

**Financial Statement Effects of Adopting International Accounting Standards: The
Case of Germany**

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Abstract

This study investigates the effects of adopting International Accounting Standards (IAS) on financial statements and their value relevance for a sample of German firms during 1998-2002. By implementing an innovative research design we compare accounting numbers reported under German accounting rules (HGB) with those under IAS for the *same set of firm-years*, and document how IAS adoption changes key financial measures and the value relevance of financial statement information. While HGB is stakeholder-oriented and commonly viewed as a historical cost accounting model that emphasizes income smoothing, IAS is shareholder-oriented and generally perceived as a fair-value accounting model that emphasizes balance sheet valuation. Consistent with these perceptions, we find that total assets and book value of equity, as well as variability of book value and net income, are significantly higher under IAS than HGB. In addition, we find that book value (net income) plays a greater (lesser) valuation role under IAS than under HGB. Finally, we find that while the IAS adjustments to book value are generally value relevant, the adjustments to income are generally value irrelevant. Our evidence provides new insights into the accounting differences between stakeholder-oriented and shareholder-oriented accounting systems and sheds light on the financial statement and valuation implications of adopting IAS in stakeholder-oriented economies, an issue that is particularly important in the upcoming adoption of IAS by the European Community.

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1. Introduction

Beginning in 2005 all listed companies in the European Union are required to prepare their financial statements in accordance with International Accounting Standards (IAS) (Hofheinz 2002).¹ IAS adoption by the European Union is one of the biggest events in the history of financial reporting and will make IAS the most widely accepted financial accounting model in the world. Hence there is an urgent need for managers and investors to understand the implications of IAS adoption, especially in European countries with stakeholder-oriented accounting systems (such as Germany and France). IAS adoption is expected to have a particularly profound effect on the financial statements of companies in stakeholder-oriented countries because IAS are heavily influenced by the shareholder-oriented Anglo-Saxon accounting model while local standards in many European countries have a greater contracting orientation and are driven by considerations of tax-book conformity.²

The objective of our paper is to examine the financial statement effects of adopting IAS in European countries with stakeholder-oriented accounting systems. Accordingly, we conduct our investigation using a sample of 80 German firms that adopt IAS for the first time during the 1998-2002 period. Specifically, we investigate the effects of IAS adoption on the financial statements by both documenting the financial statement changes precipitated by adopting IAS, and examining the effects of these changes on key financial

¹ For ease of exposition, we use the term IAS to refer to both the International Accounting Standards (IAS) issued by International Accounting Standards Committee (IASC) and the International Financial Reporting Standards (IFRS) issued by IASC's successor, International Accounting Standards Board (IASB).

² The tax-driven nature of national accounting standards is regarded as a major obstacle for a country's willingness to adopt IAS (GAAP Convergence 2000).

ratios and the value relevance of financial statement information. Examining financial statement implications is important because, while IAS adoption might lead to indirect economic consequences such as higher market liquidity or lower cost of capital, the only *direct* effects of adopting IAS are changed financial statements (and related footnote disclosures).

We limit our investigation to the German capital markets primarily to overcome problems associated with comparing across countries with different institutional environments. In addition, Germany is particularly well suited for our empirical investigation for several reasons. First, the accounting system in Germany has traditionally been stakeholder-oriented (Ball, Kothari and Robin 2000). Unlike IAS, German Generally Accepted Accounting Principles (GAAP) or Commercial Code (*Handelsgesetzbuch* – HGB) encourages a “prudent” approach to asset valuation and liability recognition to facilitate contracting with stakeholders (Harris, Lang and Moller 1994; Leuz and Wustemann 2004).³ Thus Germany provides an ideal “natural experiment” in which to examine the financial statement effects of adopting IAS in countries with stakeholder-oriented accounting systems. Second, Germany has a strong tradition of the rule of law and an efficient judicial system (La Porta, Lopez-de-Silanes, Shleifer and Vishny 1998). Thus, we are reasonably assured that there is adequate enforcement of accounting rules, which is a necessary condition when comparing

³ For ease of exposition, we use the terms German GAAP and HGB interchangeably even though the term German GAAP refers to a broader concept that includes all legal rules, principles and standards that have to be applied by a company in the preparation of its financial statements.

alternative accounting rules' regimes.⁴ Third, Germany has a relatively large number of companies adopting IAS,⁵ which provides us with a reasonably large sample.

Our research design allows us to directly compare accounting numbers (and their properties) prepared under HGB with those under IAS for the *same set of firm-years*. We are able to make this direct comparison because German firms adopting IAS are required to restate their prior-year results under IAS during the adoption year, thus providing us with financial statements prepared under both IAS and HGB for the year prior to adoption.⁶ Thus, our research design completely controls for cross-sectional and time-series differences between the IAS and HGB users. In addition, we restrict our sample to firms adopting IAS during 1998 or after because of two important events that occurred in 1998: (1) the core IAS standards were completed; and (2) IAS adopters were mandated to fully comply with the IAS standards (prior to 1998, companies could choose to implement only a subset of IAS standards). Hence, examining post-1997 adoptions ensures that our IAS firm-years are truly representative.

Our empirical investigation comprises three basic sets of analyses. First, we document both the incidence and magnitude of key accounting differences between IAS and HGB. Second, we examine the effects of IAS adoption on key accounting measures

⁴ Several recent developments also strengthen the auditing and implementation environment in Germany. In April 1998, section 323 of HGB increased the legal liability for auditors, and sections 331-332 of HGB subjected auditors and directors to criminal prosecution.

⁵ More than 40% of the companies in German DAX100 index have adopted IAS and many companies are planning to do so in near future (Leuz and Wustemann 2004). This trend is partially due to the enactment of KapAEG law (Capital Raising Facilitation Act) in 1998 that allows German listed firms preparing their consolidated financial statements according to internationally accepted accounting standards instead of German accounting standards.

⁶ For example, BMW adopted IAS for the first time in 2001. Thus, in its 2001 annual report, BMW restated its 2000 financial statements under IAS. The 2000 financial statements, however, were originally reported in its 2000 annual report under HGB. By collecting information from both 2000 and 2001 annual reports, we are able to obtain BMW's financial statement information for 2000 under both HGB and IAS.

and financial ratios. Finally, we examine the relative and incremental value relevance of IAS and HGB book values and net income.

We begin by documenting both the incidence and the magnitude of key accounting differences between HGB and IAS based on book value and net income reconciliation adjustments that a subset of our sample firms report in their annual reports. We find that switching to IAS results in widespread and significant changes in deferred taxes, pensions, PP&E, and loss provisions and, while less widespread, changes in intangibles/R&D are also significant for certain firms. Overall, our analysis reveals that while HGB emphasizes the prudence principle and income smoothing (e.g., limited recognition of assets and frequent use of discretionary loss provisions), IAS emphasizes fair-values and balance-sheet valuation (e.g., use of fair value for financial instruments and recognition of internally developed intangibles).

We next analyze the effects of adopting IAS on key accounting measures and financial ratios for our sample of IAS adopters. Consistent with HGB's conservatism and IAS's fair-value orientation, we find that total assets and book value of equity are significantly larger under IAS than under HGB and that cross-sectional variation in book value and net income are significantly higher under IAS than under HGB. We also find that IAS adoption significantly decreases return on equity and asset turnover because of the relatively larger book value of equity and total assets under IAS. We find no significant differences in leverage between HGB and IAS, because both liabilities and the book values of equity tend to increase under IAS. Finally, we find that adopting IAS significantly affects commonly-used valuation metrics. For example, book-to-market ratios tend to increase while earnings-to-price ratios tend to decrease. In summary, we

find that adopting IAS results in economically significant changes to many key accounting measures and financial ratios.

