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The value relevance of intangible assets and the mandatory adoption of IFRS

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Research Question

Objective is to analyze whether the value relevance of accounting information on intangible assets might be affected by accounting standards

In order to do that:

◆ I consider the mandatory adoption of International Financial Reporting Standards (IAS/IFRS), and

◆ compare the value relevance of intangible assets reported under IFRS and Italian GAAP.

Empirical evidence on sample of Italian public companies in the period of 1996-2006

Motivation (1/2)

- Economic and strategic literature extensively recognized the importance of intangible assets for firms and economies (e.g. Lippman & Rumelt, 1982; Romer, 1998; Nakamura, 2003)

- Several accounting studies claimed that:

  > accounting rules do not fully recognize the economic value of intangible assets (e.g., Amir and Lev 1996; Hand and Lev 2003),

  > the consequences of information deficiencies on intangible assets have been widely investigated (Lev and Sougiannis 1999; Lev and Zarowin 1999; Aboody and Lev 2000; Chan et al. 2001; Lev et al. 2005).

Motivation

- IASB have considered possible revisions of accounting for intangible assets (IASB meeting, 12/12/2007) arguing that:

  "...intangible assets are an increasingly significant class of assets for a wide range of entities across many jurisdictions and ... information about intangible assets is important to the needs of users. The issues are pervasive and, to the extent that the current requirements in IAS 38 are inadequate, the current accounting treatment will give rise to problems that are frequent and material unless resolved."

- Nevertheless, standard setters decided not to add a project on intangible assets to their active agenda since:

  "properly addressing the accounting for intangible assets would impose a large demand on the Board's limited resources."

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  The effectiveness of accounting standards to provide investors with relevant information on intangible assets will remain a critical issue as long as it has been not comprehensively investigated.

The Italian adoption of IFRS

The Italian adoption of IFRS is a unique empirical setting:

- the accounting switching was _compulsory_ at the same time for all companies listed in the stock market (control for self-selection bias of voluntary adoption);

- Italian GAAP and IFRS represent two opposite accounting systems, respectively stakeholder- and shareholder-oriented;

- recognition and measurement of intangible assets are markedly different between IFRS and Italian GAAP.

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The analysis of these divergences allows a deeper understanding of the influence of accounting standards on the value relevance of intangible assets.

Tab. 1   Main accounting differences between Italian GAAP and IFRS

	Italian GAAP	IFRS
Recognition criteria:		
Brands	internally developed acquired	acquired
Patents	internally developed acquired	acquired
Licenses	internally developed acquired	acquired
Computer Software	internally developed acquired	internally developed acquired
Deferred Costs	capitalized	expensed
R&D capitalized	development costs advanced research costs	development costs
R&D expenditures	basic research costs	basic research costs advanced research costs
Valuation criteria :		
Goodwill	systematic amortization	test for impairment

Effects of IFRS adoption

- Research investments and internally generated intangibles (patents, brands and licenses) are expensed (IAS 38) instead of being capitalized (Italian GAAP No. 24):

  > *reduction of information on intangible assets provided to investors*

- Test for impairment of goodwill (IAS 38, IAS 36) instead of its systematic amortization under Italian GAAP (Italian GAAP No. 24):

  > *disclosure of private and forward-looking information and enhance the value relevance of goodwill* (e.g., Churyk 2005)

  >> *further opportunistic behaviors in the absence of strong control exercised by the corporate governance system* (Beatty and Weber 2006; Ramanna 2008)

Contributions (1/2)

1. Literature on the value relevance of intangible assets

Previous studies:

- proved the adverse effects related to systematic expensing of intangible assets (e.g., Lev and Zarowin 1999; Lev et al. 2005)

- claimed that capitalizing intangible assets (i.e., R&D) provides investors with more relevant information (e.g., Lev and Sougiannis 1996; Healy et al. 2002)

However, these conclusions:

- refer to a single set of accounting standards or stem from accounting simulations [$P_A(A)$➜ $P_A(B)$ vs $P_A(A)$➜ $P_B(B)$]

- focused on intangibles fully expensed (e.g. R&D)

Contributions (2/2)

2. Debate on the effects of IFRS adoption

Previous studies:

- examined the economic consequences of IFRS adoption and documented that it improves the quality of accounting information and reduces information asymmetries (Leuz and Verrecchia 2000; Leuz 2003; Barth et al. 2008; Daske et al. 2008)

