *minus* low turnover industries



In Spain, reforming BTR to best practice could improve capital reallocation by 2.5%pts, with recent reforms potentially accounting for 0.8%pts of these gains

Weak labour productivity underpins the collapse in OECD potential growth

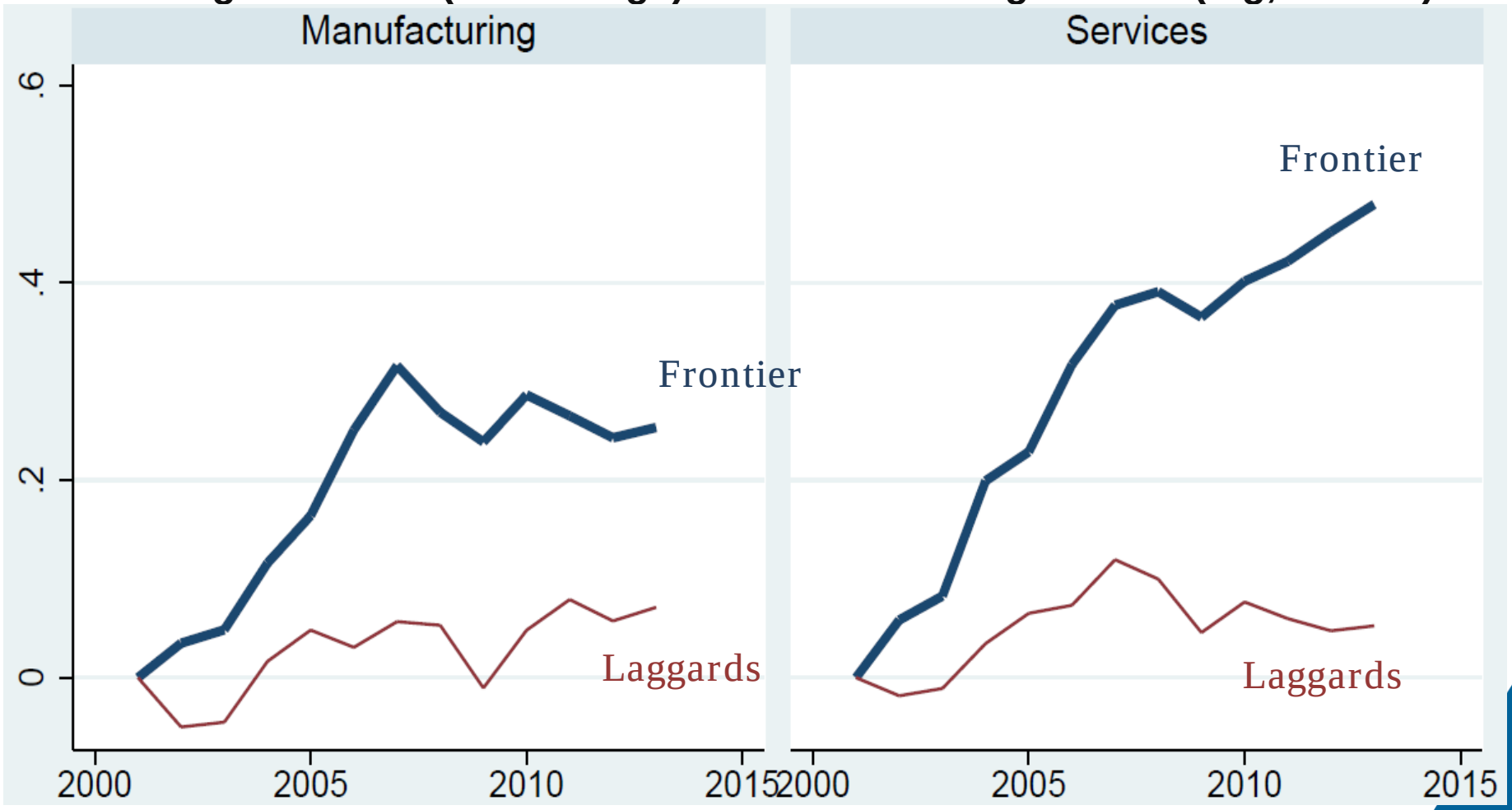
Contribution to potential per capita output growth (% pts unless otherwise noted)



Source: OECD Economic Outlook 2016, Volume 1.