Our final set of analyses examines the effects of IAS adoption on the value relevance of book values and net income. We measure value relevance in terms of the ability of accounting measures to explain contemporaneous stock prices. We compare the relative value relevance of HGB and IAS measures and assess the incremental value relevance of the adjustments made by IAS to the HGB measures. While our relative value relevance analysis compares the ability of HGB versus IAS to reflect economic information incorporated in stock prices when only one set of measures is available, our incremental value relevance analysis assesses the ability of HGB and IAS to reflect information beyond each other when both accounting measures are simultaneously available. Relative value relevance tests are more appropriate in our context, because firms that switch to IAS discontinue reporting HGB measurements. However, we also conduct incremental value relevance tests in order to evaluate specifically value relevance of adjustments made by IAS to the HGB numbers.

Our relative value relevance analysis suggests that IAS markedly reduces income persistence, probably because of its relatively greater emphasis on fair values and lesser emphasis on income smoothing. Consistent with this conjecture, book value (net income) is relatively more (less) important under IAS than under HGB in a valuation model that includes both book value and net income. We find no evidence suggesting that IAS improves the relative value relevance of the summary measures, book value of equity and net income, either separately or in combination. Our incremental value relevance analysis suggests that while the IAS adjustments to book value are generally value

relevant, the adjustments to income are generally value irrelevant and may even impair value relevance. Overall, our value relevance results are consistent with IAS being balance-sheet and fair-value orientated and HGB being income-smoothing oriented. Although the change in focus from income smoothing to fair value accounting increases the relative importance of book value vis-à-vis net income, it does not appear to improve the value relevance of either summary measure, separately or in combination.

We note that our sample firms do not represent a random selection of German firms because they voluntarily switched to IAS prior to the mandatory IAS adoption date. To assess the impact of self-selection on our value relevance results, we implement the two-stage regression procedure suggested by Heckman (1979). The results of this procedure suggest that, although firm size and financing needs drive IAS adoption decisions, all our inferences are robust to the effects of self-selection bias.

We contribute to the literature on several dimensions. First, we provide evidence on the likely financial statement effects of the impending adoption of IAS throughout the European Union, which is arguably one of the most important events in the history of financial reporting. By focusing on Germany, we study a country that is experiencing a major shift to the shareholder-oriented IAS from a stakeholder-oriented accounting system (HGB), which is typical of many European countries (e.g., Austria and France). While prior studies speculate on the potential effects of adopting IAS in economies with stakeholder-oriented accounting systems, data constraints prevent these papers from directly quantifying the effects of adoption (Joos and Lang 1994). By using hand collected data from annual reports of firms switching from HGB to IAS, we provide evidence regarding the financial statement implications of adopting IAS in a country with

a stakeholder-oriented accounting system such as Germany, with immediate implications for the impending transition in Europe.

Second, in addition to the topical interest, our study also contributes to the academic literature. Extant literature generally makes comparisons between IAS and U.S. GAAP (e.g., Harris and Muller 1999; Ashbaugh and Olsson 2002), non-U.S. and U.S. GAAP (e.g., Amir, Harris and Venuti 1993) and across different local standards including U.S. GAAP (Ali and Hwang 2000; Ball, Kothari and Robin 2000). This literature, however, rarely compares IAS with local GAAP. We are one of the first studies to document such a comparison.⁷

Third, we contribute to the important debate on the relative superiority of the Anglo-Saxon shareholder-oriented versus the continental European stakeholder-oriented accounting models. Prior literature examines this question based on cross-sectional comparisons across different countries and concludes that the shareholder-oriented model is generally more value relevant than the stakeholder-oriented model (Ali and Hwang 2000; Ball et al. 2000).⁸ The literature, however, is unable to disentangle whether this finding is driven by the difference in accounting standards or other institutional factors such as shareholder protection or market development. In contrast, our design focuses on a single country and compares alternative accounting standards for the same set of firm-

⁷ A recent paper by Bartov, Goldberg and Kim (2004) provides some evidence on this issue. Unlike our study, however, Bartov et al. restrict their analysis to examining the value relevance of income, which does not bring out the consequences of the fair-value orientation of IAS. Additionally, Bartov et al. focus on cross-sectional (“IAS versus non-IAS firms”) and time-series (before versus after IAS adoption) analyses, which do not have the experimental control of our design that compares HGB and IAS for the identical set of firm years.

⁸ While Ali and Hwang (2000) do not use the term “stakeholder-oriented” economy (“shareholder-oriented” economy), their country-specific factors such as bank-oriented (market-oriented), Continental model (British-American model) and tax-book conformity (no tax-book conformity) are typical characteristics of stakeholder-oriented economies (shareholder-oriented economies). See Ball et al. (2000) for further discussions on the governance structure of stakeholder-oriented and shareholder-oriented economies.

years. Such a research design allows us to examine accounting differences under a *ceteris paribus* condition that naturally controls for time series and cross-sectional differences in various country-specific institutional factors.⁹ We find no significant differences in value relevance between stakeholder-oriented (HGB) and shareholder-oriented (IAS) accounting models. While speculative, our results suggest other institutional factors such as shareholder protection may play a more important role than accounting standards in explaining cross-country variation in the value relevance of accounting data (Hung 2000; Ball, Robin and Wu 2003).

Finally, we add to prior studies examining the value relevance of IAS (Harris and Muller 1999; Ashbaugh and Olsson 2002) by focusing on the period subsequent to the adoption of the core standards by the IASC in 1998. The core standards substantially change several accounting recognition and measurement rules comprising IAS and are generally regarded as the “true” presentation of IAS.¹⁰ Furthermore, IAS “adopters” prior to 1998 are allowed to be only partially compliant with the standards. Thus, our paper is arguably the first to examine the value relevance of truly representative current IAS accounting standards. Consequently, we are the first to document the substantial

⁹ The only other set of papers that are able to implement such a design are studies that compare non-U.S. with U.S. GAAP using 20F filings (a disclosure required by the U.S. Securities and Exchange Commission that includes reconciliation of book value and net income from home-country accounting principles to U.S. GAAP). For example, Amir et al. (1993) compare differences between foreign GAAP and U.S. GAAP and Harris and Muller (1999) compare differences between IAS and U.S. GAAP using these filings. These studies do not, however, exclusively compare shareholder-oriented and stakeholder-oriented accounting models.

¹⁰ For example, the core standards are the standards being considered for endorsement by the International Organization of Securities Commissions (IOSCO). The endorsement of IAS by IOSCO is one of the key factors for European Commission’s decision to adopt IAS.

fair-value orientation of IAS and its implications for the value relevance of book value and net income.¹¹

The rest of the paper proceeds as follows. Section 2 describes the sample and Section 3 discusses accounting differences between HGB and IAS. Section 4 reports the effects of accounting differences on financial statement measures and ratios. Section 5 provides the results on relative value relevance of HGB and IAS measures as well as the incremental value relevance of IAS book value and net income adjustments. Section 6 summarizes our results and discusses limitations of our paper.

2. Sample and Data

Our sample consists of 80 German industrial firms that adopted IAS for the first time during 1998-2002. We begin our investigation period from 1998 because two important events in the development of IAS occurred during that year. First, the IAS core standards were completed, with the approval of IAS 39 (Financial Instruments: Recognition and Measurement).¹² Second, the revised IAS 1 (Presentation of Financial Statements), which demands full compliance from IAS adopters, became effective in 1998.¹³ Thus, by restricting our sample to firms adopting IAS during 1998 and later, we are assured that (1) the standards applied by our IAS sample firms are representative of the core international standards and that (2) our sample IAS adopters are not selectively applying only a subset

¹¹ While the fair value orientation of IAS has not been documented earlier in the academic literature, this aspect of IAS has been highlighted by practitioners (e.g., Ernst and Young 2004).

¹² While the majority of the core standards have effective dates earlier than 1998, some standards have effective dates later than 1998. However, we note that the standards generally encourage early adoption.

¹³ Before the revised IAS 1 became effective in 1998, there was no requirement that IAS adopters should be in full compliance with IAS and many “IAS adopters” selectively adopted standards between local GAAP and IAS in their financial statements. Specifically, the revised IAS 1 states:

“Financial statements should not be described as complying with International Accounting Standards unless they comply with all the requirements of each applicable Standard and each applicable interpretation of the Standing Interpretations Committee.”

of the prescribed international standards. Together, these two conditions ensure that the IAS data that we use in our analyses are representative of the current IAS rules.