- offered mixed results on the effects of IFRS on the value relevance of key accounting variables, such as book value of equity and net income (Bartov et al. 2005; Hung and Subramanyam 2007, Barth et al. 2008)

However:

- the observed consequences of IFRS could be contingent on countries' institutional environments (cross-country comparisons) or firms' incentives to change accounting standards (within-country voluntary adoption of IFRS)

Empirical Models (1/2)

- Price nested models:

Italian GAAP: $MV_{it} = \alpha_{10} + \alpha_{11}\,adjBVE_{it} + \alpha_{12}\,adjNI_{it} + \alpha_{13}\,YR + \varepsilon_1$ (1.a)

IFRS: $MV_{it} = \alpha_{20} + \alpha_{21}\,adjBVE_{it} + \alpha_{22}\,adjNI_{it} + \alpha_{23}\,YR + \varepsilon_2$ (1.b)

Italian GAAP: $MV_{it} = \beta_{10} + \beta_{11}\,adjBVE_{it} + \beta_{12}\,adjNI_{it} + \beta_{13}\,NetINT_{it} + \beta_{14}\,GOOD_{it} + \beta_{15}\,R\&Dexp_{it} +$
$+ \beta_{16}\,YR + \varepsilon_1$ (2.a)

IFRS: $MV_{it} = \beta_{20} + \beta_{21}\,adjBVE_{it} + \beta_{22}\,adjNI_{it} + \beta_{23}\,NetINT_{it} + \beta_{24}\,GOOD_{it} + \beta_{25}\,R\&Dexp_{it} +$
$+ \beta_{26}\,YR + \varepsilon_2$ (2.b)

Italian GAAP: $MV_{it} = \gamma_{10} + \gamma_{11}\,adjBVE_{it} + \gamma_{12}\,adjNI_{it} + \gamma_{13}\,GOOD_{it} + \gamma_{14}\,BRPAT_{it} + \gamma_{15}\,LIC_{it} +$
$+ \gamma_{16}\,SOFT_{it} + \gamma_{17}\,OTHINT_{it} + \gamma_{18}\,R\&Dcap_{it} + \gamma_{19}\,R\&Dexp_{it} + \gamma_{110}\,YR + \varepsilon_1$ (3.a)

IFRS: $MV_{it} = \gamma_{20} + \gamma_{21}\,adjBVE_{it} + \gamma_{22}\,adjNI_{it} + \gamma_{23}\,GOOD_{it} + \gamma_{24}\,BRPAT_{it} + \gamma_{25}\,LIC_{it} +$
$+ \gamma_{26}\,SOFT_{it} + \gamma_{27}\,OTHINT_{it} + \gamma_{28}\,R\&Dcap_{it} + \gamma_{29}\,R\&Dexp_{it} + \gamma_{210}\,YR + \varepsilon_2$ (3.b)

where:

MV_{it} = stock market value of equity, computed as the product of the number of common shares outstanding and stock price at the end of third month following year t.

$adjBVE_{it}$ = book value of common equity less total intangible assets capitalized in year t.

$adjNI_{it}$ = net income before extraordinary items plus R&D expenditures of year t.

$GOOD_{it}$ = *net amount of goodwill capitalized in year t.*

$NetINT_{it}$ = *net intangible assets capitalized in year t, excepting goodwill. It includes the following variables defined in model 3: brand and patents, licenses, computer software, other intangible assets, R&D capitalized.*

$BRPAT_{it}$ = *net book value of brands, patents and trademarks capitalized in year t.*

LIC_{it} = *net book value of licenses, franchises and production rights capitalized in year t.*

$SOFT_{it}$ = *net computer software costs capitalized in year t.*

$OTHINT_{it}$ = *all other net intangible assets capitalized in year t and not recognized in the previous categories of brand and patents, licenses, and computer software. It comprises deferred costs under the Italian GAAP regime.*

$R\&Dcap_{it}$ = *net research and development costs capitalized in year t. It comprises advanced research and development costs under the Italian GAAP regime, whereas it includes only development costs under IFRS.*

$R\&Dexp_{it}$ = *research and development expenditures of year t reported in the income statement.*

YR = *year dummies.*

In order to control the scale effects of price models, in each regression dependent and independent variables are deflate by total assets (Kothari and Zimmerman,1995).

