LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Institute for Accounting Auditing and Analysis

Christian Barthelme, Siemens Group christian.barthelme@whu.edu

Vicky Kiosse, University of Exeter p.kiosse@exeter.ac.uk

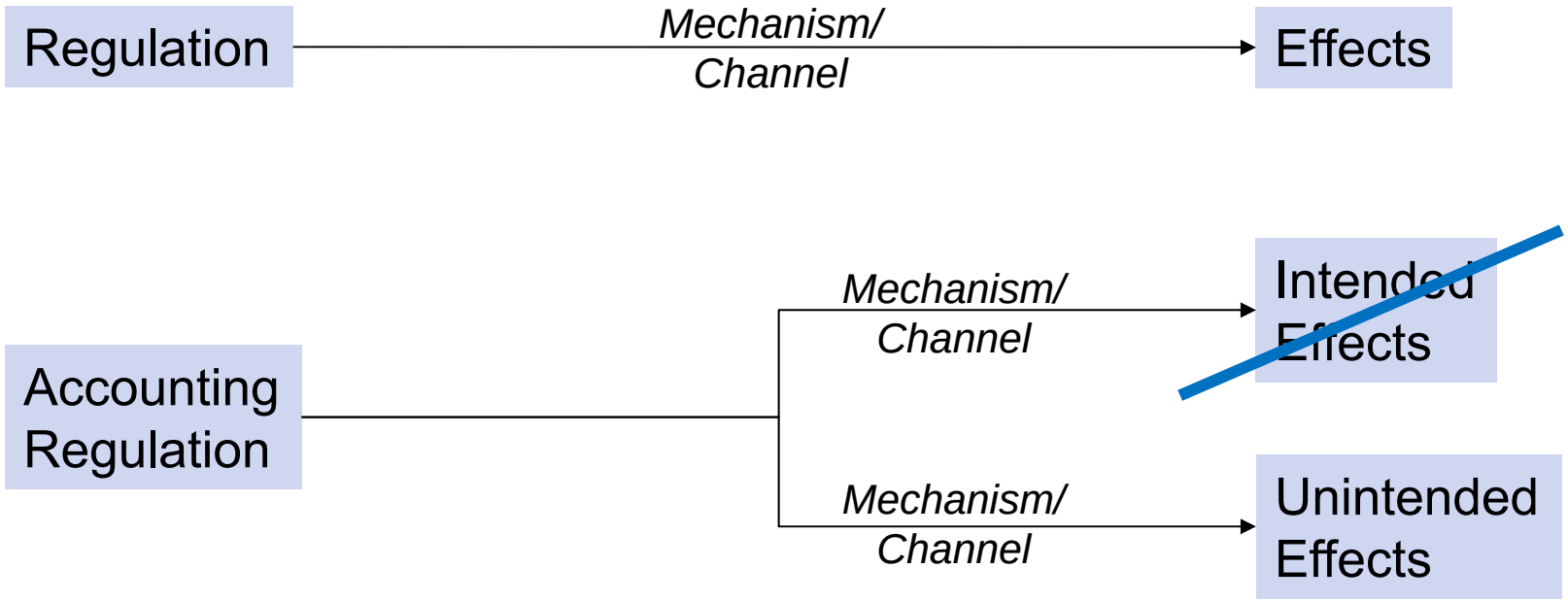
Thorsten Sellhorn, LMU Munich sellhorn@bwl.lmu.de

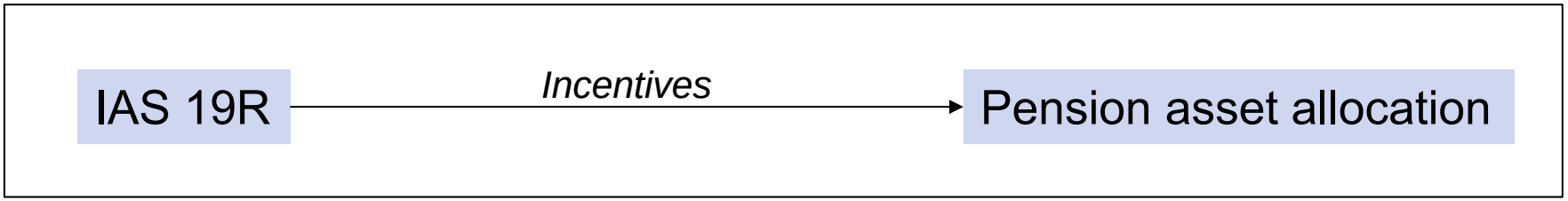
The impact of accounting standards on the allocation of pension assets

IASB Research Forum

Brussels, 28-29 November 2017

Big Picture
Effects studies of regulation



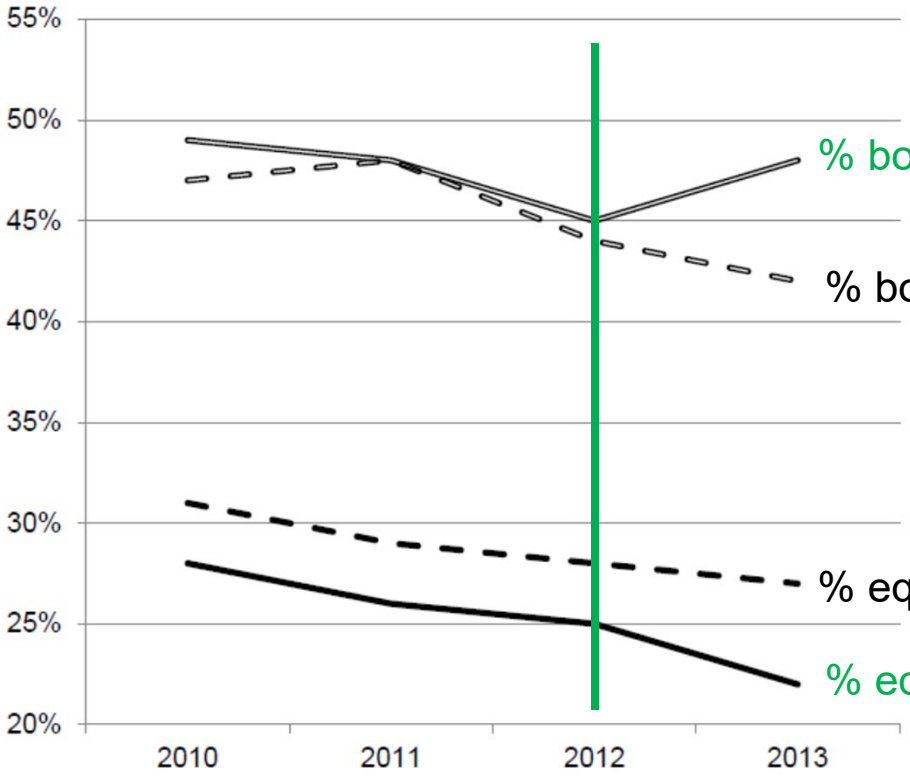


What got us interested
Anecdotal evidence

- *Christian Stracke*, Global Head of Credit Research, PIMCO: „the **volatility of the [pension] liability** is a critical factor in credit analysis.“

