Real Effects of Intangibles Capitalization —Empirical Evidence from Voluntary IFRS Adoption in Japan—

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Summary

Purpose	• To examine changes in firms' behaviors after IFRS adoption in Japan expanding the scope for intangibles capitalization
Key findings	• More intangibles → IFRS adoption • IFRS adoption → More intangibles
Contribution	• <u>Academic</u>: providing empirical evidence related to past analytical works • <u>Practical</u>: suggesting that intangibles accounting affects real decision-making

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- Theory and hypotheses

- Research design

- Results

- Conclusion

Should intangibles be capitalized?

- How should a firm measure and disclose its intangible assets?

Capitalization	Historical cost approach
- Traditional financial statements have become less relevant	- Intangibles being recorded on B/S is problematic
- Without capitalization of intangible investments, B/S are undervalued	- Investors can evaluate firms based on the information in P/L
- Intangibles capitalization increases the usefulness of financial statements	- Disclosure of intangible investments should be left to private incentives

Real effects of intangibles capitalization

- How intangibles are measured and reported can significantly affect firms' real decisions

1. **More intangibles → Capitalization**
   - When the relative weight of intangibles is sufficiently large, intangibles capitalization is more preferable than expensing (Kanodia et al., 2004)

2. **Capitalization → More intangibles**
   - Investment level under expensing is lower than that under capitalization (Lu and Sivaramakrishnan, 2017)

IFRS vs Japanese GAAP

- IFRS and JGAAP have several differences in terms of intangibles accounting

	IFRS	JGAAP
Goodwill	• No regular amortization	• Regularly amortized within 20 years
R&D	• Development cost is partially capitalized	• R&D expenditure is fully expensed

> How do those differences impact
> the amount of intangibles of IFRS adopters?

Preliminary analysis (1/2)

- Comparing intangibles and ROA under JGAAP and IFRS in the year of transition (year t)

Transition date to IFRS

First disclosure under IFRS

| Year t-1 | **Year t** | Year t+1 |

JGAAP
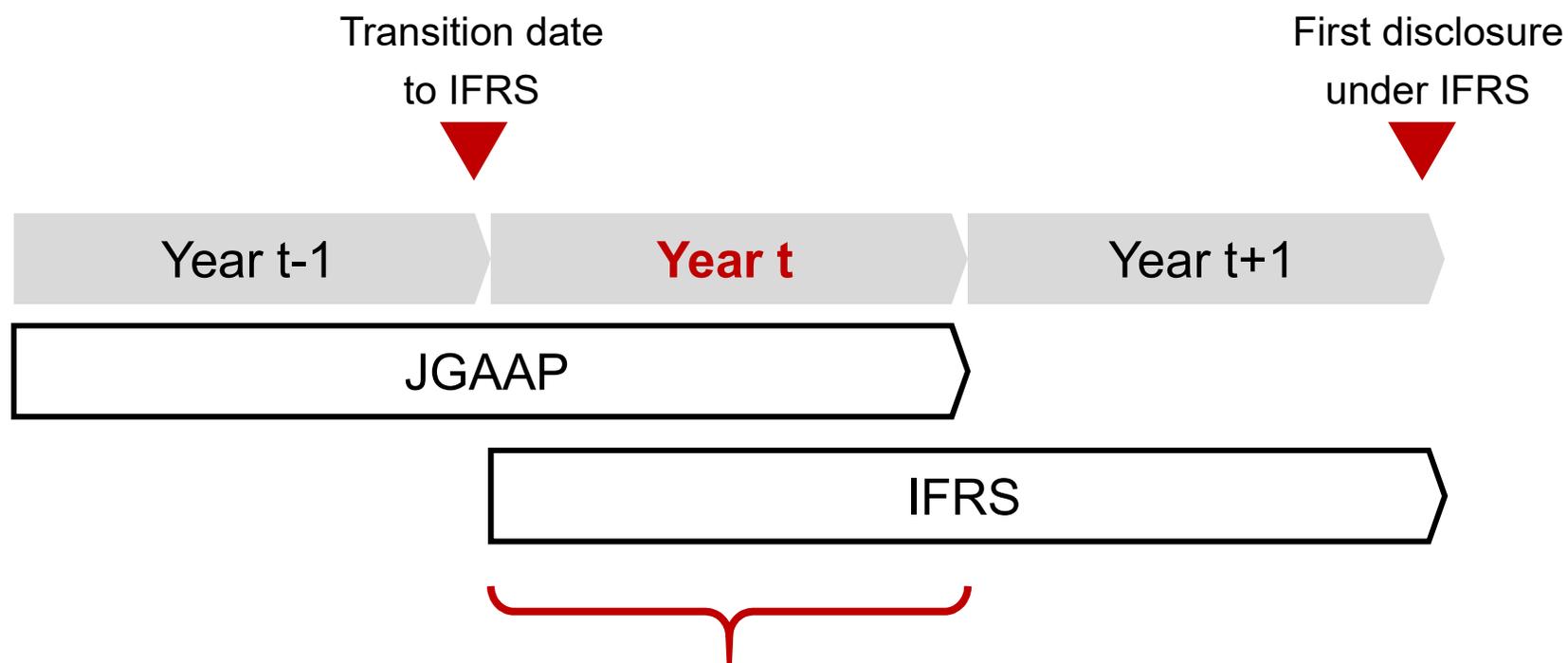
IFRS

How are IFRS adopters' intangibles and ROA different between the two standards?

Preliminary analysis (2/2)

- Firms with larger intangibles benefit more from and thus have greater incentives for IFRS adoption

Panel A: *IA* (Intangible assets deflated by total assets)

Sample	N	JGAAP (1)	IFRS (2)	Difference (2) − (1)
All	40	0.109	0.120	**0.010**
Large IA	20	0.203	0.218	**0.016**
Small IA	20	0.016	0.021	**0.005**

Panel B: *ROA* (net profit deflated by beginning-year total assets)

Sample	N	JGAAP (1)	IFRS (2)	Difference (2) − (1)
All	40	0.052	0.084	**0.033**
Large IA	20	0.061	0.101	**0.040**
Small IA	20	0.042	0.068	**0.025**

Hypotheses

- **More intangibles → IFRS adoption**

    H1: The more intangibles a firm has, the more likely it is to adopt IFRS.

- **IFRS adoption → More intangibles**

    H2: Once a firm decides to adopt IFRS, it further increases its intangible investment.