We use the following procedures to identify our sample and collect the necessary restated IAS accounting data. First, we use the Compustat Global Vantage Industrial/Commercial and Issue databases to gather all firm-year observations with available data on net income, book value and market value for firms incorporated in Germany.¹⁴ Second, we identify all firms that switch their accounting standards from local GAAP to IAS, i.e., those with Global Vantage accounting standard codes changing from ‘DS’ (Domestic standards) to ‘DI’ (Domestic standards generally in accordance with IASC guideline), during our sample period.¹⁵ These procedures result in an initial sample of 89 firms.¹⁶

Third, we obtain all available annual reports for these 89 firms during our sample period either from the respective company’s website or the Thomson ONEBanker Company Filing database. We verify whether the firms are using HGB or IAS by examining notes to consolidated financial statements and audit reports. We delete eight firms because the Global Vantage database erroneously identifies an IAS adoption during our sample period, i.e., the annual reports of these eight firms indicate that they have been using either HGB or IAS through the entire sample period and contain no references

¹⁴ Following the convention in Global Vantage, we define net income as earnings before extraordinary items, book value as shareholders’ equity excluding minority interest and market value as closing price multiplied by the number of shares outstanding.

¹⁵ We note that in addition to ‘DI,’ there are two other accounting standards codes in Global Vantage with references to IAS: ‘DA’ — Domestic standards generally in accordance with IASC and OECD (Organization for Economic Cooperation and Development) guidelines, and ‘DT’ — Domestic standards in accordance with principles generally accepted in the United States and generally in accordance with IASC and OECD guidelines. We only focus on ‘DI’ to identify IAS adopters because none of the German companies have the accounting codes ‘DA’ or ‘DT’ during our sample period.

¹⁶ One firm has the accounting standard codes changing from ‘DS’ to ‘DU’ then to ‘DI’ during our sample period, where ‘DU’ denotes ‘Domestic standards in accordance with principles generally accepted in the United States.’ We check the accounting standards in the company’s annual reports throughout our sample period. We find that the codes ‘DU’ should have been ‘DS’ and make the corrections accordingly.

to changes in accounting standards. This reduces our viable sample to 81 firms. In addition we also modify the IAS adoption year for thirteen firms because Global Vantage database appears to have misclassified this information.¹⁷

Fourth, for these 81 firms, we collect both the original HGB and the restated IAS information for the year prior to IAS adoption. We are able to obtain two sets of financial statements—prepared alternatively under HGB and IAS—for the same firm-years because the Standing Interpretations Committee Interpretation SIC 8 (First-time Application of IAS as the Primary Basis of Accounting) requires restatement of prior period results for first-time IAS adopters.¹⁸ Specifically, for the year prior to adoption, the SIC 8 requirement allows us to collect the original HGB numbers from the annual report for that year and the restated IAS numbers from the annual report for the following year (i.e., the adoption year).¹⁹ To maximize our sample size, we use all available restated accounting information. Since some firms voluntarily provide more data (three firms provide two-year book value and net income reconciliation from HGB to IAS and one firm provides consolidated financial statements based on both HGB and IAS prior to adopting IAS), we are able to obtain four more sample observations.

¹⁷ While manually verifying the IAS adoption from annual reports ensures that we do not erroneously classify a firm as an IAS adopter during our sample period, we acknowledge that it is possible that there are firms that did adopt IAS during our sample period but were not included in the sample because of errors in the Global Vantage database and our reliance on this database for the initial screening process.

¹⁸ SIC 8 requires firms to restate prior periods as if the financial statements had always been prepared in accordance with IAS and disclose when the amount of adjustment to the opening balance of retained earnings cannot be reasonably determined. We note that SIC 8 is superseded by IFRS 1 (First Time Adoption of International Accounting Standards), which enhances several disclosure requirements and will be effective in 2004.

¹⁹ We illustrate our procedure by using BMW as an example. BMW adopted IAS for the first time in 2001 (see Appendix 1 for excerpts from BMW's 2001 Annual Report). In its 2001 Annual Report, BMW reports the 2001 financial statements according to IAS and restates the 2000 financial statements as if prepared in accordance with IAS. Since the 2000 financial statements reported in its 2000 annual report are based on HGB, we are able to obtain both HGB and IAS data for 2000.

Finally, consistent with prior research such as Collins, Maydew and Weiss (1997), we delete firms with negative book value of equity (under either HGB or IAS). This results in the loss of one firm. Thus, our sample selection procedure ultimately yields 80 firms, comprising 84 firm-year observations, with accounting numbers based on both HGB and IAS.

Table 1 reports the distribution of our sample firms by year and industry group. Panel A of Table 1 shows that the number of German firms switching from HGB to IAS has a relatively large increase in 1999 (from 4 to 19). This is likely due to the enactment of the KapAEG law (Capital Raising Facilitation Act) in 1998, which allows companies to prepare consolidated financial statements in accordance with internationally accepted accounting standards instead of German GAAP (Leuz and Verrecchia 2000).²⁰ Panel B of Table 1 classifies firms based on the industry group classification in Fama and French (1997). It shows that our sample firms are well dispersed across various industry groups with no industry constituting more than 15% of the sample. In addition, the relatively high concentration of our sample firms in Machinery, Wholesale and Business services industries likely reflect the dominance of these industries in the German economy.²¹

²⁰ We note that the adoption of IAS for consolidated financial statements by a German company does not have direct tax or dividend implications because tax and dividends are tied to a firm's parent-only statements (Leuz and Verrecchia 2000).

²¹ For example, Machinery and Business services are the top two industries in terms of the number of German industrial firms included in the Global Vantage database. In addition, while our sample is not concentrated in the high-tech industry, we note that 20 of our 80 firms are traded in the New Market (or Neuer Market). The New Market was launched in 1997 as a new German stock market segment geared toward small- and medium-size companies in innovative and fast-growing industries (Leuz 2003). According to the regulations in Deutsche Börse, financial statements for New Market firms have to be prepared in accordance with either IAS or U.S. GAAP. Some of these firms are identified as first-time IAS adopters and included in our sample because, in its early days, the New Market allowed some firms to provide German GAAP financial statements for a limited time if they were temporarily unable to prepare them according to IAS or U.S. GAAP.

Overall, our sample firms are representative of a broad cross-section of German companies.

3. Accounting Differences between HGB and IAS

HGB is typically characterized as stakeholder-oriented and tax-driven (Harris et al. 1994; Ball et al. 2000; Leuz and Wustemann 2004). It differs substantially from IAS, which is shareholder-oriented and independent of tax reporting considerations. The different roles of the accounting systems have several important implications for the accounting standards. First, HGB generally encourages a “prudent” approach to asset valuation and liability recognition to facilitate contracting with stakeholders, while IAS promotes “true and fair” presentation of balance sheets to facilitate decisions making for investors. For example, HGB does not allow capitalization of internally developed intangibles or research & development cost (R&D). On the contrary, IAS allows capitalization if certain criteria are met. Second, HGB permits great flexibility for managers to value assets at their lowest amount possible to minimize tax liability, while IAS constrains such flexibility. For example, HGB allows tax-based accelerated depreciation methods for property, plant and equipment and IAS does not. Third, HGB is characterized by income smoothing through the use of reserves to dampen fluctuations in income and also through delayed and gradual recognition. IAS, on the other hand, is more fair-value oriented and therefore likely to incorporate the effects of economic events in a more timely (and volatile) manner in the financial statements (Coopers & Lybrand 1993; GAAP 2000; Alexander and Archer 2001). Table 2 summarizes key accounting differences between HGB and IAS.

We obtain information regarding the incidence and magnitude of specific differences between HGB and IAS from voluntary reconciliation disclosures that a subset of our sample firms provide in the years surrounding their IAS adoption. We find that a substantial proportion of our sample firms provide information on book value reconciliation, while relatively fewer firms provide information on net income reconciliation.²² Specifically, we obtain 57 firm-year observations on book value reconciliation adjustments and 31 firm-year observations on net income reconciliation adjustments for our sample of 80 firms.²³ Appendix 1 reports the reconciliation adjustments for BMW and Washtec AG, two firms that disclose both book value and net income reconciliation adjustments.