Productivity dispersion is rising

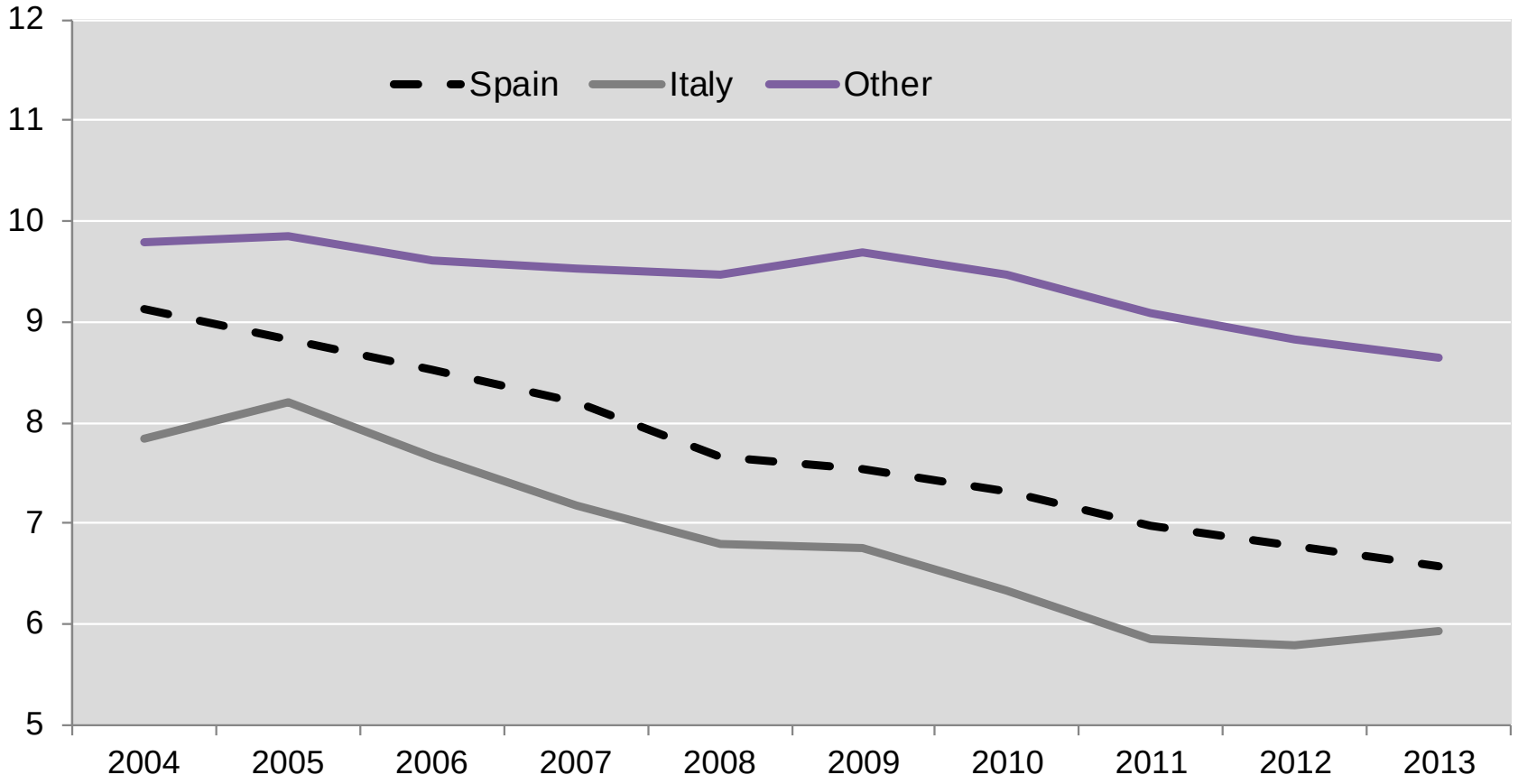
Average of MFPR (Wooldridge) across each 2-digit sector (log, 2001=0)



Source: Andrews, D. C. Criscuolo and P. Gal (2016), "The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy", OECD Productivity Working Papers, No. 5.

Rising productivity dispersion, but declining reallocation

Difference in capital growth between high and low productivity firms (%pts)



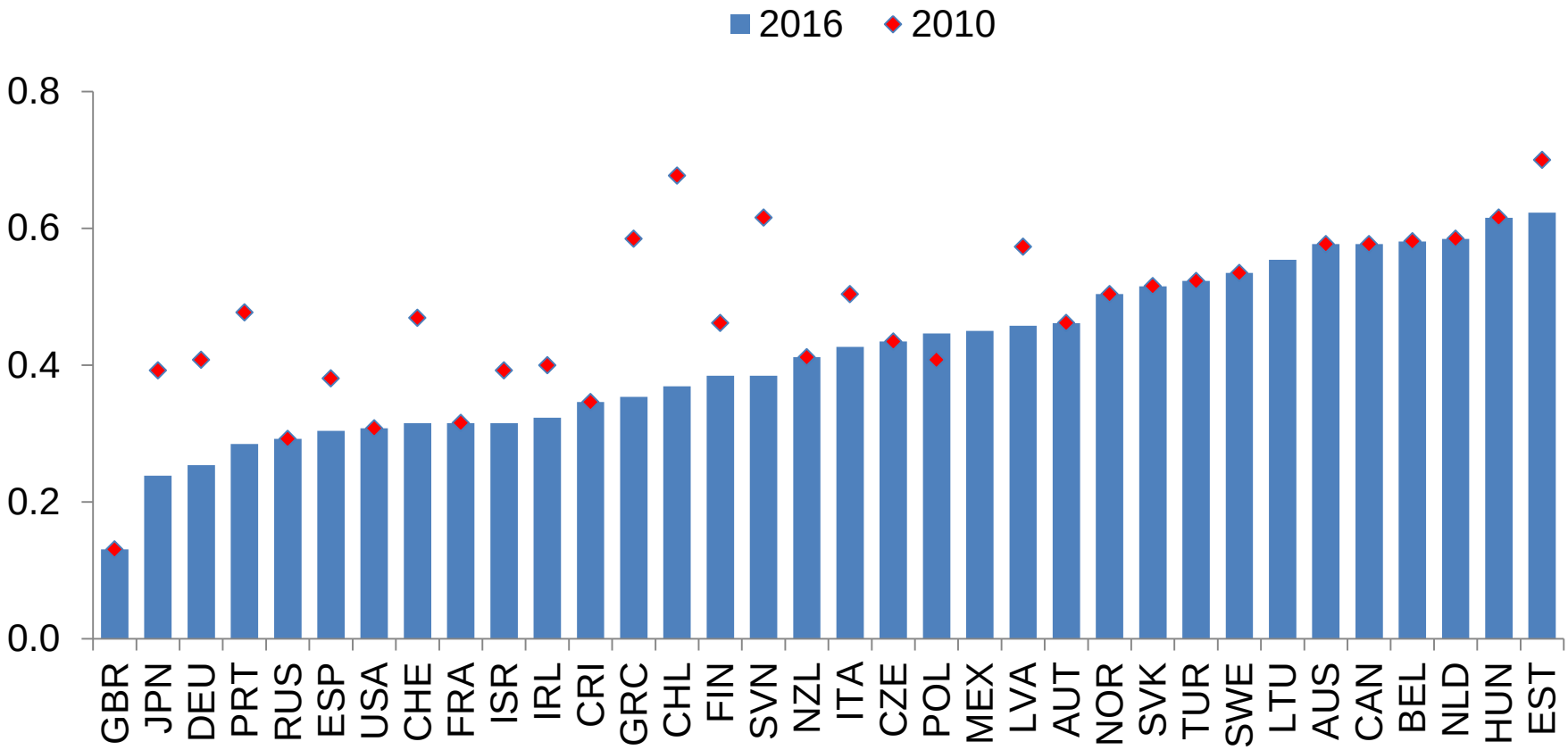
Source: Adalet McGowan, M., D. Andrews and V. Millot (2017), "The Walking Dead? Zombie Firms and Productivity Performance in OECD countries", OECD Economics Department Working Paper No. 1372.