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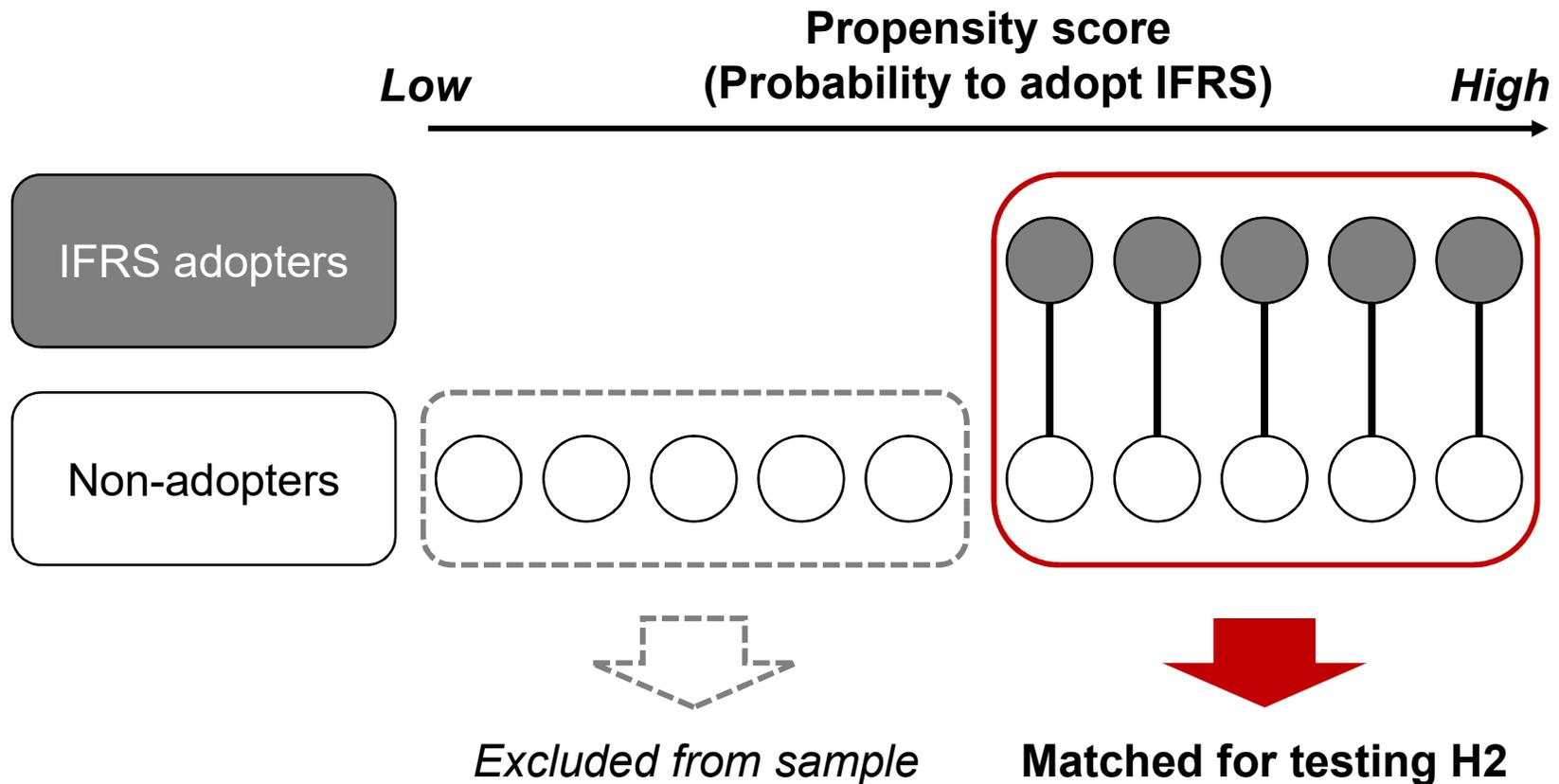- Conclusion

Logit model for IFRS adoption

- To test H1, this study builds a logit model to predict the likelihood of IFRS adoption

$$ADOPTION_{i,t} = Logit(\beta_0 + \boldsymbol{\beta_1 IA}_{i,t-5} + \boldsymbol{\beta_2 RD}_{i,t-5} + Controls)$$

- *ADOPTION* = A dummy variable which takes a value of 1 for IFRS adopters, and 0 otherwise
- *IA* = Intangible assets/Total assets
- *RD* = R&D expenses/Sales

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Propensity score matching (PSM)

- To eliminate self-selection bias, IFRS adopters are matched with non-adopters based on propensity score

Propensity score
(Probability to adopt IFRS)

Low → *High*

IFRS adopters

Non-adopters

Excluded from sample

Matched for testing H2

Difference in difference (DID)

- Intangibles are compared between pairs of IFRS adopters and non-adopters before and after adoption

$$IA = \beta_0 + \beta_1 POST + \beta_2 ADOPTION + \boldsymbol{\beta_3}\left(\boldsymbol{POST * ADOPTION}\right) + Controls$$

- *IA* = Intangible assets/Total assets
- *POST* = A dummy variable that is equal to 1 after IFRS adoption, and 0 otherwise
- *ADOPTION* = A dummy variable which takes a value of 1 for IFRS adopters, and 0 otherwise
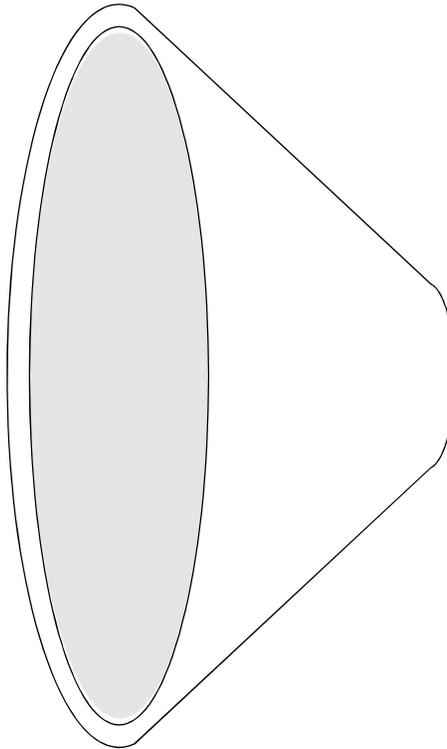- *POST * ADOPTION* = Interaction term

Sample

- 14,809 firm-year samples for the logit model and 80 matched firms for DID are collected

Logit model	PSM	DID

14,809 firm-year

- All the listed firms except:
  - Those without available data
  - Financial services
  - US GAAP adopters

80 firms

- 40 IFRS adopters
- 40 matched non-adopters

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Logit model for IFRS adoption

- Intangibles and R&D expenses are significantly correlated to the likelihood of IFRS adoption

IA	**6.858*** (2.175)**
RD	**0.315** (0.128)**
FS	2.162*** (0.631)
SIZE	0.964*** (0.254)
AGE	-0.501*** (0.114)
Intercept	-33.248*** (3.419)
Year FE	Yes
Industry FE	Yes
N	14,809
Nagelkerke R-square	0.405