3.1. Differences in Book Value of Equity

Panel A of Table 3 reports details of the book value reconciliation adjustments between HGB and IAS (in Euro million).²⁴ We classify adjustments into ten specific categories (categories are identified as those with a minimum of ten observations) and group all other adjustments under “other.” We report descriptive statistics for each of the categories, in addition to book value measured under HGB and IAS. In addition, we present two sets of descriptive statistics: the first set reports statistics after coding missing values as zero (thus describing the average magnitude of an adjustment among all

²² We note that while firms with book value or net income reconciliation likely differ from those without reconciliation in terms of firm size or investor base, we do not expect the differences to affect our overall inferences on the accounting differences. This is because our conclusion on the accounting differences is mainly based on the actual accounting standards.

²³ Five (three) firms provides book value (net income) reconciliation for two separate years. We note that the years for which firms provide reconciliation adjustments vary. While most firms provide reconciliation adjustments on the beginning balance of book values in their annual reports of the IAS adoption year, some firms provide such information on the ending balance of book values. Thus, the reconciliation adjustments reported in Table 3 do not necessarily pertain to the same years that are used in our primary analyses.

²⁴ European Union countries, including Germany, officially launched Euro in 1999. We use the exchange rate data in the Global Vantage currency database to translate accounting numbers based on Deutsche Mark to Euro. Thus all our numbers are in Euros.

observations) and the second set reports statistics after deleting missing observations (thus describing the magnitude of an adjustment when it exists). The former provides an assessment of the general importance of the adjustment while the latter provides an estimate of the magnitude of reported individual adjustments.

Panel A of Table 3 shows that book values of equity under IAS are larger than those under HGB. Both mean and median book value under IAS (1,253 million and 231 million respectively) are larger than under HGB (840 million and 170 million respectively).²⁵ This is consistent with HGB producing more conservative accounting numbers than IAS. Additionally, IAS almost doubles the standard deviation (from 1,657 million to 3,157 million), indicating that adopting IAS increases cross-sectional variation. This is consistent with the income-smoothing orientation of HGB and fair-value orientation of IAS (because fair-values likely magnify differences across companies). Finally, the panel reports the following major book value reconciliation categories (in the order of reporting frequency):

Deferred Tax. Deferred tax is the most frequent adjustment item, with a frequency of 54 out of 57 observations. Deferred tax differences arise because IAS eliminates tax-book conformity, thus potentially affecting every company. The average effect is deceptively small (mean of 0.28 million) given the relatively large standard deviation of 275 million due to the presence of both book-value increasing (i.e., creation of deferred tax assets) and book-value decreasing (i.e., creation of deferred tax liabilities) adjustments.

Pension. Pension adjustments are also fairly common (41 companies make pension adjustments). IAS pension adjustments tend to generally reduce book values (the mean

²⁵ While not reported in Table 3, the difference in mean (median) book value is significant at $p \leq 10\%$ ($p \leq 1\%$). We report statistical tests on the book value differences for the full sample in Table 4.

reduction is 77 million). This effect likely arises from an increase in pension liabilities under IAS because, unlike HGB, IAS considers expected future compensation levels in determining pension liabilities.

Property, Plant and Equipment (PP&E). IAS adjustments related to PP&E on average increase book value (mean of 180 million). This suggests PP&E values are higher under IAS than HGB, probably because of the elimination of tax-based accelerated depreciation methods. For example, Volkswagen states in its 2001 Annual Report: “Movable tangible assets are depreciated using the straight line method instead of the declining balance method...Furthermore, useful lives are now based on commercial substance and no longer on tax law. Special depreciation for tax reasons is not permitted in IAS.” (Volkswagen 2001 Annual Report, p.85).

Provisions. IAS allows less flexibility in recognizing provisions than HGB, thereby decreasing opportunities to set up “hidden reserves” to smooth income, an alleged common practice in Germany (Celarier 1993, Joos and Lang 1994). The corresponding reductions in provisions, results in an average increase in book value of equity (mean of 116 million) on adopting IAS. For example, BMW states in its 2001 Annual Report: “provisions may only be recognised under IAS if an enterprise has a present obligation (legal or constructive) to a third party and outflow of resources is probable (“more likely than not”)... Provisions are measured for HGB purposes on the basis of prudent management judgment, for IAS purposes at their most probable amount.” (BMW 2001 Annual Report, p.61).

Goodwill. The adjustment related to goodwill on average increases book value of equity by 2 million. The increase in book value likely results from capitalizing goodwill that

was previously offset against equity. This is because HGB allows goodwill to be offset against equity reserves while IAS requires goodwill to be capitalized and amortized.

Although about 50% of the companies report goodwill adjustments, the magnitudes of these adjustments are generally miniscule.

Inventory. HGB allows inventory to be valued at various combinations of direct and full cost. In contrast, IAS requires inventory to be valued at full cost. Thus adopting IAS generally increases inventory values, resulting in an average increase (mean of 26 million) in book value of equity.

Leases. The adjustment related to leases on average increases book value of equity (mean of 27 million), suggesting an increase in net assets related to leases when firms switch from HGB to IAS. This adjustment is likely due to the capitalization of finance leases required by IAS.²⁶ For example, Washtec discloses in its 2001 Annual Report that the 0.26 million book value adjustment on lease contracts is due to “capitalising the asset value and remaining liability of financing leases in accordance with the allocation criteria of IAS 17.” (Washtec 2001 Annual Report, p.42).

Receivables. The adjustment related to receivables on average decreases book value of equity by 0.08 million. The change is miniscule and likely due to differences in the reduction rates recognized under HGB and IAS. For example, Baywa discloses in its 2002 Annual Report “In the case of trade receivables, the overall adjustment applied to financial statements prepared under German commercial law, which is generally based on reduction rates recognized for tax purposes, was replaced by a standardized reduction calculated on the basis of the age structure.” (Baywa 2002 Annual Report, p.56).

²⁶ Note that lease capitalization creates compensating assets and liabilities on the balance sheet. The increase in book value likely occurs because the capitalized assets exceed the liability, which usually happens in the later stages of the lease for the lessee (and in the early stages for the lessor).

Financial Instruments. The adjustment related to financial instruments on average increases book value of equity by 7 million, suggesting an increase in assets value for financial instruments when firms switching from HGB to IAS. The increase is likely because HGB requires lower of cost or market values for financial instruments, while IAS generally uses fair values. For example, Volkswagen reports that “securities are recorded at their fair value, even if this exceeds cost, with the corresponding effect in the income statement.” (Volkswagen 2001 Annual Report, p.85).

Intangibles/Research & Development Cost (R&D). The adjustment related to intangibles and R&D on average increases book value of equity by 128 million. This is likely due to capitalization of internally developed intangibles and development costs required by IAS, another feature of fair-value accounting. While the occurrence of this item in the reconciliation adjustments is relatively infrequent (only 10 out of 57 observations), the average effect is extremely large when it occurs (the mean for those companies that make this adjustment is 732 million) and such an effect is concentrated among a small set of companies with high development costs (the median magnitude of this effect is only 16 million). For example, capitalization of development costs, at 2 billion, is the largest book value reconciliation adjustment for BMW (see Case 1 of Appendix 1), accounting for over 40% of the increase in book value from adopting IAS.

3.2. Differences in Net Income

Panel B of Table 3 reports details of net income reconciliation adjustments between HGB and IAS (in Euro million). As in Panel A, Panel B provides the two sets of descriptive statistics on the reconciliation adjustments as well as net income measures under HGB and IAS. The panel shows that net income is slightly larger under IAS than

under HGB: the mean (median) net income under IAS is 165 (5) versus 143 (4) million under HGB.²⁷ In addition, the standard deviation of net income increases under IAS (from 407 million to 507 million).