- Commenting on the imminent IAS 19R:
  - Deutsche Lufthansa AG states that “changes in the discount rate … and … fluctuations in the market value of plan assets, can in particular result in **considerable, unpredictable fluctuations in the balance sheet**.”
  - Deutsche Post AG (2010 comment letter): “… highlighting short-term volatility … may .. lead to **inefficient investment decisions by entities (in order to avoid such volatility**).”

Changes in firms‘ pension asset allocations around IAS 19R adoption



% bonds in plan assets: affected firms

% bonds in plan assets: unaffected firms

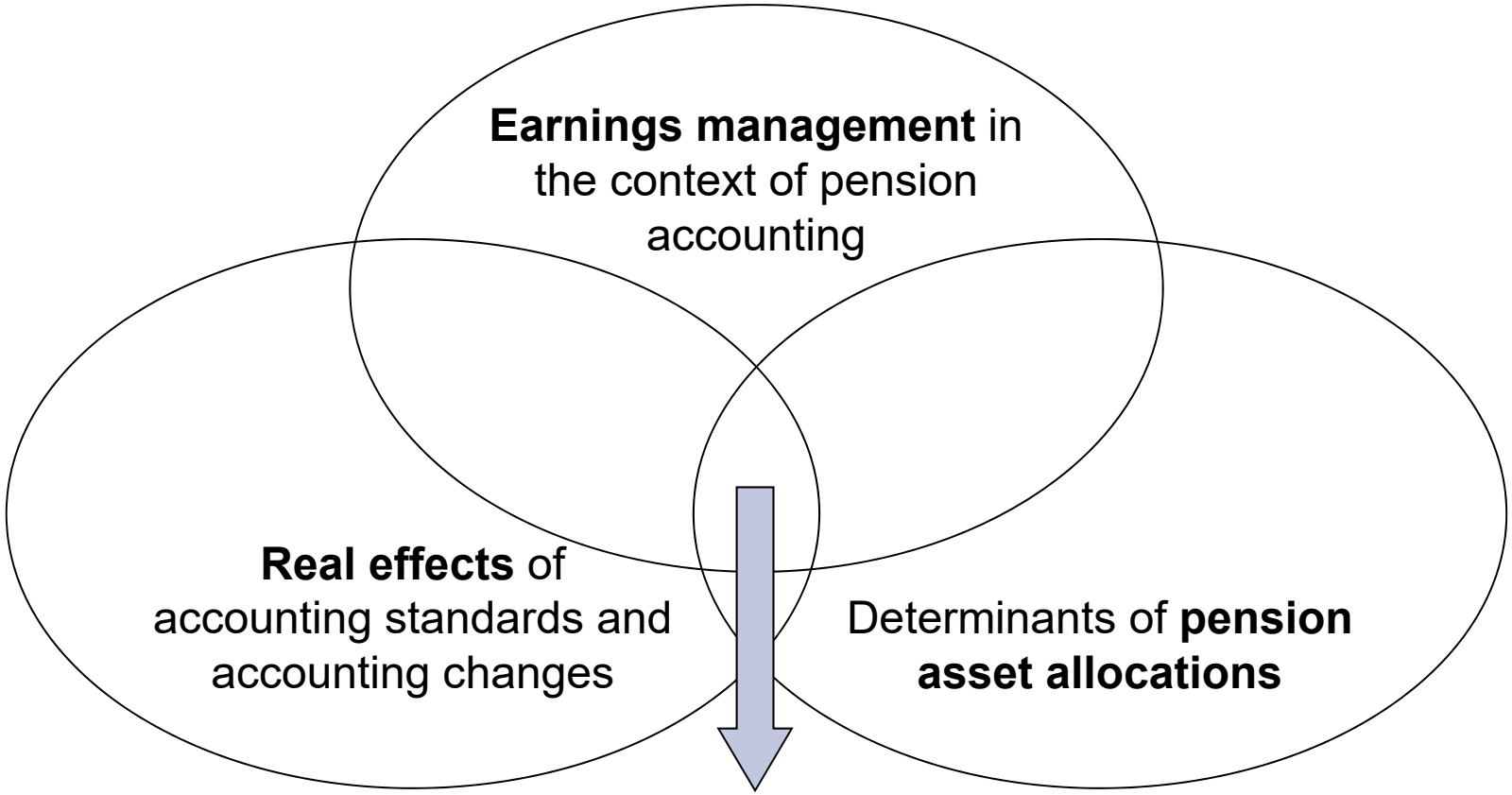
% equities in plan assets: unaffected firms