Year-clustered standard errors are in parenthesis

*** , **, and *, indicate statistical significance at the 1%, 5%, and 10% levels, respectively
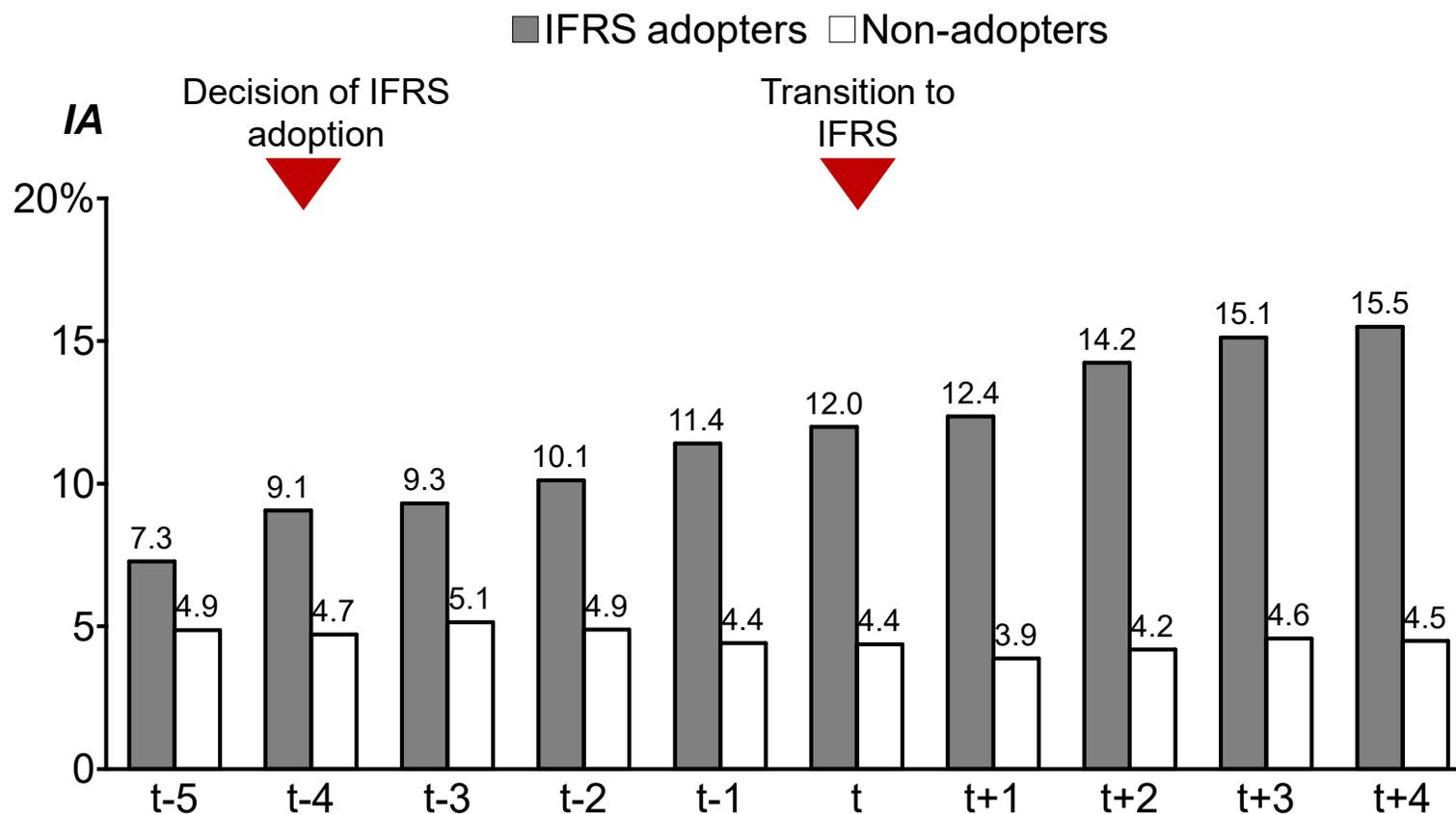
Propensity score matching (PSM)

- Matched pairs are well balanced and appropriate for DID comparisons

	Adopters	Non-Adopters	Difference	P-value
IA	0.073	0.049	0.024	0.332
RD	0.190	0.040	0.151	0.276
FS	0.352	0.405	-0.052	0.433
SIZE	12.735	12.978	-0.242	0.490
AGE	3.804	3.988	-0.183	0.184
PS	**0.148**	**0.125**	**0.022**	**0.632**
N	40	40	-	-

Changes in intangible assets

- IFRS adopters increase intangibles compared with matched non-adopters

■ IFRS adopters □ Non-adopters

IA

Decision of IFRS adoption

Transition to IFRS

	t-5	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
IFRS adopters	7.3	9.1	9.3	10.1	11.4	12.0	12.4	14.2	15.1	15.5
Non-adopters	4.9	4.7	5.1	4.9	4.4	4.4	3.9	4.2	4.6	4.5

This table presents mean value of *IA* (intangible assets deflated by total assets) for the sample of 40 matched pairs of IFRS adopters and non-adopters.
The numbers for IFRS adopters are those of JGAAP until year t-1 while IFRS after t

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Changes in intangible assets

1. One-time accounting effect
   - A portion of the past investments expensed under JGAAP are capitalized ex post facto in year t, which increases IA as a one-time effect

2. Continuous accounting effect
   - IA should increase faster than in the pre-adoption period even if firms continue their operations in exactly the same manner
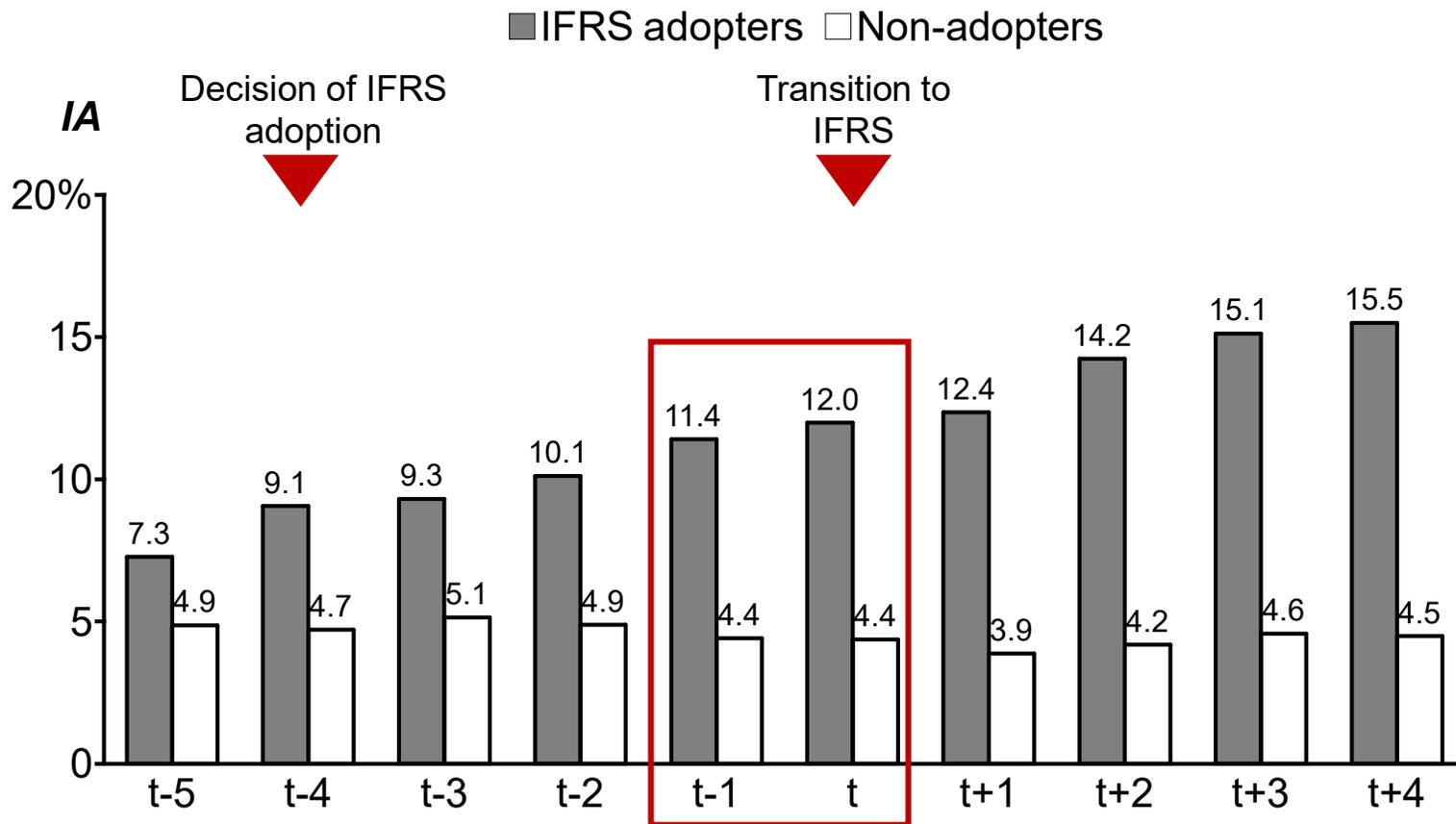
3. Continuous real effect
   - The remainder of the change can be attributed to a real effect, which is as assumed in H2