The average effects of net income reconciliation items are generally in the same direction as those of book value reconciliation items, except for the adjustments related to provisions and deferred taxes. We note that the accounting differences do not necessarily change book value and net income in the same direction because book value captures the cumulative effect of accounting differences and net income captures the effect during the fiscal year. For example, while the change from tax-based accelerated depreciation methods to straight-line depreciation methods will increase book value of PP&E and therefore increase book value of equity, it will generally decrease (increase) depreciation expense and therefore increase (decrease) net income in the earlier (later) stage of PP&E's useful life.

Since the net income adjustments result from the same accounting differences described in Section 3.1, we only provide a brief description of the five most frequent adjustment items:

Deferred Tax. As expected, deferred tax is the most frequent net income adjustment item, with a frequency of 25 out of 31 observations. In addition, IAS expense adjustments related to deferred taxes on average reduce net income by 7 million.

Property, Plant and Equipment (PP&E). IAS adjustments related to PP&E on average increase net income by 19 million, indicating a decrease in depreciation expense related to PP&E during the reporting period.

²⁷ While not reported in Table 3, the difference in mean and median net income is not significant at the conventional levels. We report statistical tests on the net income differences for the full sample in Table 4.

Leases. IAS adjustments related to leases on average increase net income by 28 million, indicating a decrease in expenses (such as interest and depreciation expenses related to the lease) during the reporting period.

Pension. While IAS adjustments related to pension are relatively frequent, the average effect on net income is miniscule (the mean and median are both less than a million). The small effect in net income suggests that most of the increase in pension liability is reflected in its opening balance for the reporting period.

Goodwill. IAS adjustments related to goodwill on average increase net income by 2 million, indicating a decrease in goodwill amortization expense during the reporting period.²⁸

3.3. Summary and Inferences

In summary, our analyses on the accounting differences and reconciliation items find that switching to IAS results in widespread changes relating to deferred taxes, pensions, PP&E, and loss provisions. While less widespread, adjustments relating to intangibles/R&D are economically significant for certain firms. Overall, our analyses are consistent with the view that, relative to HGB, IAS is balance-sheet focused and fair-value oriented (Ernst and Young 2004). While HGB emphasizes conservatism and income smoothing (e.g., limited recognition of assets and frequent use of discretionary loss provisions), IAS focuses on fair-value accounting and balance-sheet valuation (e.g., use of fair value for financial instruments and recognition of internally developed intangibles).

²⁸ While this might seem surprising given that average goodwill increases in the balance sheets, we note that the effect of the accounting difference related to goodwill on net income during the reporting period depends not only on the total amount of capitalized goodwill, but also on the amortization schedule.

4. Effects of Accounting Differences on Financial Statement Measures and Ratios

In this section, we document the effects of adopting IAS on key accounting measures and financial ratios. Panel A of Table 4 provides descriptive statistics on key balance sheet (total assets, total liabilities and book value of equity) and income statement (sales revenue and net income) measures. For the balance sheet, we find that *both* total assets and total liabilities are higher under IAS than under HGB: the mean (median) total assets under IAS are significantly higher than that under HGB at $p \leq 5\%$ ($p \leq 1\%$), while mean (median) total liabilities under IAS are higher than that under HGB at $p = 17\%$ ($p \leq 1\%$).²⁹ This implies that IAS recognizes more asset and liability items on the balance sheet or that it measures them at higher values, probably because of its fair-value orientation. In addition, book values of equity are larger under IAS than under HGB: the mean (median) book value under IAS is 930 (131) versus 653 (127) million under HGB with the difference significant at $p \leq 5\%$ ($p \leq 1\%$). These results are consistent with the common view that HGB is more conservative than IAS. Moving to the income statement, we do not find significant differences in sales revenue under HGB and IAS, which is expected because there are relatively few differences in revenue recognition across the two systems. Additionally, while median net income under IAS is significantly lower than that under HGB at $p \leq 5\%$, mean net income is not significantly different between the two systems at the conventional levels.

²⁹ While we have 84 observations for book value of equity and net income, we only have 81 observations for other key accounting numbers. This is because we are not able to get restated total assets, total liabilities and sales revenue numbers from book value and net income reconciliation adjustments (recall that in the sample selection description, we gather three additional observations on book value of equity and net income from firms that disclose two-year book value and net income reconciliation).

Interestingly, Panel A of Table 4 shows that IAS generates greater cross-sectional variability in both balance sheet and income statement measures. In particular, the standard deviation of book values under IAS is almost twice that under HGB (difference significant at $p \leq 1\%$). Standard deviation in net income is also significantly higher under IAS than under HGB (difference significant at $p \leq 5\%$), although the magnitude of the difference is less striking. These results imply that IAS (HGB) tends to magnify (diminish) differences across companies, which could be a consequence of its greater fair-value orientation (smoothing orientation).

Panel B of Table 4 provides descriptive statistics on key financial ratios. We first examine five ratios that rely on financial statements only: (1) return on equity, ROE, defined as net income divided by book value of equity; (2) return on assets, ROA, defined as net income divided by total assets; (3) total asset turnover, ATO, defined as sales revenue divided by total assets; (4) leverage, LEV, defined as total liabilities divided by book value of equity; and (5) profit margin, PM, defined as net income divided by sales revenue. The results reveal that ROE, ROA and ATO ratios under IAS are all significantly lower than under HGB at $p \leq 5\%$ (the mean difference in ROA, however, is insignificant at the conventional levels). The panel also shows an insignificant difference in LEV, suggesting that the increases in both total liabilities and book value of equity under IAS result in leverage ratios that are similar. In addition, the mean difference in PM is insignificant at the conventional levels, while median PM is significantly higher under IAS (difference is significant at $p \leq 10\%$).

We next examine two financial ratios comparing accounting-based valuation of shareholders' equity and net income to market valuation: (1) book to market ratio, BM,

defined as book value of equity divided by total market value of equity, and (2) earnings to price ratio, EP, defined as net income divided by total market value of equity. While BM is significantly higher under IAS than under HGB at $p \leq 5\%$, EP is significantly lower.³⁰ The decrease in average EP ratio contradicts the higher average net income generated under IAS, indicating that the IAS effects are different between small and large firms (note that the EP ratio is like a deflated version of net income and hence controls for size).

In summary, our analyses indicate that adopting IAS significantly affects many key accounting measures and financial ratios. Consistent with HGB's conservatism and IAS's fair-value orientation, we find that total assets and book value of equity are significantly larger under IAS than under HGB and that cross-sectional variation in book value and net income are significantly higher under IAS than under HGB. In addition, we find that IAS adoption significantly decreases return on equity and asset turnover because of the relatively large book value of equity and total assets under IAS. Finally, we find that adopting IAS significantly affects commonly-used valuation metrics.

5. Value Relevance of German (HGB) and IAS Accounting Measures

In this section, we examine the value relevance of summary accounting measures—book values and net income—measured alternatively under HGB and IAS. By value relevance we refer to the ability of the summary accounting measures to reflect the underlying economic value of the firm, which we measure through contemporaneous

³⁰ While we have a much smaller sample, we note that our financial ratios are generally comparable to those for the German companies during 1994-1999 in Land and Lang (2002). For example, the median ROE, BM and EP in our study are 0.11, 0.48 and 0.04, respectively, and the corresponding numbers in Land and Lang (2002) are 0.11, 0.47 and 0.05.

stock prices. It is important to note that we are not attempting to measure whether the alternative accounting numbers are differentially valued by the stock market participants, i.e., whether these alternative measures actually differentially affect investors' decisions. Rather, we merely use stock prices as proxies for the fundamental value of the firm, and thus examine the extent to which the alternative measurements correlate with the information set used by investors in setting stock prices (Barth, Beaver and Landsman 2001).

Researchers in the past have used either levels (price) or changes (returns) specifications for examining value relevance issues. The price specification is economically better specified than the returns specification (Kothari and Zimmerman 1995). An additional advantage of the price specification is that it is possible to examine the value relevance of both the stock (book value) and flow (net income) variables. Since a major focus of IAS is on the balance sheet and we document significant differences between HGB and IAS in both book values and net income, it is important that we examine the combined value relevance of both book value and net income. This is especially important if there is a trade-off between the value relevance of the book value and net income, i.e., it is possible that the IAS improves the value relevance of book values at the expense of net income.³¹ Accordingly, we adopt a price specification in all

³¹ While income under fair-value accounting is less persistent and hence unlikely to correlate better with stock price, it can be argued that it measures change in the value of net assets of the firm and should therefore correlate better with returns. Therefore, it could be argued that income under fair-value accounting is more value relevant in the sense of explaining returns.