Empirical Models (1/2)

Test:

1) the general significance of IFRS adoption

   → *Chow test*

2) **Incremental** *value relevance* of intangible assets with regard to key accounting variables: whether intangible assets significantly complement information provided to investors by book value of equity and net income adjusted *(adj.BV, adjNI)*

   → *test the increment in R-squared between nested regressions [1vs 2(3) models]*

3) **Relative** *value relevance* of intangible assets: whether, by distinguishing between Italian GAAP and IFRS reporting periods, the coefficients under Italian GAAP are equal to the coefficient under IFRS

   → *Test the difference of coefficients under Italian GAAP and under IFRS ($\beta_{13} \neq \beta_{23}$, $\beta_{14} \neq \beta_{24}$)*

Sample

- 267 non-financial public companies (1751 observation-years)
- Sample period: 1996 - 2006
- Data source: Worldscope, Extel, Osiris and company financial statements

	Firms	Obs.
Initial sample	363	3245
Less: observations without fully-consolidated financial statement or price data, total assets	2	1280
Less: firms that do not adopt IAS in 2005-2006	24	176
Less: extreme observations (negative book value, top or bottom 1% of distribution of book value and net income)	2	38
Final sample	**267**	**1751**

Descriptive Statistics (1996-2006)

	Mean[b]		Median[c]		Standard Deviation[d]	
	Italian GAAP	IFRS	Italian GAAP	IFRS	Italian GAAP	IFRS
Book value of equity	0.393	0.412	0.371	0.378	0.194	0.225
	-1.42		*-0.74*		*0.74****	
Net Income	0.006	0.020	0.022	0.025	0.110	0.076
	-2.83***		*-1.71**		*2.05****	
Adj. Book value of equity	0.289	0.248	0.288	0.238	0.236	0.276
	2.57***		*2.98****		*0.73****	
Adj. Net income	0.013	0.029	0.026	0.028	0.113	0.086
	-2.87***		*-1.46*		*1.70****	
Tangible assets	0.267	0.262	0.236	0.196	0.193	0.214
	0.38		*1.23*		*0.82***	
Total intangible assets	0.104	0.164	0.056	0.099	0.128	0.173
	-6.06***		*-5.72****		*0.55****	
Goodwill	0.055	0.097	0.014	0.039	0.091	0.136
	-5.56***		*-6.55****		*0.44****	
Net intangible asset [e]:	0.049	0.066	0.017	0.020	0.088	0.111
	-2.70***		*-0.61*		*0.62****	
- Brands-Patents	0.003	0.013	0.000	0.000	0.015	0.048
	-3.85***		*-5.47****		*0.09****	
- Licenses	0.016	0.024	0.000	0.001	0.067	0.068
	-2.04**		*-6.28****		*0.98*	
- R&D capitalized	0.001	0.004	0.000	0.000	0.011	0.014
	-2.91***		*-7.03****		*0.70****	
- Computer Software	0.000	0.002	0.000	0.000	0.001	0.007
	-5.08***		*-15.52****		*0.02****	
- Other intangible assets	0.029	0.025	0.010	0.003	0.052	0.071
	1.18		*10.26****		*0.54****	
R&D expenditures	0.007	0.009	0.000	0.000	0.023	0.038
	-0.77		*0.03*		*0.37****	
N	1400	351	1400	351	1400	351

Italian GAAP reporting period entails years from 1996 to 2004. IFRS reporting period comprises 2005 and 2006.

[a] All variables are deflated by total assets.

[b] The difference in means is based on pairwise t-tests with unequal variance. t-values in italic.

[c] The difference in medians is based on signed rank test. z-values in italic.

[d] The difference in standard deviations is based on F-test. f-values in italic.

[e] Net Intangible assets = Total intangible Assets – Goodwill

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level in a two-tailed test

Descriptive Statistics

◆ The growth of intangible assets could reflect a time trend that reveals the economic importance of intangible resources in the modern economy (Nakamura, 2003).

Time trend of Tangible and Intangible Assets (mean values)