1. One-time accounting effect

- IFRS adopters increase intangibles compared with matched non-adopters

■ IFRS adopters □ Non-adopters

Decision of IFRS adoption

Transition to IFRS

IA

	t-5	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
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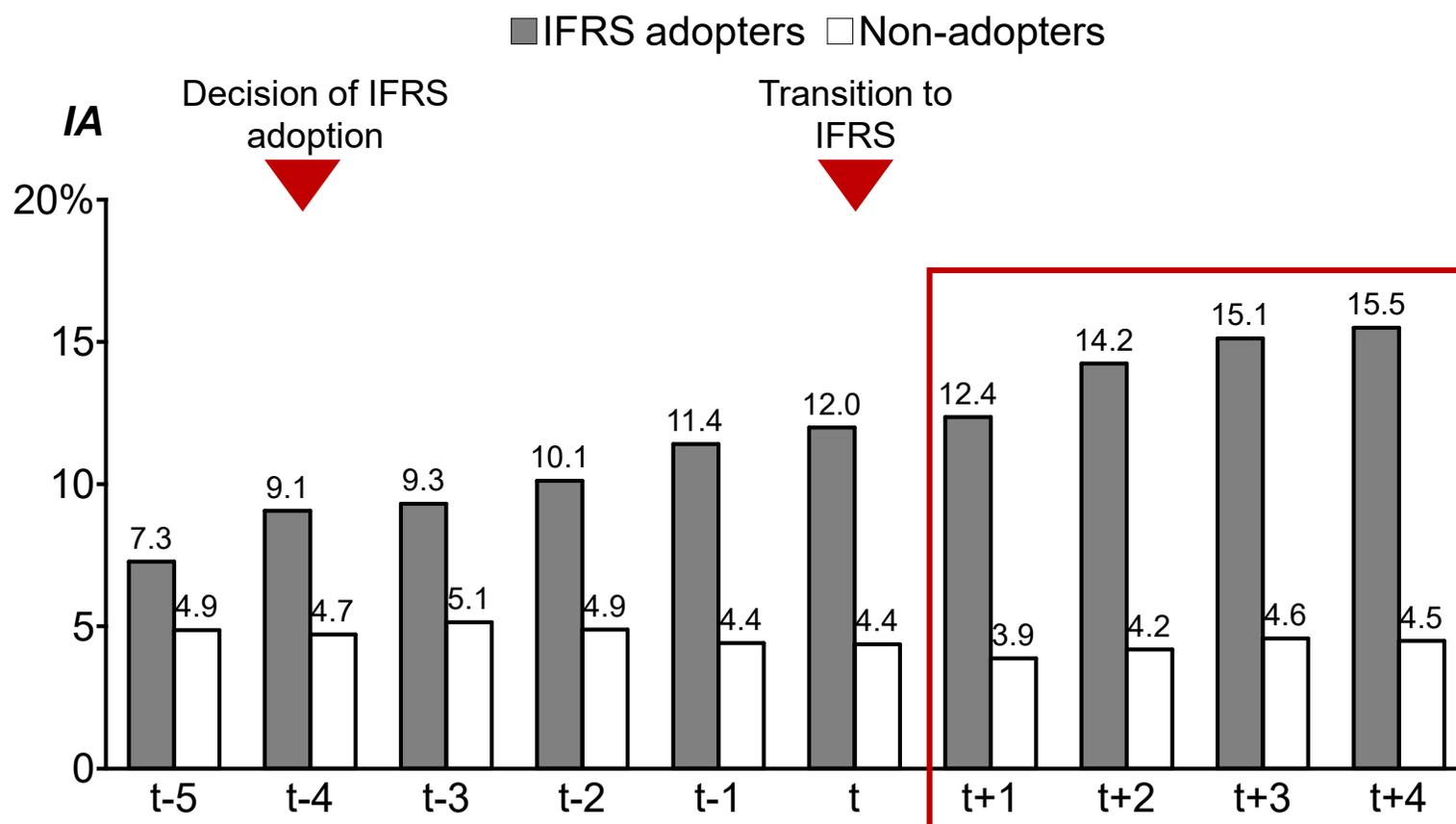
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2. Continuous accounting effect

H2: IFRS adoption → More intangibles

- IFRS adopters increase intangibles compared with matched non-adopters

This table presents mean value of *IA* (intangible assets deflated by total assets) for the sample of 40 matched pairs of IFRS adopters and non-adopters.

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Changes in intangible assets