Although this argument has merit, it must be noted that income in a returns' specification plays the role of book value in a price specification, i.e., both correlate with value with a theoretical coefficient of one. Consequently, any assertion made about the value relevance of income in a returns' specification is equivalent to an assertion made about book value in a price specification (Ohlson 1995). In order to capture the role that income plays in a price specification, i.e., the value relevance arising through persistence with a theoretical coefficient equal to the reciprocal of cost of capital, in a returns specification

our analyses. The major disadvantage of the price specification is that it is prone to econometric problems, largely arising from heteroskedasticity and scale bias (Kothari and Zimmerman 1995). Accordingly, we replicate all our analyses using several alternative deflators (including an undeflated specification).

We first compare the relative value relevance of book values and net income alternatively measured under HGB and IAS. Relative value relevance tests compare the ability of measurements under each alternative system, separately, to reflect economic information incorporated in stock prices, i.e., when information from only one of the two alternative systems is available. Relative value relevance tests are particularly appropriate in our context, because firms that switch to IAS discontinue reporting HGB measurements. We also examine the incremental value relevance of the adjustments made by IAS to HGB book values and net income. Incremental value relevance tests evaluate the ability of IAS measures to reflect information beyond that in the HGB measurements, i.e., when both sets of information are simultaneously available. While incremental value relevance tests are less appropriate in our context, these tests allow us to specifically evaluate the value relevance of the adjustments made to the existing HGB measures when adopting IAS.

5.1. Relative Value Relevance

When income is neither transitory nor permanent, Ohlson (1995) suggests that the correct specification is a model in which price is regressed on both book value of equity and net income.³² Accordingly our basic model for testing relative value relevance is:

one needs to examine the *change* in income. Since the data on changes in income under HGB and IAS are not available for the same set of firm-years, we do not include a returns specification in our analyses.

³² While the book value plus income specification is very popular in empirical research, the correct specification as per Ohlson (1995) is a model that includes dividends and “other” information in addition to

$$P_{it} = a_0 + a_1 BV_{it} + a_2 NI_{it} + e_{it} \quad (1)$$

Where:

P_{it} = total market value of equity for the i th firm at yearend t .

BV_{it} = book value of equity.

NI_{it} = net income.

All numbers are in Euro million.

Book value and net income are alternatively measured under the IAS and HGB methods.

We also estimate a book-value only version of (1), which represents a balance-sheet approach to valuation (Barth 1991). This model is important because it allows us to test the effects of IAS on the value relevance of the balance sheet alone, which is a primary focus of the fair-value approach adopted by IAS. We also examine an income only version of equation (1), which assumes a permanent income approach to valuation (Black 1993).

Table 5 reports results of our relative value relevance analyses. We adopt three alternative deflation rules: undeflated, per-share (i.e., deflated by number of shares; as in Harris et al. 1994) and lagged market-value deflated (as in Easton 1998) which are respectively reported in Panels A, B and C. Within each panel we separately report results of the book-value only, income only and combined book-value and income versions of (1). For each model we run two sets of regressions: one with HGB measurements and the other with IAS measurements. We also report differences in coefficients and adjusted R-squares across the HGB and IAS models.

book value and income. Obviously, “other” information can not be ascertained readily, and even Ohlson ignores this term in later propositions. Lo and Lys (2001) show that the exclusion of dividends from the model does not in any way affect the coefficients.

In order to control for the effect of outliers, we delete observations with absolute studentized residual values above 2 for each of our regression models.³³ Because our truncation rules are specific to each regression model, the number of observations varies across individual regressions. However, to maintain a comparable sample, we ensure that each pair of regressions (i.e., alternatively with HGB and IAS measures) for a given specification/model have identical observations. Thus, the observations used in the regression estimates are those with absolute studentized residuals below (or equal to) 2 in both the HGB and IAS versions of the respective specification. We lose between 5% and 10% of our sample through this truncation procedure.³⁴ Since we lose a significant proportion of our sample through truncation, we replicate our analysis for alternative truncation rules that are less stringent, including the full sample (i.e., without truncation). Our results (not reported) are qualitatively similar in these replications, although statistical significance is understandably lower. It must be noted that most of our analyses are low power because of the relatively small sample sizes in our paper, compared to typical market-based analyses.³⁵

We first compare the value relevance of HGB and IAS book value and net income numbers. As in prior studies (e.g., Lev 1989), we measure value relevance as the explanatory power of accounting measures for market values. The analyses find little

³³ Belsley, Kuh and Welsch (1980) suggest deleting observations with absolute studentized residuals greater than 2 to minimize the effect of influential observations.

³⁴ For the lagged market value deflated model in Panel C, the maximum number of observation is 63 rather than 84. The smaller sample is due to lack of availability of lagged market values, probably because a number of firms in our sample are not yet included in the Global Vantage database in the year previous to our analysis.

³⁵ A potential problem with statistical inferences in small samples is the validity of the normal distribution assumption. To address this concern, we apply the bootstrapping approach to the estimations of book-value and income combined models in Tables 5 and 6 (Efron and Tibshirani, 1993). Specifically, we bootstrap the residuals, construct 1,000 random samples and assess the significance level based on the 1,000 random parameter estimates. The results (not tabled) show that p-values from the bootstrapping approach are qualitatively the same as the parametric p-values reported in Tables 5 and 6.

evidence suggesting that the value relevance of book value and/or net income improves under IAS. For the book-value only model, the explanatory power under IAS is higher in the per-share and lagged market-value deflated specifications (although statistically and economically significant only in the per-share specification), but lower in the undeflated specification (although statistically insignificant, the difference is of economically large magnitude). For the income only model, the explanatory power under IAS is lower in the undeflated and lagged market-value deflated specifications (although the lagged market-value specification is significant only at the 0.16 level), but higher in the per-share specification (although the difference is insignificant). Finally, we examine the model combining book value and income. Unlike the book-value only and income only specifications, the combined model provides us a more complete picture of the value relevance of aggregate accounting measures under the two alternative systems. Nonetheless, the explanatory power results are again mixed in this model: the explanatory power under IAS is lower in the undeflated and lagged market-value specifications (although statistically significant only in the undeflected specification), but higher in the per-share specification (although statistically insignificant). Thus, there is little evidence that either HGB or IAS (at least in terms of aggregate measures) is better at explaining market values.

We next examine the pricing weights (coefficients) on book value and/or net income. For the book-value only model, the coefficient on book value is generally higher under the HGB measurements (although the difference is insignificant under the per-share specification). The higher coefficients on the HGB book values are likely due to the lower values reported under HGB, which arises from the greater conservatism of HGB

vis-à-vis IAS. For the income only model, the coefficients on net income are also generally higher under HGB (although the difference is insignificant under the per-share specification). The higher coefficients on the HGB income are consistent with the HGB income numbers being more smoothed and hence more persistent than the IAS numbers. In addition, it is understandable that the HGB income numbers are superior at explaining price because an income only valuation model is based on the concept of permanent income (Black 1993). Finally, we examine the model combining book value and income. This model is particularly important because there can be important trade-offs between the relative valuation roles of book value and net income. We find that the pattern of coefficients is consistent across all three specifications and provides two important insights into the differences between HGB and IAS. First, and most striking, is the extent to which the income coefficients are different under the two systems: the HGB income coefficients are between two to six times larger than their IAS counterparts. The differences in the income coefficients are also significant at better than $p = 5\%$ across all specifications. Second, the book-value coefficients under IAS are correspondingly around twice as large as that under HGB, and the differences are generally significant (except that the significance for the per-share specification is only 0.17). The higher book-value and lower income coefficients under IAS vis-à-vis HGB is consistent with much lower income persistence under IAS. While the higher book-value coefficients under IAS could indicate superior value-relevance of the balance sheet, it is not necessary: lower income persistence could exclusively induce higher book value coefficients (Ohlson 1995).