Tangible Assets — Total Intangible assets
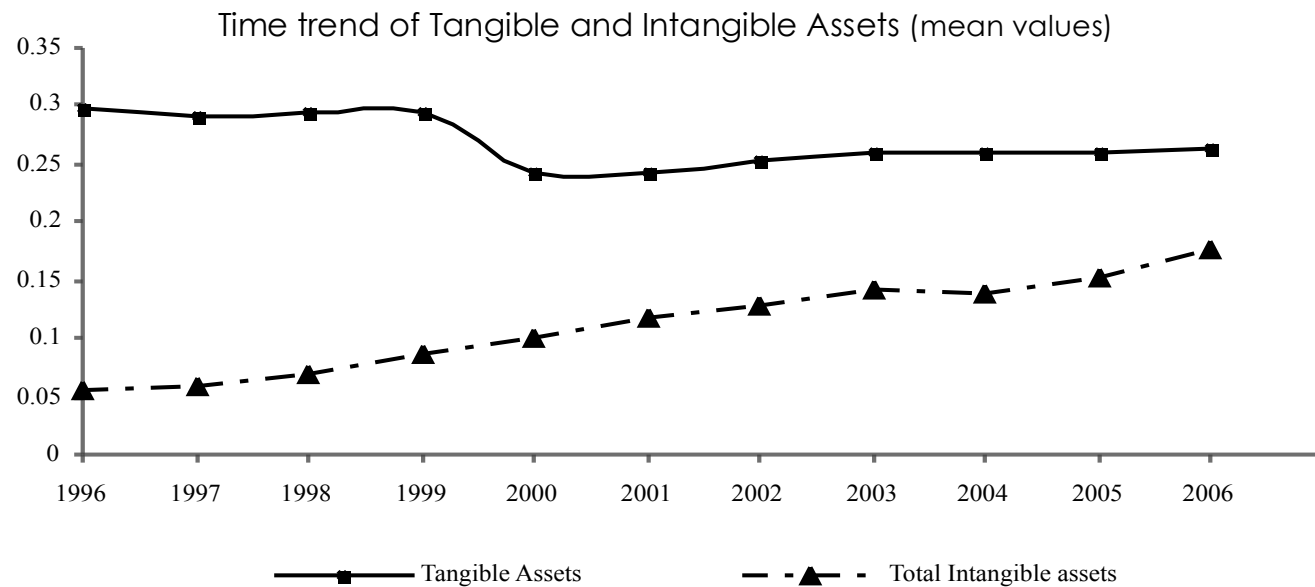
Descriptive Statistics (2004 analysis)

♦ As specified by IFRS 1, firms adopting IFRS in 2005 had to provide in the financial statements of that year a restatement of the accounting items of 2004 (originally presented under Italian GAAP) according to IFRS.

(thousands of €)	Italian GAAP[a]	IFRS[b]	Δ	t-value [c]	Power of t-test [d]
Goodwill	368419	383439	4.1%	-0.059	5.0%
Brand-Patents	28423	26943	-5.2%	0.063	5.1%
Licenses	85878	85670	-0.2%	0.005	5.0%
Computer Software	735	2274	209.6%	-1.358	27.4%
Other Intangible	44226	31206	-29.4%	0.741	11.5%
R&D capitalized	18142	18114	-0.2%	0.001	5.0%
N	156	156			

[a] Italian GAAP accounting data were retrieved from 2004 financial statements.
[b] IFRS accounting data were retrieved from 2005 financial statements in which companies provided restatements of the previous year (2004) according to IFRS.
[a] The differences in means are based on pairwise t-tests with unequal variance. t-value in italic.
[b] Given a sample size, the power of a t-test measures the probability of rejecting the null hypothesis of equality between means when the null hypothesis is really wrong.

Correlations

	M V	adjBVE	adjN I	G O O D	NetINT	BRPA T	LIC	SOFT	OTHIN T	R&Dcap
adjBVE	0.31*									
adjN I	0.19*	0.17*								
G O O D	0.13*	-0.49*	-0.11*							
NetINT	0.14*	-0.31*	-0.02	0.03						
BRPA T	0.07*	-0.12*	0.00	0.05*	0.35*					
LIC	0.10*	-0.22*	0.01	-0.01	0.74*	0.13*				
SOFT	0.05*	-0.07*	-0.03	0.15*	0.05*	0.06*	0.02			
OTHIN T	0.07*	-0.19*	-0.04*	0.02	0.59*	0.01	-0.01	-0.03		
R&Dcap	0.03	-0.08*	-0.11*	0.04	0.23*	0.09*	0.12*	0.03	-0.01	
R&Dexp	0.05*	0.06*	0.28*	-0.05*	-0.04	0.02	-0.04	-0.01	-0.04*	0.08*