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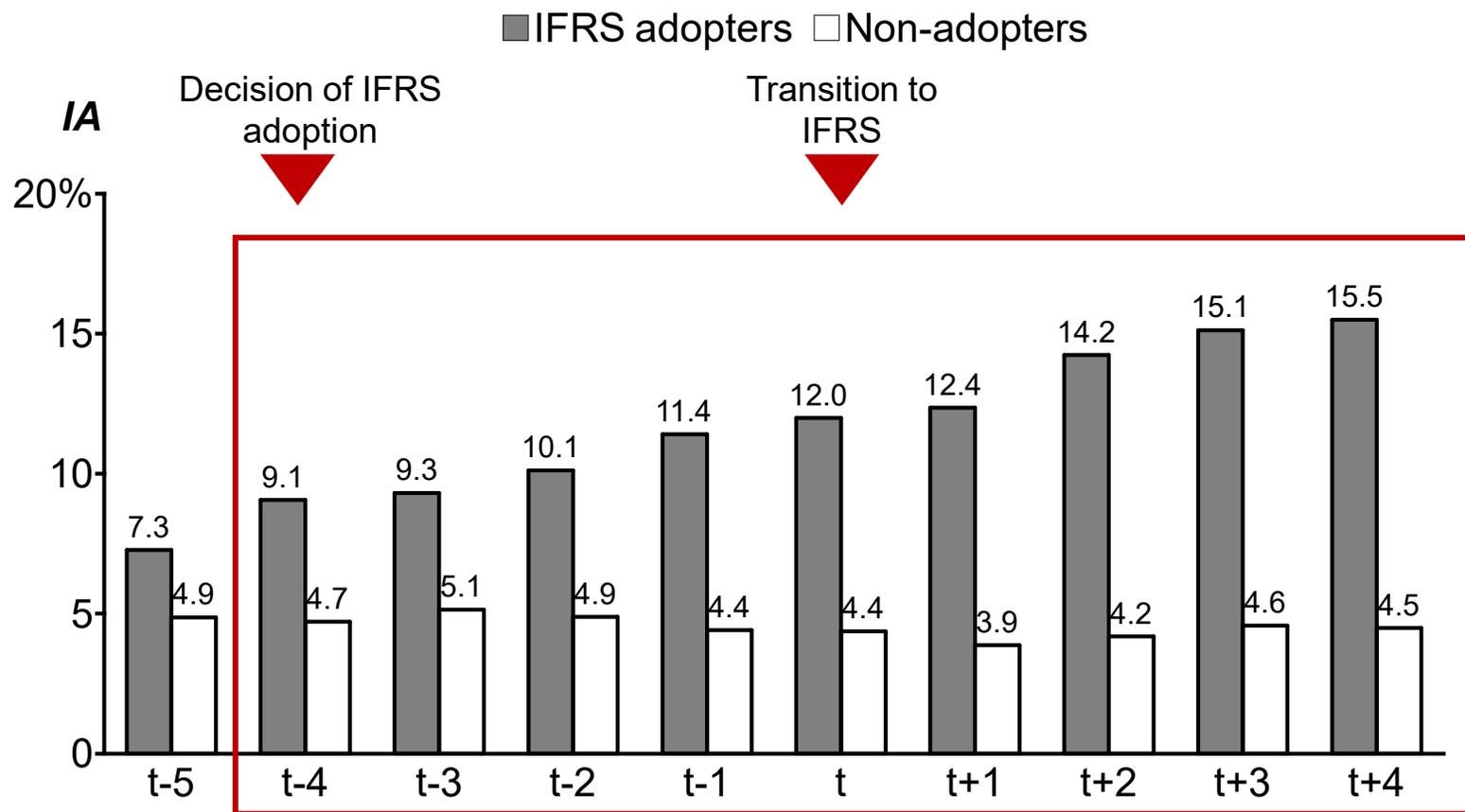
3. Continuous real effect
   - The remainder of the change can be attributed to a real effect, which is as assumed in H2

3. Continuous real effect

- IFRS adopters increase intangibles compared with matched non-adopters

IFRS adopters ▓ Non-adopters ☐

IA

Decision of IFRS adoption ▼

Transition to IFRS ▼

	t-5	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
IFRS adopters	7.3	9.1	9.3	10.1	11.4	12.0	12.4	14.2	15.1	15.5
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The numbers for IFRS adopters are those of JGAAP until year t-1 while IFRS after t

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Difference in difference (DID)

- The result holds when using multivariate DID model

*(POST*ADOPTION)*	**0.062** (0.020)**
POST	0.007 (0.021)
ADOPTION	-0.003 (0.012)
BTM	-0.010 (0.007)
LEV	0.146*** (0.035)
SIZE	-0.010 (0.008)
Intercept	0.082 (0.047)
Year FE	Yes
Industry FE	Yes
N	160
Adjusted R-square	0.270

Year-clustered standard errors are in parenthesis

***, **, and *, indicate statistical significance at the 1%, 5%, and 10% levels, respectively

Robustness test

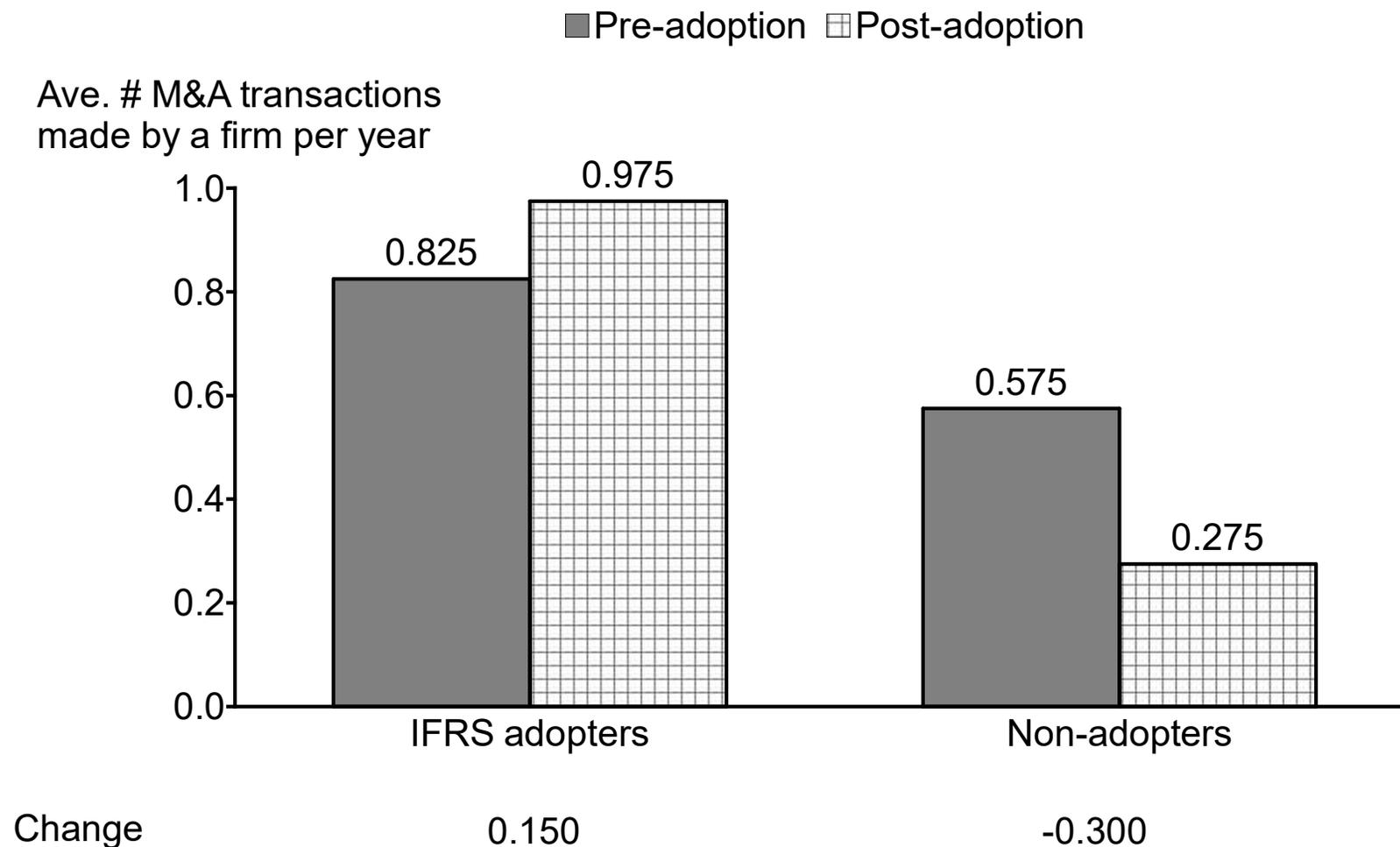1. Changes in real actions following adoption