Insolvency regimes: rationale, goals and trade-offs

- Rationale: market imperfections prevent the orderly exit of failing firms
- Goals: insolvency regimes can restructure viable firms and liquidate non-viable ones
  - In practice, correctly distinguishing between viable and non-viable firms can be difficult.
- Trade-offs: insolvency regimes need to balance providing incentives for experimentation by entrepreneurs with lending by creditors.

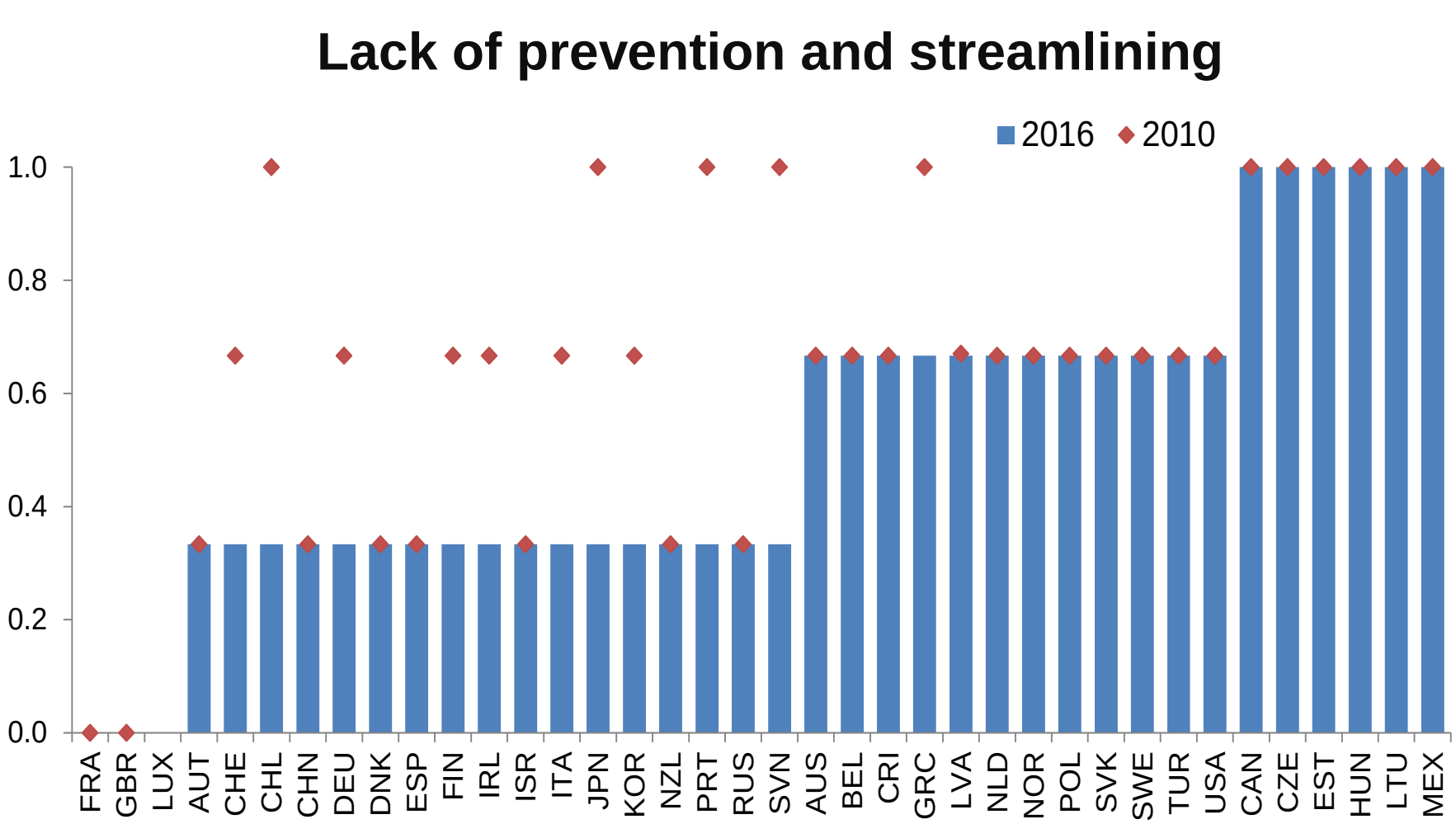
Cross-country differences in insolvency regimes are significant