% equities in plan assets: affected firms

In a nutshell

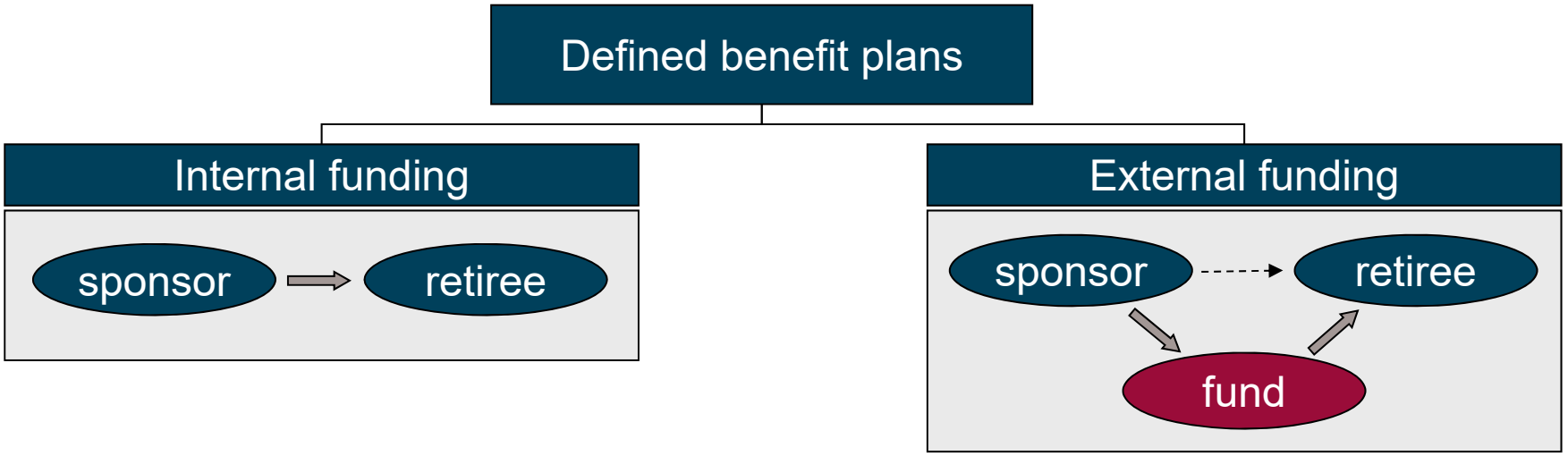
- ***What* are we studying?**
  - Research question: *How does mandatory adoption of IAS 19R affect pension asset allocation decisions made by pension plan sponsors?*
- ***Why* do we care?**
  - Motivating question: Unintended 'real' effects of changes in accounting standards – here: on firms' investing decisions?
  - Concerns in practice about IAS 19R, which increases pension-induced equity volatility
- ***How* do we draw conclusions?**
  - Exploit exogenous shock to expected pension-induced equity volatility – caused by mandatory adoption of IAS 19R
  - Apply difference-in-differences design to facilitate causal inference
  - Interviews with sample firm Chief Accountants provide "evidence on the actions and beliefs of individuals and institutions [to] bolster causal claims based on associations" (Gow, Larcker and Reiss 2015: 4)

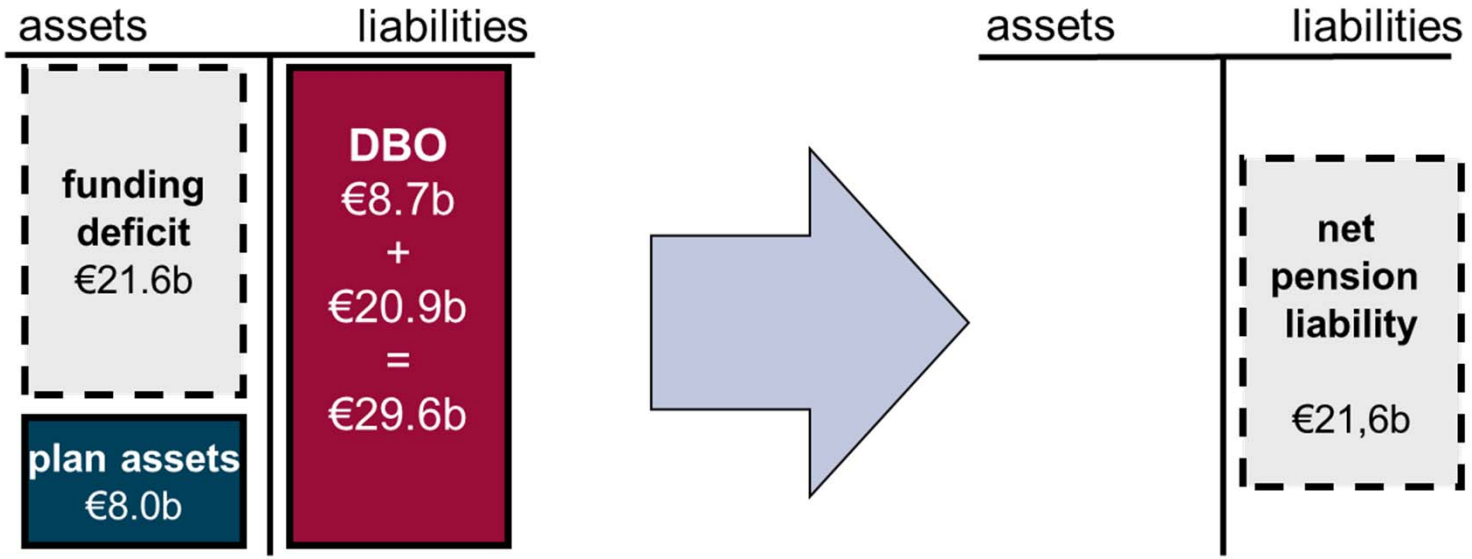
Prior literature and contribution
Three related research streams



IAS 19R adoption → *Earnings management incentives* → Pension asset allocation

Institutional background
Defined benefit plans in Germany





Source: Volkswagen AG, 2013

Before IAS 19R

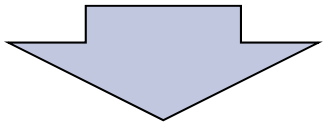
Sponsors choose between three methods of accounting for actuarial gains and losses:

1. The **corridor** method (similar to FAS 87)
   → smooth earnings, equity
2. Immediate recognition in **profit or loss** (virtually unused)
   → volatile earnings *and* equity
3. Immediate recognition in **OCI** ('OCI method')
   → smooth earnings, volatile equity

IAS 19R

Eliminates methods 1 and 2, leaving 3

1. ~~Corridor method~~
2. ~~P&L method~~
3. **Immediate recognition in OCI** ('OCI method')



Actuarial G/L now affect pension liabilities, OCI, equity, and all related financial ratios *immediately*

Institutional background
An example (cont'd)

%	GERMANY 2014	GERMANY 2013	ABROAD 2014	ABROAD 2013
Discount rate at December 31	2.30	3.70	4.35	5.51