	Model 1			Model 2			Model 3		
	Italian GAAP	IFRS	*test diff* [b]	Italian GAAP	IFRS	*test diff* [b]	Italian GAAP	IFRS	*test diff* [b]
intercept	-1.43 (-16.36)***	-0.54 (7.30)***		-2.05 (-22.78)***	-1.08 (-5.79)***		-2.08 (-22.65)***	-1.15 (-8.42)***	
adjBVE	1.27 (11.12)***	0.57 (3.90)***	*14.31***	2.48 (18.25)***	1.47 (3.79)***	*6.05**	2.50 (18.04)***	1.60 (5.82)***	*8.41***
adjNI	0.78 (1.19)	2.08 (2.45)**	*1.45*	0.86 (1.61)	1.57 (1.52)	*0.4*	0.86 (1.54)	1.47 (1.45)	*0.27*
GOOD	…	…		4.23 (14.28)***	2.64 (5.47)***	**7.95***	4.26 (14.35)***	2.81 (7.29)***	**8.95***
NetINT	…	…		3.86 (11.78)***	1.57 (1.79)*	**6.02**	…	…	
BRPAT	…	…		…	…		1.61 (0.35)	2.55 (4.05)***	*0.04*
LIC	…	…		…	…		3.41 (8.64)***	2.23 (3.39)***	*2.41*
SOFT	…	…		…	…		28.73 (1.32)	2.00 (0.51)	*1.47*
OTHINT	…	…		…	…		4.61 (8.67)***	0.45 (0.33)	**8.00***
R&Dcap	…	…		…	…		2.27 (0.70)	5.86 (1.66)*	*0.56*
R&Dexp	…	…		0.92 (0.69)	-0.44 (-0.34)	*0.53*	0.94 (0.69)	-0.66 (-0.54)	*0.75*
year dummy	yes	yes		yes	yes		yes	yes	
N	1400	351		1400	351		1400	351	
F-value	26.97***	9.20***		43.07***	11.08***		33.84***	9.52***	
R^2	0.2009	0.1213		0.4041	0.2823		0.4039	0.2993	
Chow Test	**23.18***			**5.74***			**4.20***		
Increment in R^2:									
- 1 vs. 2 model				**157.54***	**25.72***				
- 1 vs. 3 model							**67.23***	**12.34***	

Italian GAAP reporting period entails years from 1996 to 2004. IFRS reporting period comprises 2005 and 2006.

[a] T-statistics based on White's (1980) heteroskedasticity-consistent standard errors are in parentheses.

[b] F-test for the null of equality between coefficients.

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level in a two-tailed test

High-Tech versus Low-Tech Industries

	High-tech industries [a, b]			Low-tech industries [a, b]		
	Italian GAAP	IFRS	test diff [c]	Italian GAAP	IFRS	test diff [c]
intercept	-1.99	-1.43		-2.05	-1.01	
	(-13.12)***	(-7.28)***		(-17.86)***	(-4.92)***	
adjBVE	2.58	2.49	0.05	2.36	1.15	6.96***
	(11.84)***	(7.03)***		(13.81)***	(2.70)***	
adjNI	0.60	-0.08	0.21	1.36	3.01	1.96
	(0.68)	(-0.06)		(2.38)**	(2.92)***	
GOOD	4.91	3.57	**3.41***	3.79	2.27	**4.61****
	(11.25)***	(6.14)***		(9.64)***	(3.88)***	
NetINT	3.73	2.56	0.67	3.76	1.34	**7.02*** **
	(3.77)***	(2.48)***		(10.70)***	(1.58)	
R&Dexp	1.56	0.73	0.10	-1.70	2.06	0.42
	(0.73)	(0.52)		(-0.57)	(0.41)	
years dummy	yes	yes		yes	yes	
N	476	127		924	224	
R^2	0.4128	0.3646		0.4075	0.3098	
Chow Test	1.74			**5.27*** **		

Italian GAAP reporting period entails years from 1996 to 2004. IFRS reporting period comprises 2005 and 2006.

[a] Determination of high- versus low-tech industries is based on OEDC classification. The following industries are included among high-tech: aerospace, computers, office machinery, electronics-communications, pharmaceuticals, scientific instruments, motor vehicles, electrical machinery, chemicals, other transport equipment, non-electrical machinery.

[b] T-statistics based on White's (1980) heteroskedasticity-consistent standard errors are in parentheses.

[c] F-test for the null of equality between coefficients.