Composite indicators of insolvency regimes

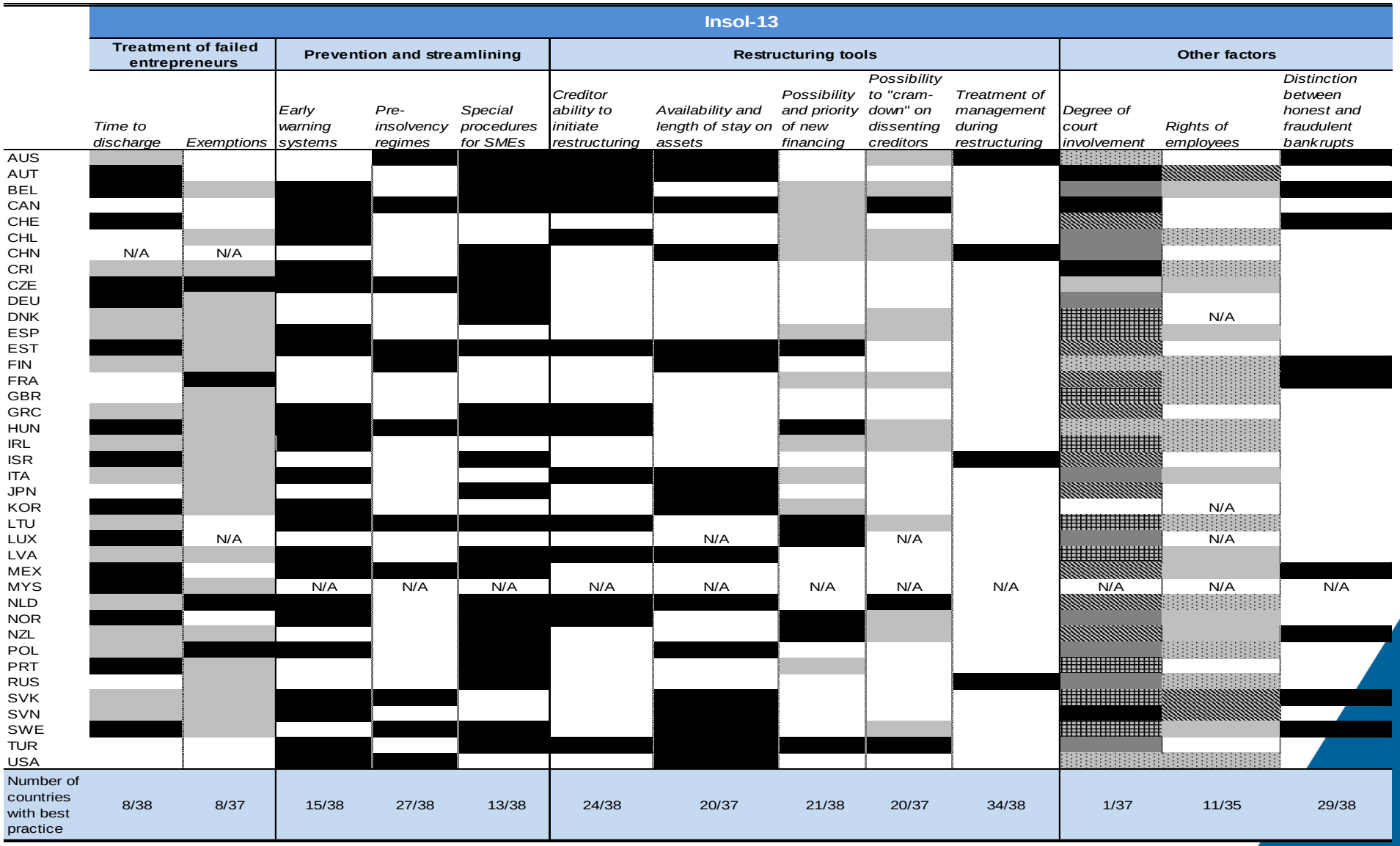


Useful for EDRC and GFG, given much scope to reform insolvency regimes in some countries

… and preventative and streamlining tools



Operationalising insolvency reform



Methodology: *how do we identify zombie firms?*

Approach 1: Persistent financial weakness:

A. Firms with interest coverage ratio<1 for 3 consecutive years (Bank of Korea)

B. Firms with negative profits (Bank of England)

C. Firms with negative value added

→ *We focus on incumbent firms aged ≥ 10 years*

Methodology: *how do we identify zombie firms?*

Approach 2: Firms receiving subsidized bank credit (Caballero et al., 2008):

- Actual interest repayments are less than an estimated benchmark R^* based on the firm debt structure and market interest rates

$$R^*_{i,t} = rs_{t-1} BS_{i,t-1} + \left(\frac{1}{5} \sum_{j=1}^{5} rl_{t-j} \right) BL_{i,t-j}$$

where $BS_{i,t}$ = short-term loans (less than one year) of firm *i* at the end of year *t*

$BL_{i,t}$ = long−term debt (more than one year) of firm *i* at the end of year *t*

rs_t = average short−term prime rate year *t*

rl_t = average long−term prime rate year *t*

- Pros: more directly linked to “evergreening” or “forbearance”; more exogenous?
- Cons: data availability is more challenging relative to (1)

Baseline analysis is based on Approach (1A) but our results hold in a smaller sample based on Approach (2). 1A and 2 highly correlated.

Excluding MNEs

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Dependent variable: zombie capital shares

Panel A: **Composite insolvency indicators**	**Insol-12**	Personal costs to failed entrepreneurs	Lack of prevention and streamlining	Barriers to restructuring
Insolvency*Turnover	0.01171***	0.00998***	0.00375**	0.00747**
	(0.004)	(0.003)	(0.002)	(0.004)
Number of observations	515	515	515	515
AdjR2	0.350	0.353	0.347	0.347
Panel B: **Individual features**		*Time to discharge*	*Lack of early warning mechanisms*	*Creditors cannot initiate restructuring*
Insolvency*Turnover		0.00335***	0.00271**	0.00121
		(0.001)	(0.001)	(0.001)
Number of observations		515	515	515
AdjR2		0.348	0.348	0.343
Panel C: **Other policies**	Administrative burdens on start-ups	Rule of law	EPL including CD	
Policy*Turnover	0.00363**	-0.00336***	0.00404***	
	(0.001)	(0.001)	(0.001)	
Number of observations	515	515	515	
AdjR2	0.348	0.351	0.350	
Country Fixed Effects	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES

Alternative definitions of zombie firms

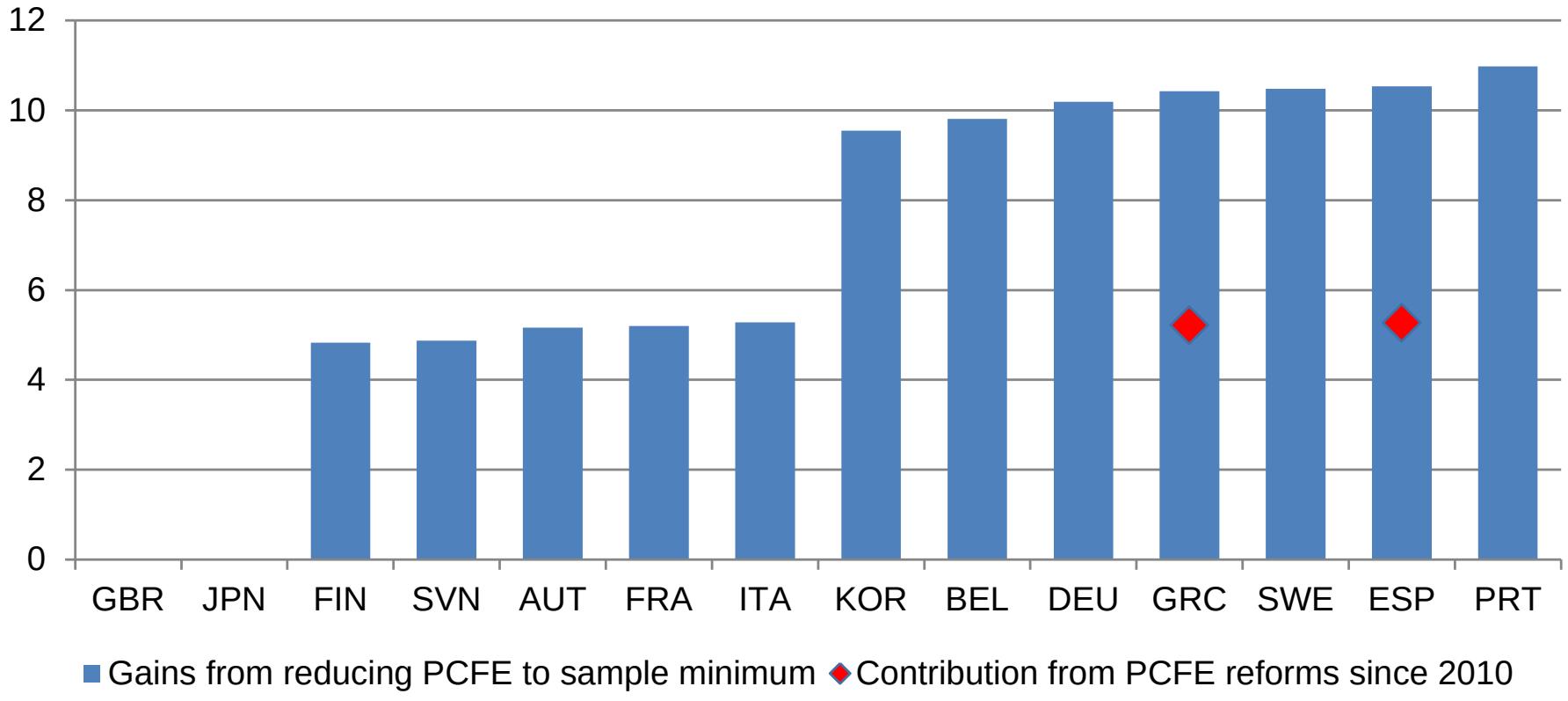
Zombie capital shares: alternative definitions

	Panel A: 3 years persistence, Age≥ 15 years					Panel B: 5 years persistence, Age≥ 10 years				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Insol-12*Turnover	0.01170**					0.00913***				
	(0.005)					(0.003)				
Personal costs to failed entrepreneurs*Turnover		0.01175***			0.00953***		0.00745***			0.00566**
		(0.003)			(0.003)		(0.002)			(0.002)
Lack of prevention and streamlining*Turnover			0.00335		0.00091			0.00176		-0.00017
			(0.002)		(0.002)			(0.001)		(0.001)
Barriers to restructuring*Turnover				0.00963***	0.00477				0.00733***	0.00503*
				(0.004)	(0.004)				(0.002)	(0.003)
Number of observations	558	558	558	558	558	558	558	558	558	558
AdjR2	0.288	0.295	0.283	0.288	0.295	0.289	0.291	0.280	0.289	0.292
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

	Panel C: 5 years persistence, Age≥ 15 years					Panel D: Zombie measure based on Caballero et al. (2008)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Insol-12*Turnover	0.00771***					0.01401**				
	(0.003)					(0.007)				
Personal costs to failed entrepreneurs*Turnover		0.00650***			0.00517***		0.00472			0.00304
		(0.002)			(0.002)		(0.005)			(0.006)
Lack of prevention and streamlining*Turnover			0.00147		-0.00009			0.00110		-0.00156
			(0.001)		(0.001)			(0.003)		(0.003)
Barriers to restructuring*Turnover				0.00587***	0.00372*				0.01254**	0.01291*
				(0.002)	(0.002)				(0.006)	(0.007)
Number of observations	558	558	558	558	558	558	558	558	558	558
AdjR2	0.291	0.294	0.283	0.290	0.295	0.683	0.683	0.680	0.685	0.680
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Reforms to insolvency regimes can reduce zombie congestion

Reduction in zombie capital share (ZKS) associated with reducing personal cost to failed entrepreneurs (PCFE) to best practice level (%)