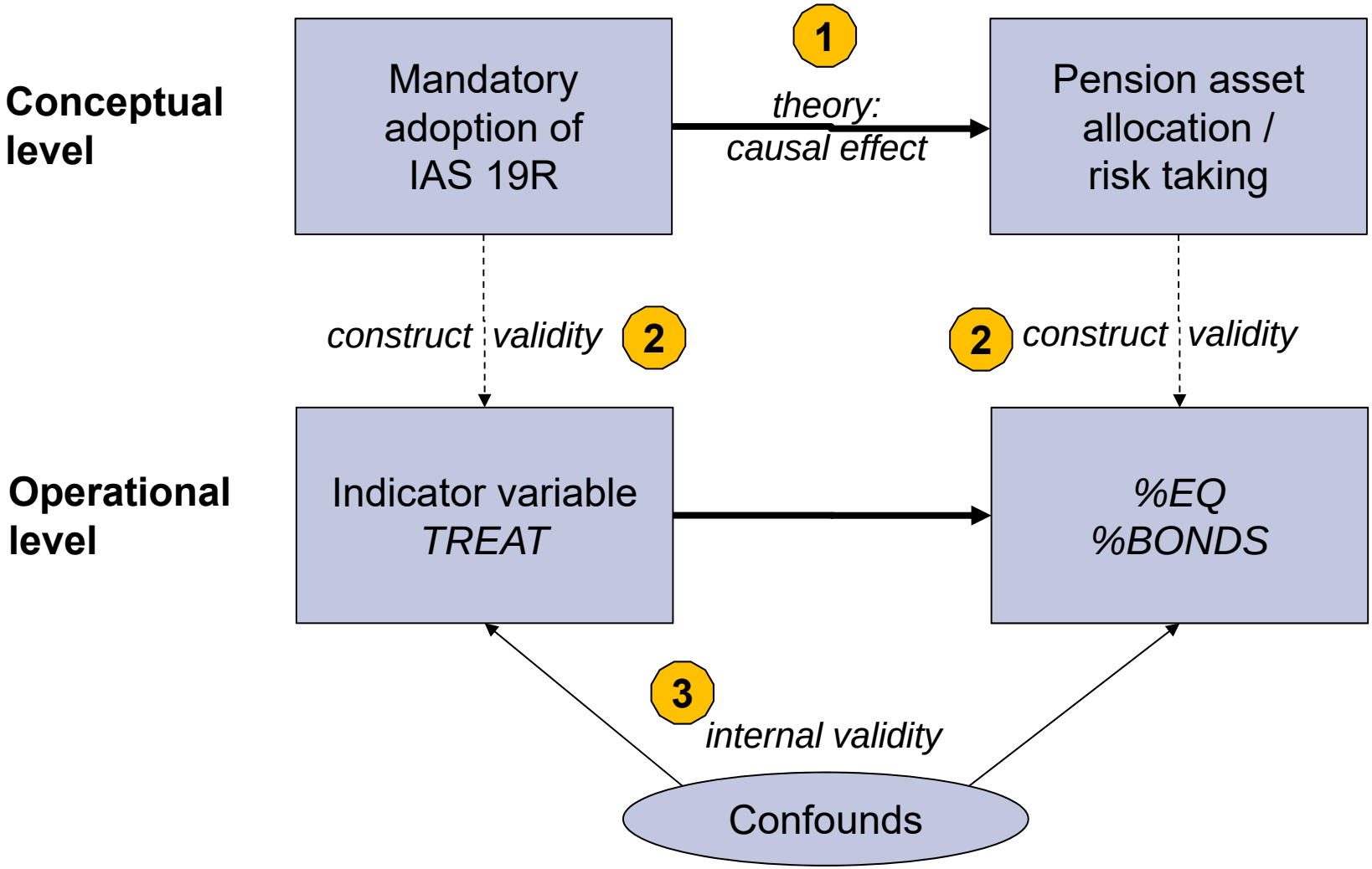
€ million	2014	2013
Net liability recognized in the balance sheet at January 1	**21,709**	**23,903**
Current service cost	728	759
Net interest expense	786	752
Actuarial gains (–)/losses (+) arising from changes in demographic assumptions	4	21
Actuarial gains (–)/losses (+) arising from changes in financial assumptions	8,145	– 2,323

Concern: Pension-induced equity volatility due to:

- Fluctuations in the DBO – primarily due to discount rate changes
- Fluctuations in plan assets – primarily due to market risk
  - See example above (Volkswagen AG, 2014)

Overview
Research approach

Institute for Accounting
Auditing and Analysis



1 Predicted causal effect
Three key assumptions

Mandatory IAS 19R adopters using the corridor method (**treatment firms**):

1. expect IAS 19R to **increase equity volatility**;

2. have incentives to **avoid such volatility**; and

3. view plan asset reallocation as an effective, efficient (i.e., relatively low-cost), and *de-facto* feasible **countermeasure**.