2. More recent sample

3. Observation period relative to adoption

4. One-to-many matching

Changes in real actions following adoption (1/2)

- M&A transaction volume increased after adoption

■ Pre-adoption ⊞ Post-adoption

Ave. # M&A transactions
made by a firm per year

	IFRS adopters	Non-adopters
Change	0.150	-0.300

Changes in real actions following adoption (2/2)

- Furthermore, transaction value increased significantly

◼ Pre-adoption ⊞ Post-adoption

Ave. M&A transaction value
relative to acquirer's total assets

	IFRS adopters	Non-adopters
Change	0.047	-0.027

Robustness test

1. Changes in real actions following adoption

2. More recent sample

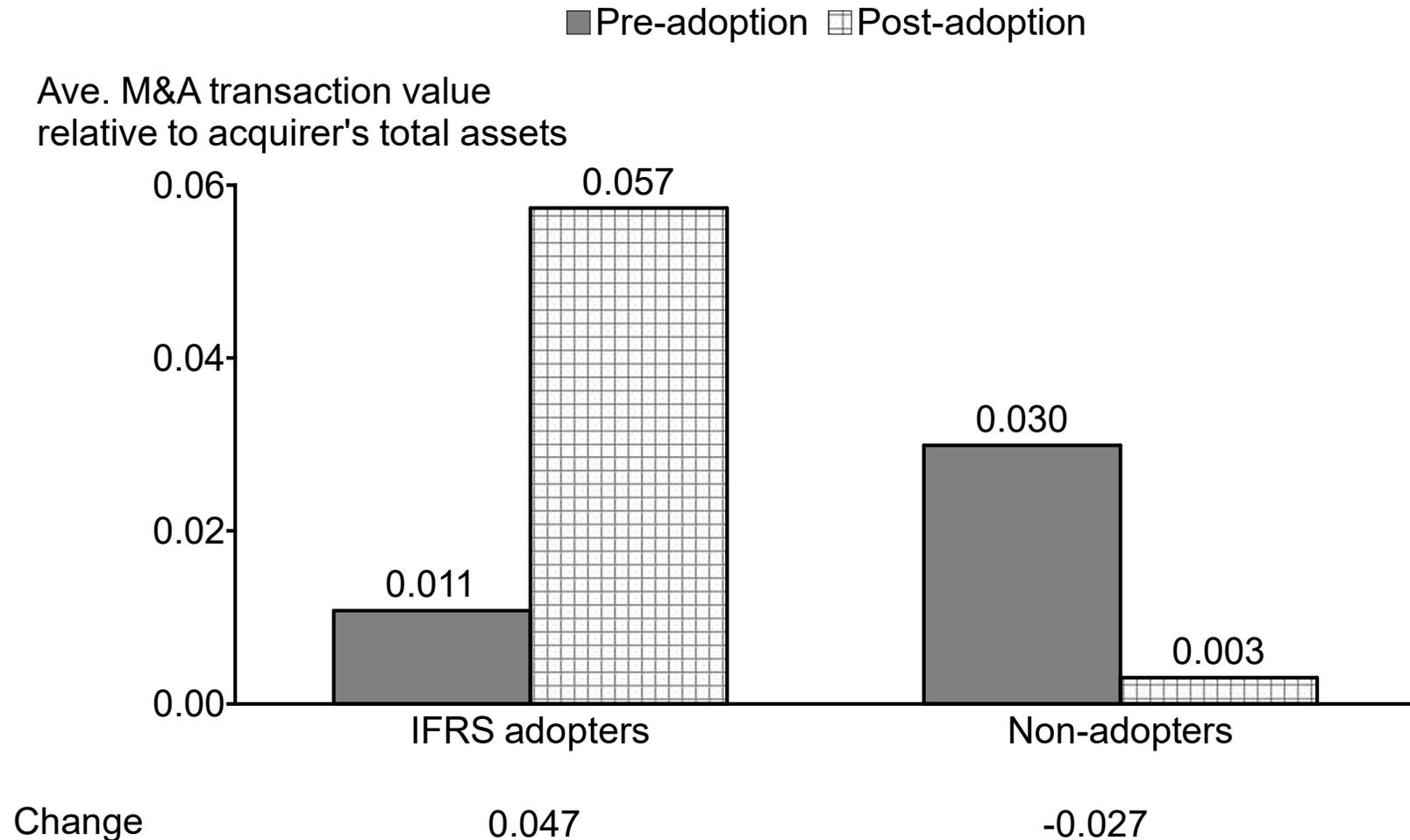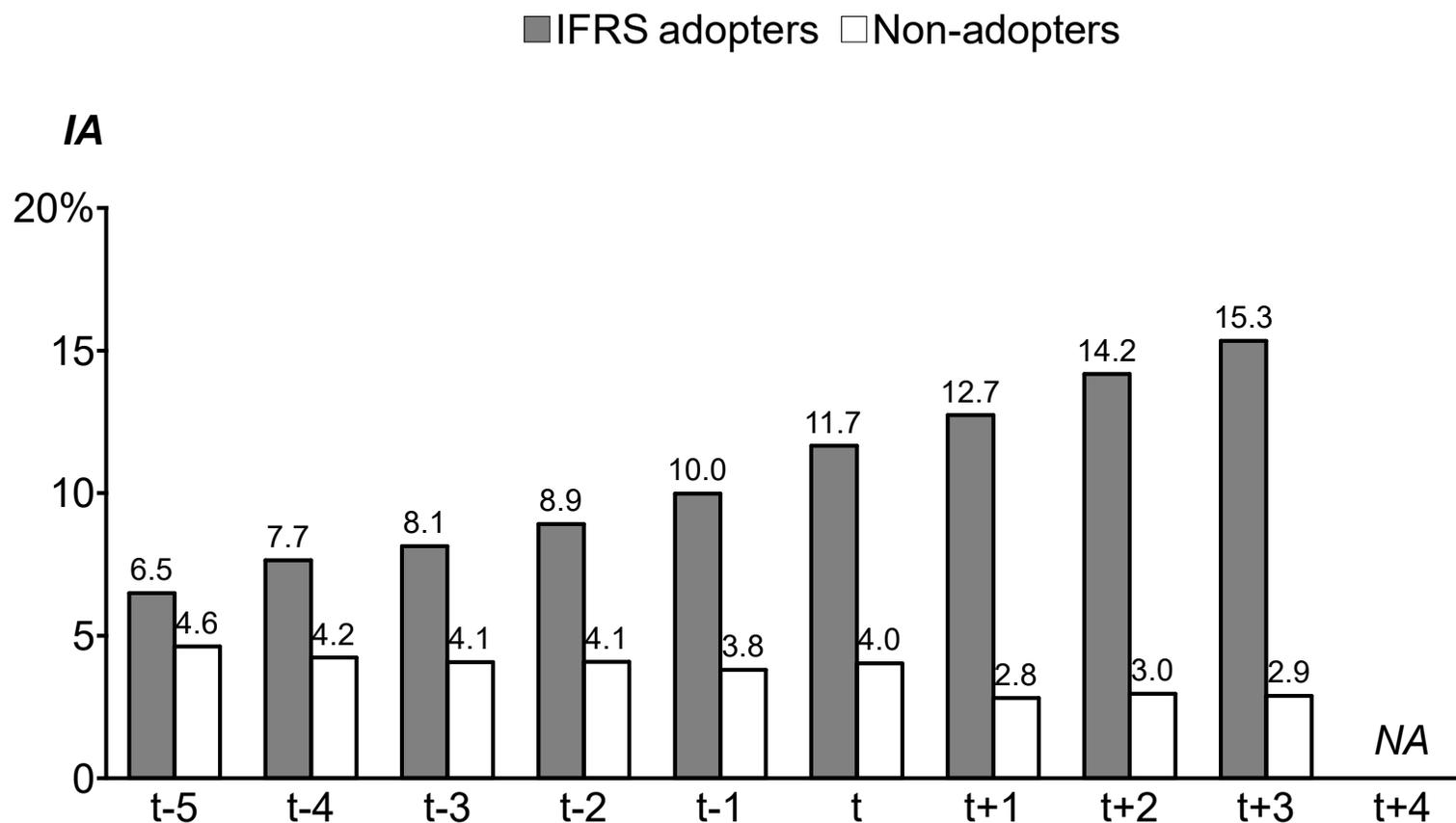3. Observation period relative to adoption