Insolvency regimes and corporate restructuring

Transition status of firms between 2010 and 2013

	(1) **Insol-12**	(2) Barriers to restructuring	(3) *Creditors cannot initiate restructuring*
	Estimation by OLS		
Insolvency*Turnover	-0.00344 (0.003)	-0.00399** (0.002)	-0.00132* (0.001)
	Estimation by Ordered Logit		
Insolvency*Turnover	-0.03783 (0.035)	-0.04463** (0.019)	-0.01442** (0.007)
Country Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Observations	787,466	787,466	787,466

$$Status_{icst} = \alpha + \sum_j \beta_1^j Insol_c^j * Exp_s + \sum_k \beta_2^k Pol_c^k * Exp_s + \sum_k \beta_3^k X_{icst-1}^k + \delta_c + \delta_s + \varepsilon_{icst}$$

INSOLVENCY REGIMES AND CAPITAL REALLOCATION

Methodology

- Foster, Grim & Haltiwanger (2016): models of firm dynamics predict that conditional on size, firms with higher MFP grow more quickly (Cooper et al., 2007)

$$\Delta K_{icst} = \alpha + \beta_1 MFP_{icst-1} + \sum_j \beta_2^j MFP_{icst-1} * Insol_c^j * Exp_s + \beta_3 MFP_{icst-1} * C_c + \beta_4 MFP_{icst-1} * S_s +$$

$$\sum_k \beta_5^k X_{icst-1}^k + \delta_{cs} + \varepsilon_{icst}$$

  - Cross-section, t = 2013
  - Firm MFP is the deviation from country-industry-year averages
  - Exp is the industry s exposure to policies (firm turnover rates for the US)
  - X denotes a vector of firm age and firm size
  - C_c and S_s are country and industry fixed effects
  - Standard errors clustered at country*industry level

Predictions: $\beta_1>0$ and $\beta_2<0$

High barriers to restructuring should disproportionately reduce the efficiency of capital reallocation in industries with higher firm turnover

Capital reallocation and insolvency regimes, 2013

Dependent variable: growth in the real capital stock

Panel A: **Composite insolvency indicators**	**Insol-13**	**Insol-12**
Insolvency*Lagged MFP*Turnover	-0.02007***	-0.01614***
	(0.007)	(0.006)
Number of observations	870,865	890,527
AdjR2	0.0193	0.0207

Panel B: **Insolvency indicators**	Personal costs to failed entrepreneurs	*Stringent exemption of assets*	Lack of prevention and streamlining	*Lack of early warning mechanisms*
Insolvency*Lagged MFP*Turnover	-0.00471	-0.00980***	-0.00180	-0.00231**
	(0.004)	(0.003)	(0.003)	(0.001)
Number of observations	890,527	890,527	890,527	890,527
AdjR2	0.0207	0.0208	0.0207	0.0207

Panel C: **Insolvency indicators**	Barriers to restructuring	*Creditors cannot initiate restructuring*	*Indefinite length of stay*	*Priority of new financing*
Insolvency*Lagged MFP*Turnover	-0.01038***	-0.00238***	-0.00260***	0.00010
	(0.003)	(0.001)	(0.001)	(0.001)
Number of observations	890,527	890,527	890,527	890,527
AdjR2	0.0208	0.0207	0.0207	0.0207
Firm age and size controls	YES	YES	YES	YES
Country Dummies*Lagged MFP	YES	YES	YES	YES
Industry Dummies*Lagged MFP	YES	YES	YES	YES
Country*Industry Fixed Effects	YES	YES	YES	YES

12 countries: AT, BE, DE, ES, FI, FR, GB,IT,KR, PT,SE, SI

Robust standard errors clustered at country*industry level

Future work

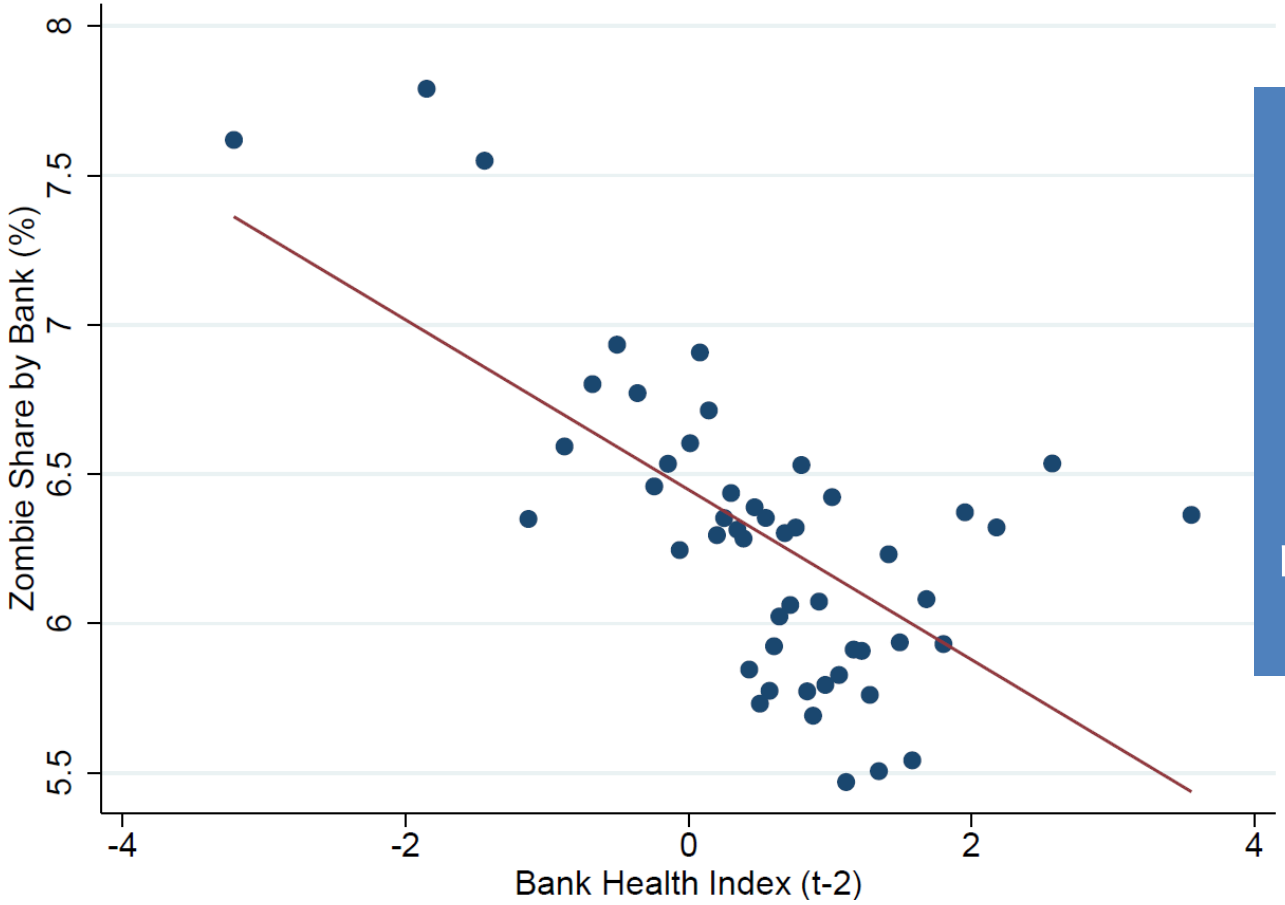
- Insolvency regimes and **within-firm** productivity growth – i.e. innovation and adoption