1 Predicted causal effect
Evidence on key assumptions

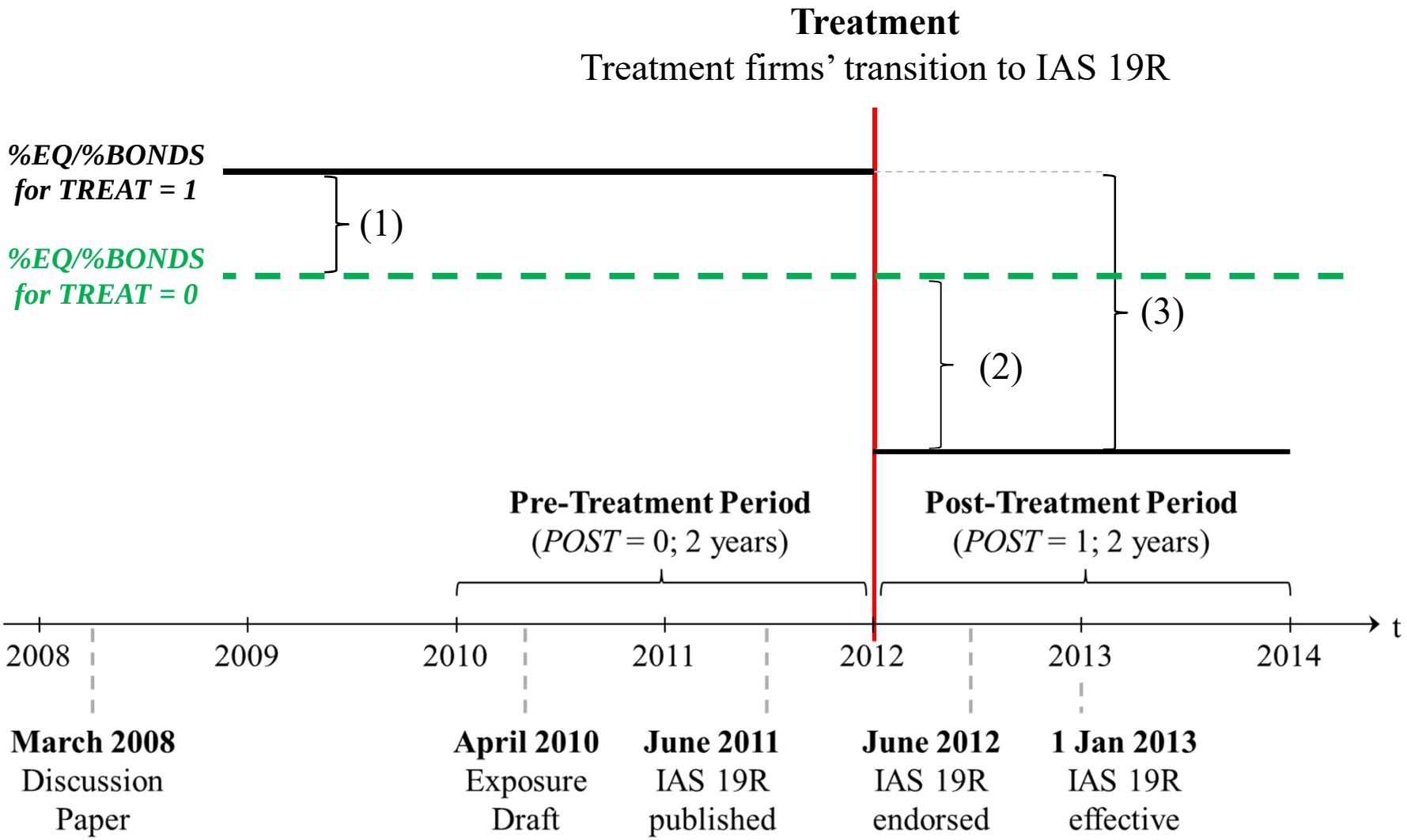
- To validate our key assumptions and support causal inference, we:
  - Conducted seven **semi-structured interviews** with sample firms' CAOs;
  - Analyze sample firms' **comment letters** leading up to IAS 19R; and
  - Review related **statements** in firms' annual reports, the media, and from analysts and rating agencies.
- This evidence generally validates our assumptions:
  - **Assumption 1:** Interviewees clearly understood how moving from the corridor method to the OCI method would affect the book value of equity.
  - **Assumption 2:** Interviewees explained incentives related to the level and volatility of book equity, including corporate bylaws and charters making dividend distribution conditional on maintained minimum ratios of book value of equity to total assets.
  - **Assumption 3**
    - Interviewees share that firms did adjust asset allocations, *inter alia*
    - Sponsor firms influenced pension asset allocations through asset allocation committees

1 Predicted causal effect
Empirical predictions

H_1 Treatment firms (which apply the corridor method) will, *on average*, **reduce (increase) the percentage of equities (bonds)** in their pension assets relative to control firms (which apply the OCI method) upon transition to IAS 19R.

H_2 When adopting the OCI method under IAS 19R, treatment firms' relative reduction (increase) in the portion of equities (bonds) in pension assets will, on average, vary with firms' (a) **exposure to pension plans** and (b) level of **funding deficits**.

2 Construct validity
Main independent variable



2 Construct validity
Dependent variables

€ million	DEC. 31, 2014 Quoted prices in active markets	DEC. 31, 2014 No quoted prices in active markets	DEC. 31, 2014 Total	DEC. 31, 2013 Quoted prices in active markets	DEC. 31, 2013 No quoted prices in active markets	DEC. 31, 2013 Total
Cash and cash equivalents	304	–	304	338	–	338
Equity instruments	292	–	292	271	–	271
Debt instruments	1,601	0	1,601	1,304	0	1,305
Direct investments in real estate	2	87	89	2	82	84
Derivatives	–4	–	–4	17	–	17
Equity funds	2,110	62	2,172	1,812	70	1,883
Bond funds	3,437	96	3,533	2,955	86	3,041
Real estate funds	234	–	234	197	1	197
Other funds	460	4	464	317	2	319
Other instruments	18	519	537	46	469	516