5.2. Incremental Value Relevance

As noted earlier, relative value relevance tests are more appropriate than incremental value relevance tests in our context because both the HGB and the IAS numbers are not expected to simultaneously be available for most firms (the exception of course is the transition period, which we exploit in this paper). Incremental value relevance tests, however, allow us to examine *per se* the value relevance of the adjustments introduced by IAS to book value and net income. Accordingly, we examine the incremental value relevance of the IAS adjustments in this section.

Our primary model for examining incremental value relevance is:

$$P_{it} = a_0 + a_{11}BV_HGB_{it} + a_{12}BV_DIF_{it} + a_{21}NI_HGB_{it} + a_{22}NI_DIF_{it} + e_{it} \quad (2)$$

Where:

P_{it} = total market value of equity for the i th firm at yearend t .

BV_HGB_{it} = book value of equity under HGB.

BV_DIF_{it} = book value of equity under IAS – book value of equity under HGB.

NI_HGB_{it} = net income under HGB.

NI_DIF_{it} = net income under IAS – net income under HGB.

All numbers are in Euro million.

Table 6 reports results of the incremental value relevance tests, with Panels A, B and C representing the undeflated, per-share and lagged market-value deflated specifications as in Table 5. Also, consistent with our relative value relevance analyses, we examine book-value only, income only and combined book-value and income versions of equation (2).

The book-value only models in Table 6 unambiguously reveal that the IAS adjustments to the balance sheet are incrementally value relevant: the BV_DIF coefficients are all significantly positive at better than $p = 6\%$. The income only models, however, reveal that the IAS adjustments to income actually impair income value

relevance: the NI_DIF coefficients are significantly negative (with the exception of the per-share specification where it is insignificant at the conventional levels). Finally, the book-value and income combined models reveal that, while the book-value adjustments are weakly value relevant (although the BV_DIF coefficients are all positive, only the per-share specification coefficient is significant at the conventional levels), the adjustments to income are still generally negative (the NI_DIF coefficient is significantly negative for the undeflated and lagged market value deflated specifications and insignificant for the per-share specification).

5.3. Controlling for Self-selection Bias

Since our sample companies voluntarily adopt IAS, they do not represent a random selection of German firms. To assess the impact of self-selection on our value relevance results, we implement the two-stage regression procedure suggested by Heckman (1979). In the first stage, we use a probit model to analyze our sample firms' decisions to adopt IAS. The dependent variable in our probit model equals 1 for an IAS-adopter (i.e., the 84 firm-years in our primary sample) and 0 for all German firm-years using HGB during our sample period. Following prior studies such as Harris and Muller (1999) and Leuz (2003), we predict that the decision to adopt IAS is a function of the following factors: (1) financial performance, measured as return on assets, (2) leverage, measured as total liabilities divided by book value of equity, (3) firm size, measured as the natural logarithm of the market value of equity and (4) financing needs, measured by cross-listing in the U.S. and increase in common stock or long-term debt. Formally, our probit model is:

$$\text{Select}_{it} = a_0 + a_1 \text{ROA}_{it} + a_2 \text{LEV}_{it} + a_3 \text{Size}_{it} + a_4 \text{Cross-listed}_{it} + a_5 \text{CS_D}_{it} + a_6 \text{Debt_D}_{it} + e_{it} \quad (3)$$

Where:

Select = dummy variable equal to one for the sample firms and equal to zero otherwise.

ROA_{it} = return on assets, which equals net income divided by total assets.

LEV_{it} = leverage, which equals total liabilities divided by book value of equity.

Size_{it} = firm size, which equals the natural logarithm of the market value of equity.

Cross-listed_{it} = dummy variable equal to one if the firm is included in the 2004 J.P. Morgan ADR list and the years are greater than the effective date for the ADR program.

CS_D_{it} = dummy variable equal to one if common stocks at par increase during the year.

Debt_D_{it} = dummy variable equal to one if long-term debts increase during the year.

Based on 1,752 firm-year observations including our 84 sample observations, our estimation results are consistent with larger firms and firms with greater financing needs more likely adopting IAS. Specifically, our estimated model is as follows (two-tailed p-values in parentheses):

$$\text{Select}_{it} = -2.59 - 0.24\text{ROA}_{it} - 0.01\text{LEV}_{it} + 0.13\text{Size}_{it} + 0.57\text{Cross-listed}_{it} + 0.33\text{CS_D}_{it} + 0.09\text{Debt_D}_{it}$$

(<0.01) (0.72) (0.42) (<0.01) (0.07) (<0.01) (0.44)

In the second stage, we include the inverse mills ratio—computed from the first-stage probit procedure—in our value-relevance regression models to control for self-selection effects. Specifically, we replicate our combined book-value and income models in Tables 5 and 6 after including the inverse-mills ratio from the first-stage as a control variable. The results (not tabled) suggest that the coefficients for the inverse mills ratios are significantly negative at better than $p=10\%$ in all regressions, suggesting the presence of self-selection effects. However, signs and significance levels of our treatment coefficients are qualitatively unchanged.³⁶ Thus, self-selection bias unlikely affects any of our inferences regarding the relative and incremental value relevance of IAS and HGB book value and net income.

³⁶ The one exception is that the coefficient on book value under HGB in the book value and net income combined model in Panel A of Table 6 becomes significant at $p \leq 10\%$. This change does not affect any of our inferences.

5.4. Summary and Inferences

In summary, there is little evidence suggesting that IAS improves the value relevance of the summary financial statements measures, book value and net income. By undoing the income smoothing orientation of HGB and emphasizing a fair-value oriented model, IAS introduces a larger transitory component to income which unambiguously reduces its persistence. The transitory nature of the IAS adjustments is so pronounced that, not only is IAS's income less value relevant than HGB's, but IAS income adjustments are also incrementally value irrelevant. Contrary to the income adjustments, IAS's adjustments to book value are unambiguously incrementally value relevant, although IAS book value is not unambiguously more value relevant than HGB's. In a combined book value and net income valuation model, book value (net income) plays a greater (lesser) valuation role under IAS than under HGB, which is consistent with IAS's greater emphasis on the balance sheet and fair values and less focus on income smoothing.

6. Conclusion

This study investigates the financial statement implications of adopting IAS for firms in Germany, a country with a stakeholder-oriented and tax-driven accounting system. By implementing a superior research design that compares information under both the HGB and IAS models for the *same set of firm-years*, we document the financial statement changes precipitated by adopting IAS and examine the effects of such adoption on key financial measures and the value relevance of financial statement information. Our findings are generally consistent with HGB being conservative and income-smoothing oriented and IAS being fair-value and balance-sheet oriented. Specifically, we document

three main findings: (1) total assets and book value of equity, as well as variation in book value and net income, are significantly higher under IAS than under HGB; (2) book value (net income) plays a more (less) important valuation role under IAS than under HGB, although there is no evidence suggesting that IAS has improved the relative value relevance of either book value or net income; and (3) the IAS adjustments to book value are generally value relevant, while the adjustments to net income are generally value irrelevant and may even impair value relevance.

Overall, our analyses portray a consistent picture of the financial statement effects of adopting the shareholder-oriented IAS from a stakeholder-orientation accounting system such as HGB. We show that an important difference is that HGB emphasizes the prudence principle and income smoothing while IAS emphasizes fair-values and balance-sheet valuation. While this difference is not widely appreciated in the prior literature, it has been highlighted by practitioners (Ernst and Young 2004). Although this fair-value orientation of IAS significantly increases the relative importance of book values vis-à-vis net income, there is little evidence suggesting that moving from HGB to IAS improves the value relevance of the summery measures, book value and net income.