- Connection between **zombie firms & weak banks,** and how this link is shaped by insolvency regimes.

Banks matter: *zombie firms are more likely to be connected to weak banks*

Average zombie share for each bin of bank health

Purged of country-industry-year fixed effects



And improvements in bank health translate into larger reductions in the zombie firm share in countries where insolvency regimes do not unduly inhibit restructuring

Source: D. Andrews and F. Petroulakis (2017), "Breaking the Shackles: Zombie Firms, Weak Banks and Depressed Restructuring in Europe", *forthcoming*.

Channels: *key features from model in Caballero et al (2008)*

- In a world without zombies, incumbents hit by unfavourable shocks exit, and are replaced by new entrants hit by favourable productivity draws.
- In a world with zombies, subsidised incumbents don't exit when hit by unfavourable shocks ("sclerosis"). In turn:
  - **Congestion**: non-zombies must compete with zombies for scarce resources; zombies may even ↓ prices & ↑ wages to compete aggressively
  - ***Non-zombies bare all the adjustment to shocks***: potentially productive entrants decide not to enter and healthy incumbents scrap expansion plans
  - **Entrants** must clear a higher productivity threshold to compensate for lower profitability caused by congestion

Methodology: zombies and "average" non-zombie performance

Baseline specification taken from Caballero et al (2008):

$$Y^{k}_{icst} = \beta_1 nonZ_{icst} + \beta_2 nonZ_{icst} * Z_{cst} + \beta_3 X_{icst-1} + \delta_{cst} + \varepsilon_{icst}$$

- Y (k=3): 1-investment, 2-employment growth; 3-MFP
- nonZ is dummy=1 if firm is a non-zombie; =0 if zombie firm
- Z is the share of industry capital sunk in zombie firms
- X: Firm level controls (firm age, size etc)
- Country-industry-year fixed effects: cyclical shocks
- Standard errors clustered at country*industry*year level

Predictions: $\beta_2<0$ for K & E | $\beta_2>0$ for MFP

- The presence of zombie will generate distortions for non-zombie firms: depress K & E growth + widen the MFP gap

Zombie congestion and "average" non-zombie firm performance

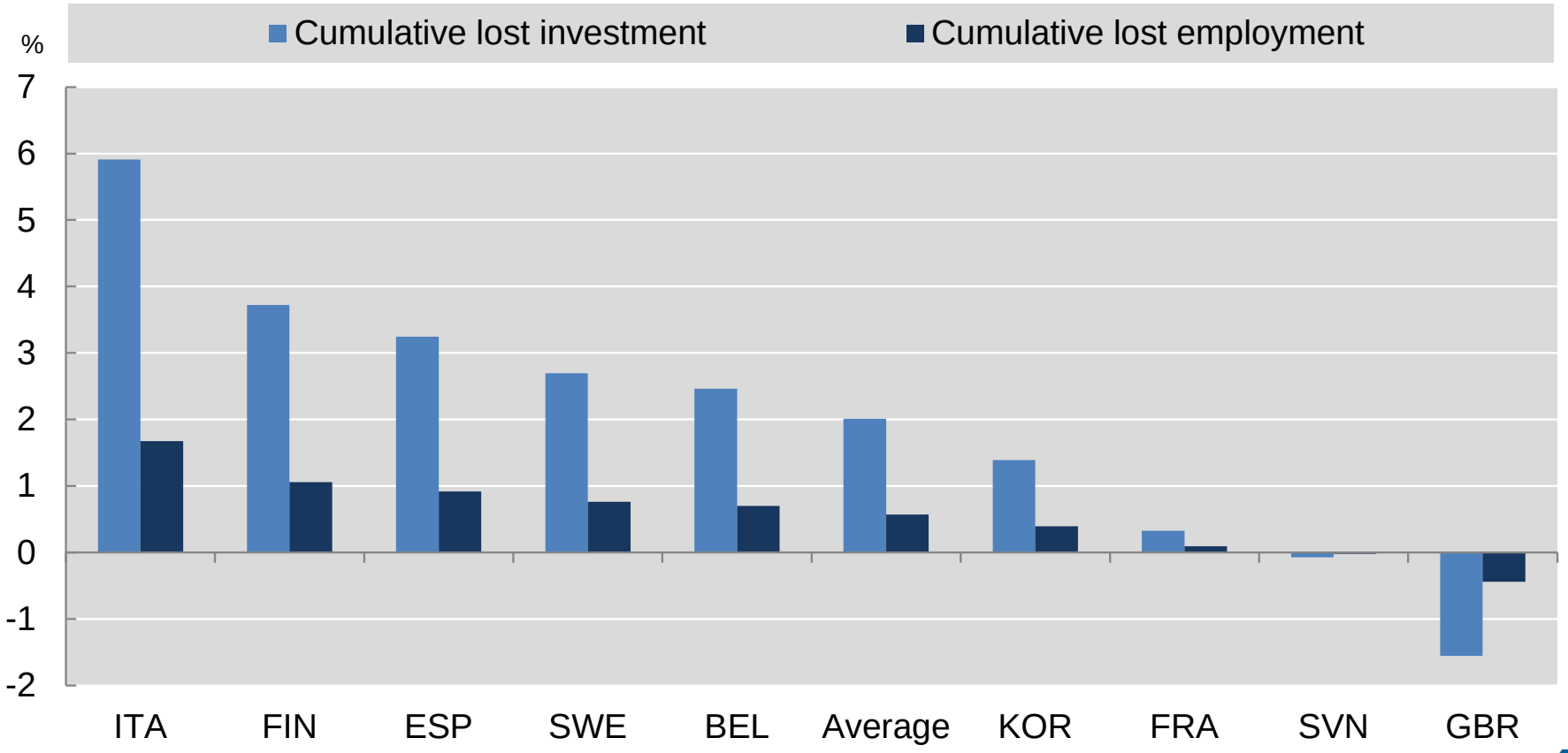
Zombie measure: interest coverage ratio<1 over the past three years and firms older than 10 years old