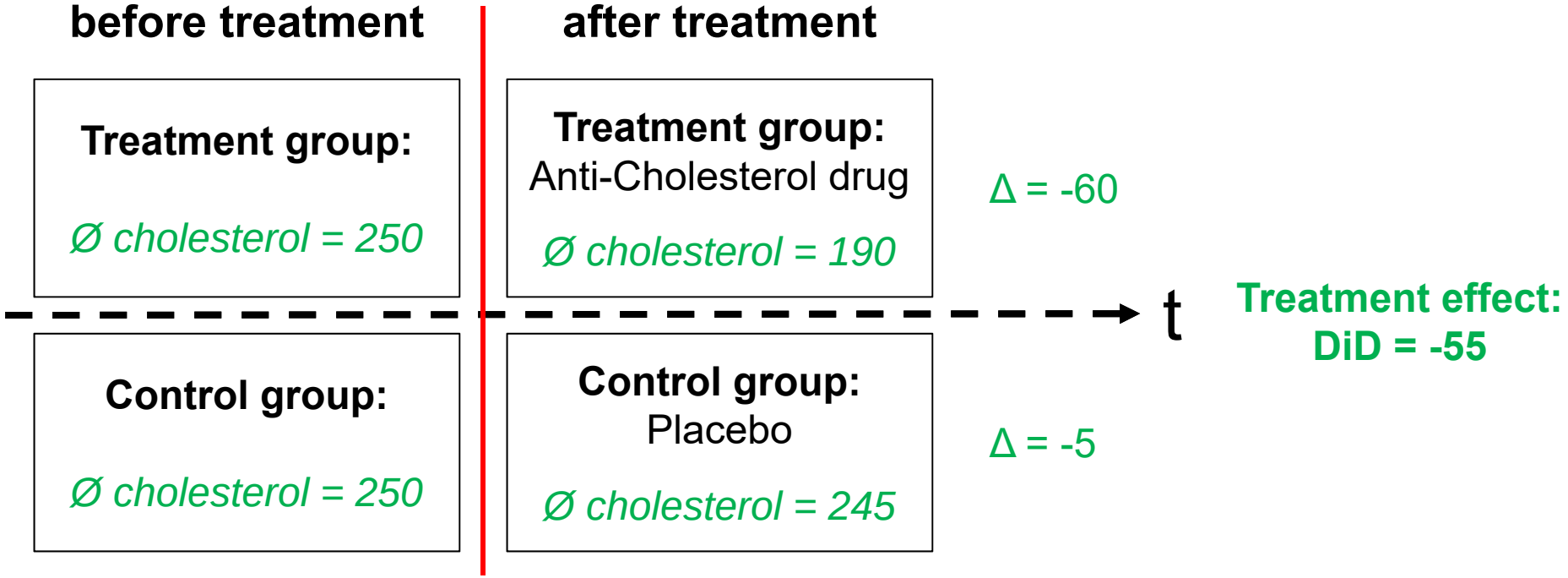
%EQ = (292+2,172) / 9,224 = 26.7%

%BONDS = (1,601+3,533) / 9,224 = 55.7%

%EQ = 27.0%

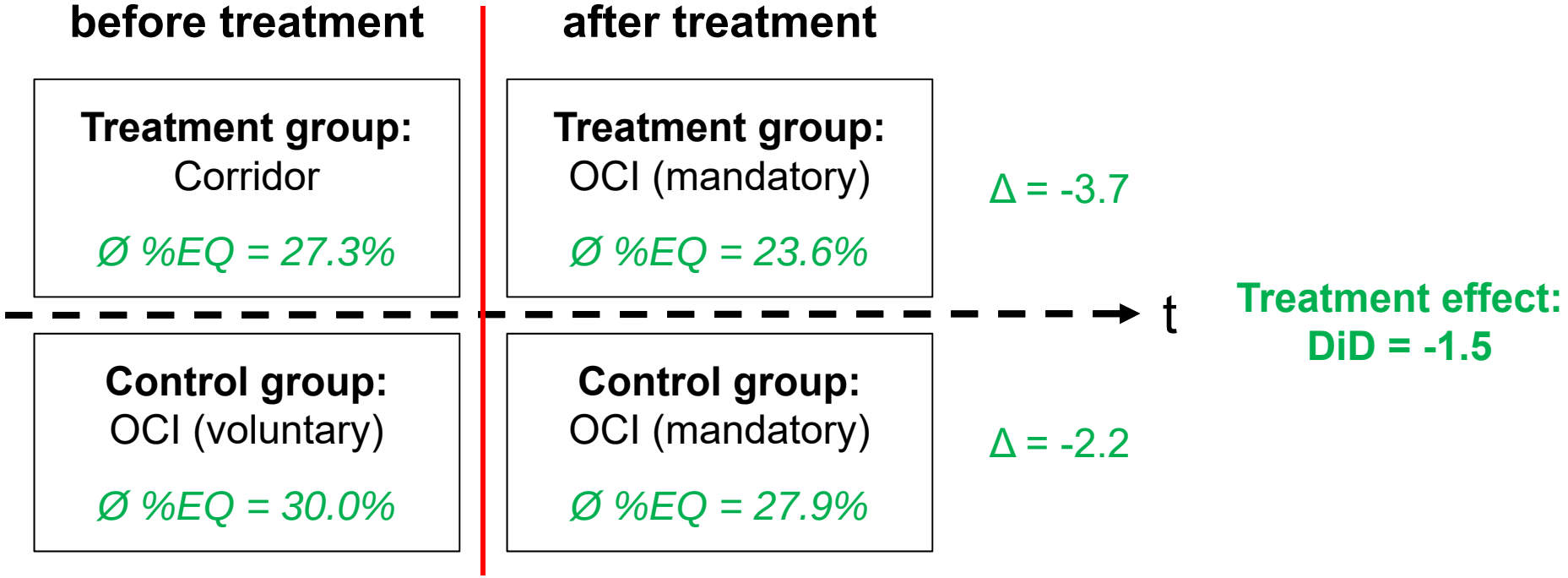
%BONDS = 54.5%

Source: Volkswagen AG, Annual Report 2014



- Controlled random experiment as the gold standard in effect studies
- Key assumptions include:
  - Under random assignment, treatment and control groups are comparable
  - They would have developed identically *absent treatment*
  - Treatment timing is clear; treatment subjects comply

3 Internal validity
Our identification approach



- ***Not*** a controlled random experiment: Firms self-select into control group
- Need for bigger ‚econometric guns' (and more assumptions): Propensity score matching on covariates shown to affect *TREAT*
- Lingering internal validity threat: Unobservable, time-variant correlated omitted factors that affect the treatment and control groups differently

Research design
Diff-in-diff design to test H_1

To test **H_1**, we estimate the following regression:

$$ASSET\_ALLOC_{it} = \beta_0 + \beta_1 TREAT_{it} + \beta_2 Post_{it} + \beta_3 Post \times TREAT_{it} + \sum_{k=4}^{21} \beta_k Controls_{it} + \varepsilon_{it} \quad (2)$$

with

- *TREAT* = an indicator variable capturing treatment observations
- *Post* = an indicator variable capturing post-treatment periods
- *Post x TREAT* = an indicator variable capturing the incremental effect of IAS 19R on treatment firms relative to control firms in post-treatment periods (i.e., the *treatment effect*)

The coefficient of interest, β_3, tests H_1 and is predicted to be negative (positive) for *ASSET_ALLOC = %EQ* (*ASSET_ALLOC = %BONDS*).

To test **H_2**, we estimate the following regression:

$$\begin{aligned} ASSET\_ALLOC_{it} = \gamma_0 & + \gamma_1 TREAT_{it} + \gamma_2 TREAT \times PP\_CHAR_{it} + \gamma_3 Post_{it} \\ & + \gamma_4 Post \times PP\_CHAR_{it} + \gamma_5 Post \times TREAT_{it} \\ & + \gamma_6 Post \times TREAT_{it} \times PP\_CHAR_{it} \\ & + \sum_{k=7}^{24} \gamma_k Controls_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

with

- *PP_CHAR* = pension plan characteristics *Exp* and *Fund*
- *Exp* = as above: exposure; i.e., plan assets divided by equity book value
- *Fund* = pension funding ratio, i.e., plan assets divided by the defined benefit obligation
- *Post x TREAT x PP_CHAR* = treatment effect for obs with non-zero values of the conditioning variables, *Exp* and *Fund*, respectively

The coefficient of interest, γ_6, tests H_2 and is predicted to differ from 0.