4. One-to-many matching

More recent sample (54 matched pairs)

- The result holds when using more recent sample

■IFRS adopters □Non-adopters

IA

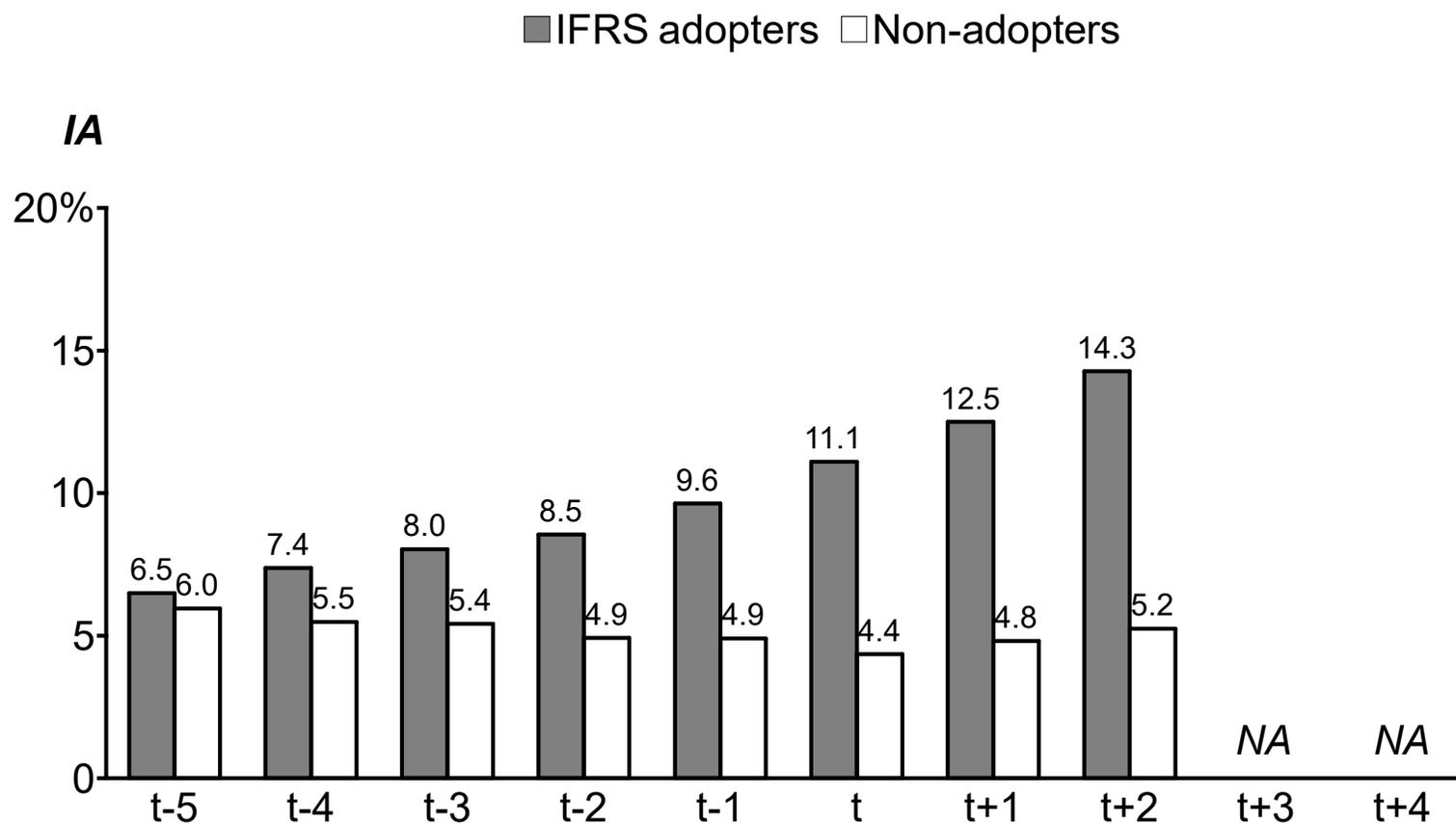|	t-5	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
IFRS adopters	6.5	7.7	8.1	8.9	10.0	11.7	12.7	14.2	15.3	NA
Non-adopters	4.6	4.2	4.1	4.1	3.8	4.0	2.8	3.0	2.9	

This table presents mean value of *IA* (intangible assets deflated by total assets) for the sample of 54 matched pairs of IFRS adopters and non-adopters including data until 2016.
The numbers for IFRS adopters are those of JGAAP until year t-1 while IFRS after t

More recent sample (80 matched pairs)

- The result holds when using more recent sample

■ IFRS adopters □ Non-adopters

IA

|	t-5	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
IFRS adopters	6.5	7.4	8.0	8.5	9.6	11.1	12.5	14.3	NA	NA
Non-adopters	6.0	5.5	5.4	4.9	4.9	4.4	4.8	5.2		

This table presents mean value of *IA* (intangible assets deflated by total assets) for the sample of 80 matched pairs of IFRS adopters and non-adopters including data until 2017.
The numbers for IFRS adopters are those of JGAAP until year t-1 while IFRS after t

More recent sample (105 matched pairs)