	(1)	(2)	(3)	(4)	(5)	(6)
	A: Panel of 9 countries, 2003-2013			***B: Cross section of 13 countries,***		
VARIABLES	*log(I/K)*	*dLog Emp*	*MFP*	*log(I/K)*	*dLog Emp*	*MFP*
Non-zombie dummy$_{i,t}$	0.07372***	0.06943***	0.52738***	0.06342***	0.08335***	0.57842***
	(0.00288)	(0.00172)	(0.01198)	(0.00794)	(0.00479)	(0.02918)
Non-zombie dummy$_{i,t}$ X Industry zombie shares$_{s,t}$	-0.13257***	-0.03759***	0.47019***	-0.07791**	-0.04757*	0.49190***
	(0.01752)	(0.01197)	(0.10471)	(0.03752)	(0.02490)	(0.17904)
Firm Age and Size Controls	YES	YES	YES	YES	YES	YES
Industry*Country Fixed Effects	NO	NO	NO	YES	YES	YES
Industry*Country*Year Fixed Effects	YES	YES	YES	NO	NO	NO
Observations	10,121,532	10,121,532	7,956,552	1,234,596	1,234,596	1,030,477
AdjR2	0.0193	0.0244	0.832	0.0152	0.0218	0.815

Source: Adalet McGowan, M., D. Andrews and V. Millot (2016), "The Walking Dead? Zombie Firms and Productivity Performance in OECD countries", OECD Economics Department Working Paper No. 1372.

CF2: Zombie congestion and non-zombie performance

Investment and employment loss of a typical non-zombie firm due to a rise in the zombie capital share after 2007



Source: Adalet McGowan, M., D. Andrews and V. Millot (2017), "The Walking Dead? Zombie Firms and Productivity Performance in OECD countries", OECD Economics Department Working Paper No. 1372..

The “average” firm is tenuous, given widespread firm heterogeneity

Within-industry MFPR distribution moments, 2013

Log points; Unweighted average across industries

Within-industry moment	Mean	Std. Dev.	IQ range
	All firms		
Median	5.785	1.841	2.258
IQ range	0.917	0.443	0.439
90-10 percentile range	1.844	0.778	0.867
95-5 percentile range	2.477	1.008	1.180

Widespread heterogeneity in firm productivity creates scope for productivity-enhancing reallocation

What if zombie congestion disproportionately constrains the growth of more productive firms?

Methodology: zombie congestion and reallocation

- Canonical models of firm dynamics predict that conditional on size, firms with higher MFP grow more quickly (Foster et al., 2016; Decker et al., 2016; Cooper et al., 2007)

$$Capital\ growth_{isct} = \delta_1 MFP_{isct-1} + \delta_2 MFP_{isct-1} * Z_{sct} + \delta_3 Firm\ controls_{isct-1} + \delta_{sct} + \epsilon_{isct}$$

where:

- Firm MFP is the deviation from country-industry-year averages
- Z is the share of industry resources sunk in zombie firms
- Firm controls are firm age and size
- Country-industry-year fixed effects
- Standard errors clustered at country*industry level

Zombie congestion and capital reallocation

Zombie measure: interest coverage ratio<1 over the past three years and firms older than 10 years old

	(1)	(2)	(3)	(4)
	A: Panel of 9 countries, 2003-2013		***B: Cross section of 13 countries,***	
	Zombie measure		*Zombie measure*	
VARIABLES	K-share	L-share	K-share	L-share
$MFP_{i,t-1}$	0.07819***	0.08241***	0.06458***	0.06588***
	(0.002)	(0.002)	(0.006)	(0.004)
$MFP_{i,t-1}$ X Industry zombie $shares_{s,t}$	-0.14017***	-0.26720***	-0.09088***	-0.15578***
	(0.018)	(0.026)	(0.034)	(0.034)
Firm Age and Size Controls	YES	YES	YES	YES
Industry*Country Fixed Effects	NO	NO	YES	YES
Industry*Country*Year Fixed Effects	YES	YES	NO	NO
Observations	6,405,339	6,405,339	902,271	902,271
AdjR2	0.0308	0.0310	0.0211	0.0211

Zombie congestion slows down productivity-enhancing capital reallocation – i.e. more productive firms are particularly harmed

Source: Adalet McGowan, M., D. Andrews and V. Millot (2017), "The Walking Dead? Zombie Firms and Productivity Performance in OECD countries", OECD Economics Department Working Paper No. 1372.