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level in a two-tailed test

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Short time period analysis (2003-2006)

	Model 2			Model 3		
	Italian GAAP	IFRS	test diff [b]	Italian GAAP	IFRS	test diff [b]
intercept	-1.60 (-15.95)***	-1.08 (-5.79)***		-1.62 (-16.59)***	-1.15 (-8.42)***	
adjBVE	1.92 (10.01)***	1.47 (3.79)***	1.81	1.92 (10.37)***	1.60 (5.82)***	1.22
adjNI	1.72 (3.37)***	1.57 (1.52)	0.02	1.93 (3.53)***	1.47 (1.45)	0.31
GOOD	3.80 (7.70)***	2.64 (5.47)***	3.74**	3.79 (8.54)***	2.81 (7.29)***	3.07**
NETINT	2.55 (6.78)***	1.57 (1.79)*	2.01	…	…	
BRPAT	…	…		0.19 (0.14)	2.55 (4.05)***	2.51
LIC	…	…		1.93 (4.37)***	2.23 (3.39)***	0.40
SOFT	…	…		24.51 (1.50)	2.00 (0.51)	1.79
OTHINT	…	…		4.41 (5.72)***	0.45 (0.33)	6.32***
R&Dcap	…	…		4.57 (1.57)	5.86 (1.66)***	0.10
R&Dexp	-0.73 (-0.36)	-0.44 (-0.34)	0.05	-1.00 (-0.60)	-0.66 (-0.54)	0.05
years dummy	yes	yes		yes	yes	
N	341	351		341	351	
F-value	23.17***	11.08***		16.90***	9.52***	
R^2	0.399	0.2823		0.4153	0.2993	
Chow Test	2.61**			2.71***		

Italian GAAP reporting period entails years 2003 and 2004. IFRS reporting period comprises 2005 and 2006.
[a] T-statistics based on White's (1980) heteroskedasticity-consistent standard errors are in parentheses.
[b] F-test for the null of equality between coefficients.
*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level in a two-tailed test

Annual value relevance before IFRS adoption

	Obs	GOOD	test diff[a]	NETINT	test diff[a]	R&Dexp	test diff[a]
1996	122	1.95		3.26		-0.69	
1997	126	2.89	(0.65)	4.47	(0.42)	-4.52	(0.53)
1998	131	3.15	(0.04)	5.11	(0.10)	-5.28	(0.03)
1999	145	3.92	(0.18)	5.76	(0.11)	-5.68	(0.00)
2000	177	4.48	(0.10)	5.81	(0.00)	7.68	(9.35)***
2001	181	4.54	(0.00)	4.17	(2.05)	2.66	(2.17)
2002	177	4.72	(0.05)	3.59	(0.27)	0.27	(0.66)
2003	168	3.83	(0.91)	2.73	(1.14)	1.17	(0.10)
2004	173	3.96	(0.02)	2.38	(0.26)	-1.42	(1.49)

[a] F-test for the null of equality between coefficients.
*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level in a two-tailed test

The effect of first-time adoption of IFRS (2004 analysis)

	2004
intercept	1.28 (5.58)***
adjBVE	1.41 (2.74)***
adjNI	5.23 (5.35)***
GOOD	2.78 (2.60)***
NetINT	3.09 (1.91)**
R&Dexp	-0.30 (-0.24)
diff_adjBVE	0.25 (1.71)*
diff_adjNI	1.23 (3.16)***
diff_GOOD	0.50 (1.70)*
diff_NetINT	0.03 (0.14)
diff_R&Dexp	-2.84 (-3.21)***
R^2	0.390

Main results (1/2)

- The new accounting standards have affected the value relevance of accounting information, but that the adoption of IFRS has not generally enhanced the relevance of intangible assets.

- The value relevance of goodwill significantly decreased after IFRS adoption:

   > in a reporting environment characterized by a weak corporate governance system and low financial transparency, such as the Italian one, the impairment test may negatively affect the value relevance of goodwill.

- The aggregate of all intangible assets aside from goodwill (i.e., net intangible assets) exhibits lower value relevance after the change of accounting standards.

   > IFRS recognition criteria that exclude internally generated intangible assets and deferred costs from firms' assets have a small effect on information provided to investors

Main results (2/2)

- Even if the adoption of IFRS was motivated by the need to increase the value relevance of accounting information, the compulsory adoption of IFRS has not enhanced in general the quality of accounting information of intangible assets.

- IFRS adoption is influenced by national reporting environment (e.g., Ball 2006), especially in a code-law country with a stakeholder model of corporate governance.

- The implementation of accounting standards depends on firms' reporting behaviors and hence is subject to local institutional factors.

Limitations

Despite the consistency of findings across various sensitivity checks, I acknowledge some limitations and the consequent risks of generalizing these results:

1. Short time period following IFRS adoption;

2. Findings are primarily related to the Italian reporting environment;

3. The analysis does not entail footnote disclosure, which, like recognition criteria, could vary across different accounting regimes.