Data description
Covariate balance: Table 2 Panel A

Panel A. Descriptive Statistics

	Pre-Treatment Period (aggregated over 2010 and 2011)						
Variable	treatment observations			control observations			
	N	mean	median	sd	mean	median	sd
%EQ	108	27.3	26.4	17.1	30.0	28.0	18.1
%BOND	108	48.3	47.0	19.2	47.7	47.7	24.2
%OTHER	108	17.2	15.2	14.5	17.1	9.0	19.5
%PROPERTY	108	7.2	4.2	7.9	5.1	2.0 *	9.0
Lev	108	63.9	66.3	18.6	63.3	61.5	18.6
FF	108	71.9	76.5	24.9	71.6	76.0	24.4
Size	108	7.6	7.1	1.7	7.9	7.9	1.5
SDCF	108	0.1	0.1	0.1	0.1	0.1	0.1
Fund	108	55.3	63.1	24.9	49.0	53.2	27.9
Horizon	108	3.9	3.8	1.0	3.8	3.8	0.6
Exp	108	21.0	15.1	22.5	25.1	8.8	37.9

Empirical results
Univariate test of H_1 (Table 3A)

Panel A. Univariate Analysis

	Pre-Treatment		Post-Treatment		Difference (Post-Pre)	
%EQ	*N*	Mean	*N*	Mean	Change	*p* -value
Treatment observations	54	27.33	54	23.60	-3.73	0.235
Control observations	54	30.04	54	27.85	-2.19	0.546
Difference					-1.54	0.10 *

	Pre-Treatment		Post-Treatment		Difference (Post-Pre)	
%BONDS	*N*	Mean	*N*	Mean	Change	*p* -value
Treatment observations	54	48.27	54	46.53	-1.74	0.658
Control observations	54	47.68	54	42.91	-4.77	0.310
Difference					3.03	0.020 **

Panel B. Multivariate Analysis – Tests of H_1

		Tests of H_1	
		(3)	(4)
Variable	**Pred.**	***%EQ***	***%BONDS***
TREAT	?	-1.36	0.88
		(-0.43)	(0.22)
Post	- | +	-2.84	-4.94
		(-2.82)***	(-3.53)***
Post×TREAT	- | +	**-2.46**	**4.61**
		(-3.35)***	**(2.43)****
Controls		Yes	Yes
Industry Fixed Effects		Yes	Yes
Adjusted R^2		0.334	0.296
N		216	216

Empirical results
Multivariate tests of H_2 (Table 3 C)

		PP_CHAR = Exp		***PP_CHAR = Fund***	
		(1)	**(2)**	**(3)**	**(4)**
Variable	**Pred.**	***%EQ***	***%BONDS***	***%EQ***	***%BONDS***
Exp	?	0.15	-0.11		
		(2.04) **	(-0.97)		
Fund				-0.31	0.07
				(-2.82) ***	(0.49)
TREAT	?	0.09	-1.38	-0.88	-6.04
		(0.02)	(-0.24)	(-0.10)	(-0.65)
TREAT×PP_CHAR	?	-0.06	0.09	-0.01	0.14
		(-0.61)	(0.76)	(-0.05)	(0.82)
Post	- | +	0.22	-8.86	-2.20	-12.16
		(0.18)	(-4.12) ***	(-0.80)	(-5.93) ***
Post×PP_CHAR	?	-0.11	0.14	-0.01	0.15
		(-6.05) ***	(3.43) ***	(-0.32)	(4.37) ***
Post×TREAT	- | +	**-6.70**	**9.08**	**-6.73**	**11.41**
		(-5.69) ***	**(3.33)** ***	**(-4.90)** ***	**(5.19)** ***
Post×TREAT×PP_CHAR	?	**0.16**	**-0.17**	**0.08**	**-0.14**
		(4.36) ***	**(-3.24)** ***	**(3.49)** ***	**(-2.26)** **
Controls		Yes	Yes	Yes	Yes
Industry Fixed Effects		Yes	Yes	Yes	Yes
Adjusted R^2		0.344	0.304	0.336	0.301
N		216	216	216	216

Prior literature and contribution
Closely related work

- Several prior papers have analyzed the relation between pension accounting standards and the pension asset allocation
  - **Amir and Benartzi (1999 JAAF)** is the first to establish a link between accounting standards and the pension asset allocation; firms avoid recognition of an additional minimum pension liability under US GAAP.
  - Using a pre/post comparison, **Amir, Guan and Oswald (2010 RASt)** establish a time-series shift in pension asset allocations around the introduction of the OCI method in the UK and the US.
  - Most closely related to our study, **Anantharaman and Chuk (forthcoming *TAR*)** documents an IAS 19R adoption effect on pension asset allocations for Canadian IFRS firms, relative to a US control group. However, the assumed mechanism is a concern about *earnings* volatility, as these authors focus on IAS 19R's elimination of the expected rate of return on plan assets, which it replaces with the notion of "net interest cost".

Alternative analysis
The 'ERR effect' of IAS 19R

Before IAS 19R

Net pension expense reflects:

1. **Interest cost**
   = DBO x discount rate
2. **Expected return on plan assets**
   = FV of plan assets x ERR

IAS 19R

Eliminates expected rate assumption; net pension expense now reflects:

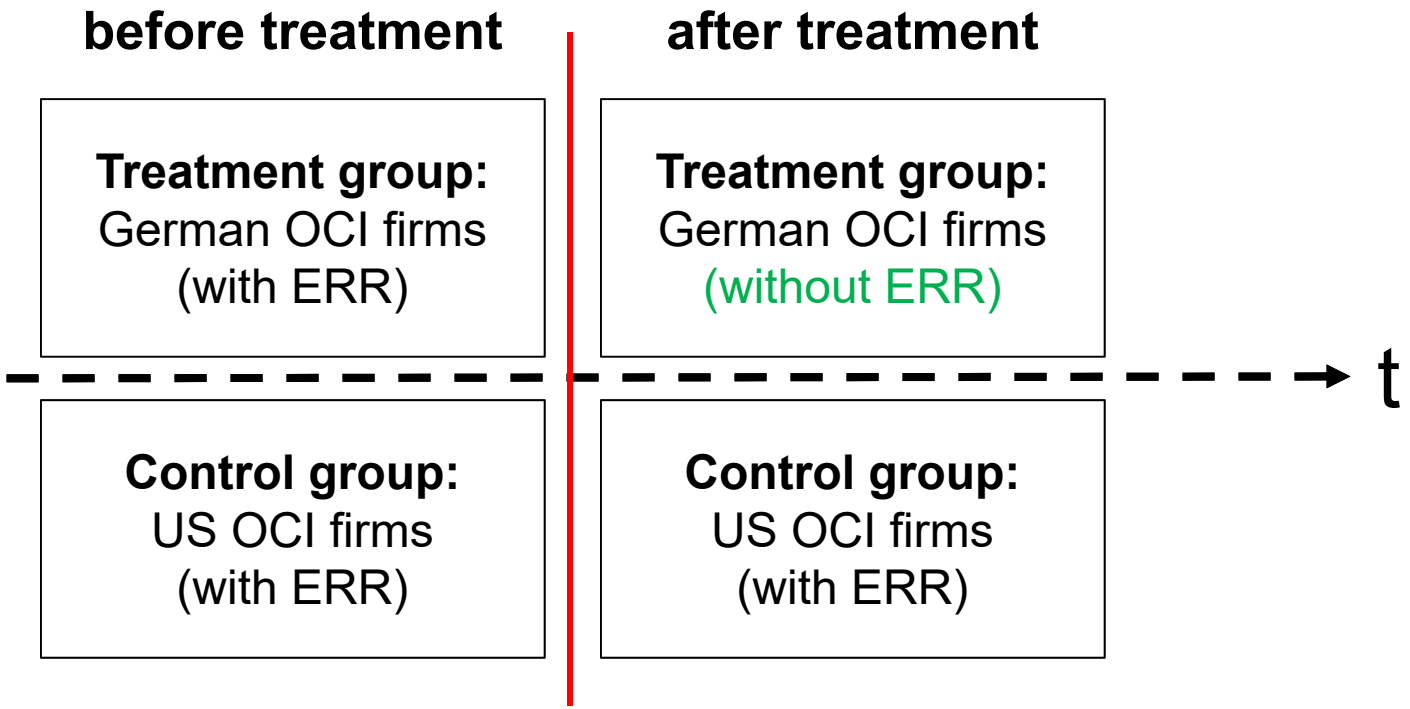
Net interest cost
= (DBO – FV of plan assets)
x discount rate

Ceteris paribus, the ERR effect should matter (i.e., earnings should fall) where:

1. Funded status is high (i.e., FV of plan assets large relative to DBOs); and
2. Expected rate of returns tend to deviate more from discount rates.

- In contrast to Anantharaman and Chuk (2017), we do not expect the ERR effect to be large in Germany:
  - Median funded status Germany = 62.8% vs Canada = 80.2%
  - Median ERR-DR spread Germany = 0.52% vs Canada = 1.77%

Alternative analysis
Replicating Anantharaman and Chuk



- This test isolates the ‚ERR effect' of IAS 19R.
- Unlike Anantharaman and Chuk (2017), we find treatment firms strongly shifting *out of* bonds relative to control firms, which contradicts H_1.
- Potential explanations: Differences in funded status and *ex-ante* ERRs.
- Highlights need for careful jurisdiction-level studies.

Alternative analysis ('ERR Effect')
Tests of H_1

	(1)		(2)	
Variable	***%EQ***		***%BONDS***	
Tests of H_1				
Post	-0.31		0.69	
	(-0.40)		(1.04)	
TREAT	-19.18		10.70	
	(-7.09)	***	(2.95)	***
Post×TREAT	0.41		-7.10	
	(0.43)		(-5.66)	***
Controls	Yes		Yes	
Industry Fixed Effects	Yes		Yes	
Adjusted R^2	0.451		0.147	
N	328		328	

Alternative analysis ('ERR Effect')
Tests of H_2

	PP_CHAR = Exp		***PP_CHAR = Fund***	
	(1)	**(2)**	**(3)**	**(4)**
Variable	***%EQ***	***%BONDS***	***%EQ***	***%BONDS***
Exp	0.17	-0.01		
	(2.38) **	(-0.14)		
Fund			0.20	-0.33
			(1.51)	(-2.16) **
TREAT	-14.46	10.34	9.92	-20.62
	(-3.37) ***	(1.82) *	(1.16)	(-2.01) **
TREAT×PP_CHAR	-0.15	0.01	-0.46	0.50
	(-1.87) *	(0.09)	(-3.61) ***	(3.29) ***
Post	0.79	1.16	-7.42	7.83
	(1.12)	(1.58)	(-4.32) ***	(5.60) ***
Post×PP_CHAR	-0.05	-0.01	0.10	-0.10
	(-1.50)	(-0.52)	(4.64) ***	(-7.61) ***
Post×TREAT	**1.98**	**-11.01**	**7.00**	**-12.08**
	(1.54)	**(-7.01) *** **	**(2.75) *** **	**(-5.59) *** **
Post×TREAT×PP_CHAR	**-0.03**	**0.12**	**-0.10**	**0.07**
	(-1.36)	**(3.32) *** **	**(-2.90) *** **	**(1.39)**
Controls	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.471	0.154	0.522	0.229
N	328	328	328	328

Conclusion

- We study the 'real' effects of IAS 19R on pension asset allocations, given firms' concerns about pension-induced equity volatility.
- Findings are consistent with treatment firms significantly reducing (increasing) equities (bonds) in the pension asset allocation, *relative to control firms*, to mitigate the volatility-increasing effect of IAS 19R.
- These inferences are maintained under several robustness tests.
- Results differ from those in a concurrent Canadian study.
- A limitation relates to self-selection into treatment.

Standard-setting implications

- We conduct an effects study motivated by the notion of evidence-based regulation
- Importance of cost-benefit analysis (causal effects)
  - Benefits: Extent to which decision usefulness increases
  - Costs: Could include unintended ‚real effects'
- However, isolating (causal) effects of accounting standards is challenging:

What helps:

- Implementation that yields quasi-experimental setting (e.g., staggered adoption)
- Rigid disclosure requirements
- Better data availability (XBRL, or an EDGAR-like repository)

What tends to hurt:

- Accounting choices
- Options to early adopt
- Long lead times between publication of standard and effective date

Thank you