- The result holds when using more recent sample
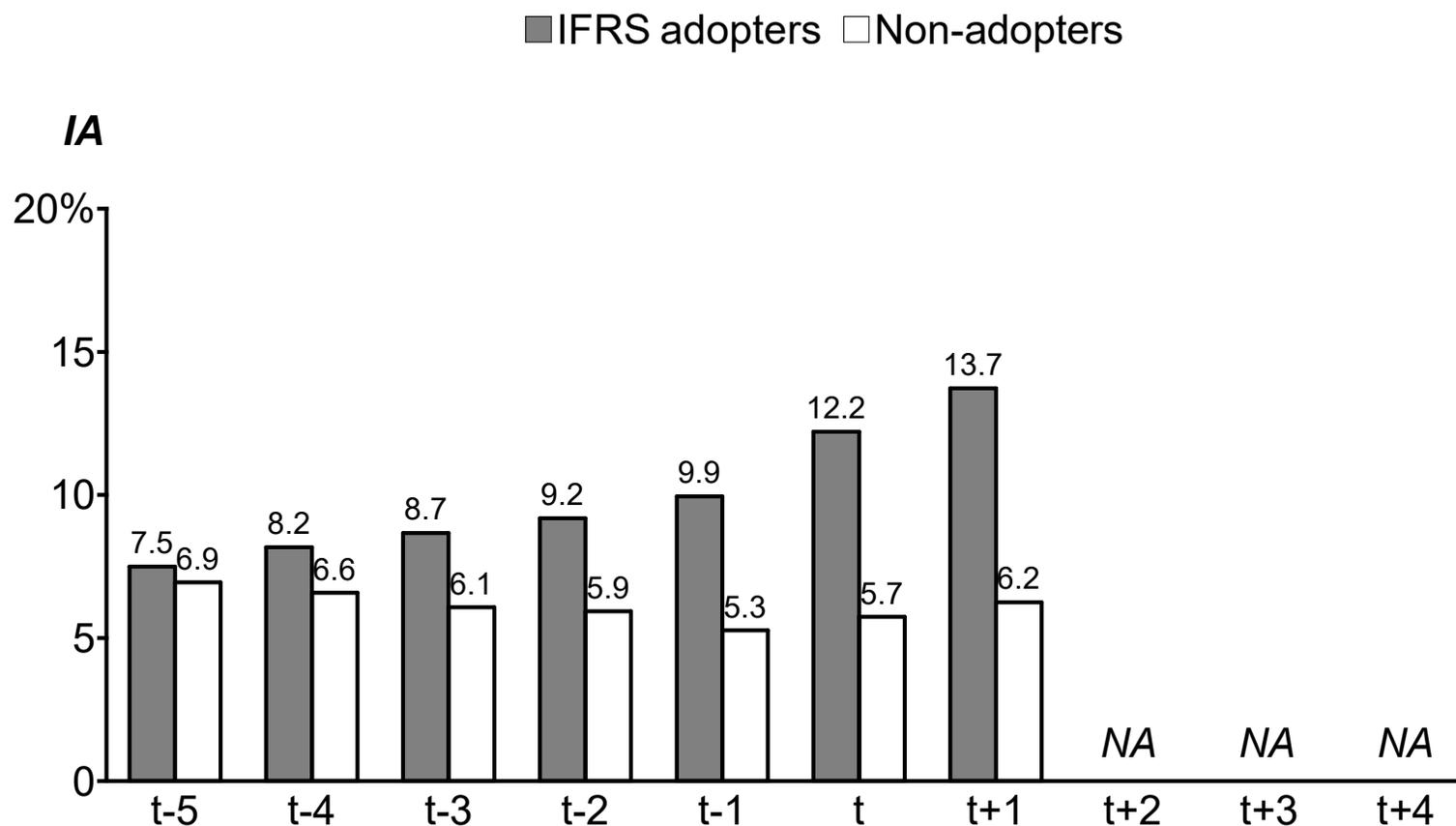
■IFRS adopters □Non-adopters

IA

This table presents mean value of *IA* (intangible assets deflated by total assets) for the sample of 105 matched pairs of IFRS adopters and non-adopters including data until 2018.

The numbers for IFRS adopters are those of JGAAP until year t-1 while IFRS after t

More recent sample

- The result holds when using more recent sample

	54 pairs	80 pairs	105 pairs
(POST*ADOPTION)	**0.074*** **(0.018)**	**0.072*** **(0.022)**	**0.066*** **(0.017)**
POST	-0.095*** (0.017)	-0.075* (0.042)	-0.025 (0.019)
ADOPTION	0.017 (0.011)	0.000 (0.018)	0.015 (0.013)
BTM	-0.005 (0.009)	-0.010 (0.006)	-0.028*** (0.005)
LEV	0.071* (0.033)	0.108*** (0.022)	0.064* (0.034)
SIZE	-0.002 (0.004)	-0.003 (0.004)	0.000 (0.007)
N	216	320	420
Adjusted R-square	0.321	0.256	0.239

Year-clustered standard errors are in parenthesis

***, **, and *, indicate statistical significance at the 1%, 5%, and 10% levels, respectively

Intercept and coefficients of year / industry dummy are not shown in the table

Robustness test

1. Changes in real actions following adoption

2. More recent sample

3. Observation period relative to adoption

4. One-to-many matching

Observation period relative to adoption

- The result of the logit model holds when changing observation period

	Period of independent variables	
	t-6	t-7
IA	7.051*** (2.160)	5.284*** (1.934)
RD	0.394** (0.181)	0.327** (0.159)
FS	2.131*** (0.555)	2.096*** (0.532)
SIZE	0.954*** (0.258)	0.935*** (0.276)
AGE	-0.451*** (0.105)	-0.555*** (0.154)
N	14,378	13,836
Nagelkerke R-square	0.397	0.383

Year-clustered standard errors are in parenthesis

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Observation period relative to adoption

- The result of the DID model holds when changing observation period

	t-6	t-7	t-5	t-5
Pre-adoption	**t-6**	**t-7**	t-5	t-5
Post-adoption	t+1	t+1	**t+2**	**t+3**
*(POST*ADOPTION)*	**0.062**</br>(0.022)**	**0.067***</br>(0.020)**	**0.072***</br>(0.021)**	**0.078***</br>(0.018)**
POST	-0.044</br>(0.030)	0.027</br>(0.016)	0.022</br>(0.026)	0.029</br>(0.027)
ADOPTION	0.000</br>(0.010)	-0.003</br>(0.008)	-0.002</br>(0.013)	-0.004</br>(0.011)
BTM	-0.034**</br>(0.014)	-0.045***</br>(0.013)	-0.013</br>(0.007)	-0.012</br>(0.008)
LEV	0.132***</br>(0.023)	0.097**</br>(0.040)	0.205**</br>(0.083)	0.197***</br>(0.063)
SIZE	-0.012*</br>(0.005)	-0.010**</br>(0.005)	-0.015</br>(0.011)	-0.015</br>(0.011)
N	160	160	160	160
Adjusted R-square	0.241	0.218	0.324	0.317

Year-clustered standard errors are in parenthesis

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Robustness test

1. Changes in real actions following adoption

2. More recent sample

3. Observation period relative to adoption

4. One-to-many matching

One-to-many matching

- The result of the DID model holds when using one-to-many matching

Matching	1 to 2	1 to 3
(POST*ADOPTION)	0.060* (0.031)	0.054* (0.030)
POST	0.006 (0.024)	0.010 (0.012)
ADOPTION	0.018 (0.022)	0.025 (0.020)
BTM	-0.019** (0.008)	-0.016** (0.006)
LEV	0.094*** (0.021)	0.082*** (0.017)
SIZE	-0.005 (0.004)	-0.002 (0.003)
N	240	320
Adjusted R-square	0.232	0.273

Year-clustered standard errors are in parenthesis

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Conclusion

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Key findings	• More intangibles → IFRS adoption • IFRS adoption → More intangibles
Contribution	• <u>Academic</u>: providing empirical evidence related to past analytical works • <u>Practical</u>: suggesting that intangibles accounting affects real decision-making

Thank you for your kind attention