Our study provides timely and relevant insights into the potential consequences of the upcoming IAS adoption by listed companies throughout the European Union, which arguably is one of the most important events in the history of financial reporting. We also add to the important literature comparing stakeholder-oriented and shareholder-oriented accounting models (Ball et al. 2000). While prior cross-country studies such as Ali and Hwang (2000) and Ball et al. (2000) find that value relevance of accounting measures is lower in stakeholder-oriented economies than in shareholder-oriented

economies, we find no significant differences. Our finding highlights the importance of institutional factors such as shareholder protection that may play a crucial role in explaining cross-country variation in the value relevance of accounting data (Ball et al. 2003).

We acknowledge several limitations of our study. First, since our study focuses exclusively on Germany our results may not be generalized to other countries. While focusing on Germany helps us better understand the accounting differences between stakeholder-oriented and shareholder-oriented accounting systems, our results have little implication for IAS adoption in shareholder-oriented countries such as the U.K. In addition, since Germany has strong law enforcement, our results might not hold in countries with weak enforcement. Second, most of our analyses are low power because of the relatively small sample size compared to typical market-based analyses. Thus, some of our findings of no differences across the two accounting models may be driven by lack of power. Finally, the development of IAS is a continuing process and IASB has recently passed several rules affecting recognitions of important economic activities (e.g., IFRS 2: Share-based Payment). While we believe that the new rules are still consistent with the balance-sheet, fair-value orientation of IAS, they will nonetheless cause additional financial statement changes for IAS adopters in the future. Thus, we acknowledge that our results should be interpreted as suggestive and subject to the current regulatory structure.

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Appendix 1

Case 1: Excerpts from the Notes to the Group Financial Statements in BMW 2001 Annual Report

[1] Basis of preparation

The consolidated financial statements of BMW AG ("BMW Group financial statements" or "Group financial Statements") at 31 December 2001 have been drawn up for the first time in accordance with the standards valid on the balance sheet date issued by the International Accounting Standards Board (IASB), London. All International Accounting Standards (IAS) and interpretations of the Standing Interpretations Committees (SIC) which were mandatory for fiscal year 2001 were applied...

[7] The impact of the adoption of IAS for financial reporting

The BMW Group financial statements have been prepared and presented as if they had always been prepared in accordance with IAS and IAS Interpretations. The adjustment resulting from the conversion to IAS has been treated as an adjustment to the opening balance of equity...

Equity

Equity under IAS increases by euro 4,536 million (+92,6%). The following summary shows the recognition and measurement differences between HGB and IAS and reconciles the equity at 31 December 2000 under HGB to the equity on the first day of the following year, 1 January 2001, under IAS:

in euro million

Equity at 31.12.2000 under HGB	4,896
Capitalisation of development costs	+2,054
Deferred taxes	+723
Inventory valuation	+691
Derecognition and different measurement of other provisions	+673
Depreciation on non-current assets	+669
Reclassification of operating leases to finance leases	+306
Release of allowances on receivables	+169
Fair value measurement of financial instruments	-1,074
Other recognition and measurement differences	+325
Equity at 1.1.2001 under IAS	9,432

The net profit under IAS is euro 183 million (+17.8%) higher than under HGB. The net profit for IAS and HGB is reconciled as follows:

In euro million

Net profit for 2000 under HGB	1,026
Capitalisation of development costs	+236
Deferred taxes	-186
Inventory valuation	+69
Derecognition and different measurement of other provisions	-485
Depreciation on non-current assets	+198
Effect of asset backed financing transactions and lease arrangements	+242
Release of allowances on receivables	+55
Fair value measurement of financial instruments	+56
Other recognition and measurement differences	-2
Net profit for 2000 under IAS	1,209

Appendix 1, continued
Case 2: Excerpts from the Notes to the Group Financial Statements in Washtec 2001
Annual Report

2. Financial statements

The consolidated financial statements of WashTec AG (as the ultimate parent company) have been drawn up in accordance with the International Accounting Standards (IAS) of the International Accounting Standard Board (IASB) in force at the balance sheet date, with due regard to the interpretations of the Standing Interpretations Committee (SIC). The financial statements are in compliance with EU Directive 83/349/EWG on consolidated financial statements.

No accounting and valuation methods under German law were applied which are not compliant with IAS or SIC.

The requirements of section 292a of the German Commercial Code (HGB) for release from the obligation to draw up consolidated financial statements under the HGB are satisfied. Evaluation of these requirements is based on the German Accounting Standard No. 1 (DRS 1) published by the German Standardisation Council.

The previous year's consolidated financial statements were drawn up under the HGB regulations, and the financial statements in the year under review are the first to be drawn up under IAS regulations..

Conversion of shareholders' equity presentation to IAS:

	in T€
Shareholders' equity to HGB as at 31.12.1999	18,305
Revised valuation of pension reserve	-13
Revised tax liability	-225
Accounting for leasing contracts	257
Capitalising deferred tax on loss carry-forwards	49
Other changes	-67
Reclassification of minority interests	-31
Shareholders' equity to IAS as at 01.01.2000 before acquisition of California-Kleindienst Group	18,275

Conversion of the income statement for FY 2000 to IAS:

	HGB	IAS	Difference
	in T€	in T€	in T€
Sales	266,549	267,040	491
Change in inventories, capitalised own work and other operating income	4,426	2,922	-1,504
Total income	270,975	269,962	-1,013
Cost of materials	-111,900	-111,150	750
Personnel costs	-90,476	-96,350	-5,874
Depreciation	-8,649	-11,003	-2,354
Other operating expenses and taxes	-47,253	-44,818	2,435
Operating result	12,697	6,641	-6,056
Results of financial activities	-5,539	-8,141	-2,602
Extraordinary result	-4,664	0	4,664
Taxes on income	1,319	-8,385	-9,704
Other taxes	-624	0	624
Consolidated net income/loss	3,189	-9,885	-13,074

Table 1
Distribution of Sample Firms by Year and Industry Group (N=80 Firms)

Panel A: Number of German Firms Switching from German GAAP (HGB) to IAS, by year

Year	1998	1999	2000	2001	2002	Total
N	4	19	19	17	21	80

Panel B: Number of German Firms Switching from German GAAP (HGB) to IAS, by Industry Group

Industry Group^a	N	%	Industry Group	N	%
Machinery	10	12.50	Beer	1	1.25
Wholesale	8	10.00	Building Materials	1	1.25
Business service	7	8.75	Books	1	1.25
Autos	6	7.50	Chemicals	1	1.25
Fun	4	5.00	Clothes	1	1.25
Computers	3	3.75	Electric Equipment	1	1.25
Fabricated Products	3	3.75	Energy	1	1.25
Retail	3	3.75	Food	1	1.25
Transportation	3	3.75	Healthcare	1	1.25
Miscellaneous	3	3.75	Paper	1	1.25
Boxes	2	2.50	Personal Service	1	1.25
Chips	2	2.50	Rubber	1	1.25
Construction	2	2.50	Steel	1	1.25
Drug	2	2.50	Telecommunications	1	1.25
Household	2	2.50	Textiles	1	1.25
Lab Equipment	2	2.50	Utility	1	1.25
Real Estate	2	2.50	Total	80	100

^aSee Fama and French (1997) for the industry classification scheme and related SIC code.

Table 2
Summary of Accounting Standards Differences between HGB and IAS

Accounting Treatment	HGB	IAS
Goodwill	-May be capitalized or offset against equity -Negative goodwill may only be released in very restricted cases	Capitalized
Inventory	Wide range of options for capitalization of manufacturing costs between direct and full costs	Systematic allocation of the production overhead costs is required
Financial Instruments	Lower of cost or market values	Fair values for certain types of investments
PP&E Revaluation/Depreciation	Revaluation not permitted Additional tax-based accelerated depreciation allowed	Revaluation permitted
Developed intangible, R&D	Not capitalized	Capitalized if certain criteria are met
Lease	Largely based on tax rules. Seldom capitalized as finance lease	Capitalized as finance lease if certain criteria are met
Provisions	Recognized on the basis of prudent management judgment, resulting in the opportunity to set up hidden reserve more easily	Recognized when probable and could be reasonably estimated
Pension	Largely based on tax rules. In most cases: -discount rate fixed at 6% -no consideration of expected future compensation levels	The actuarial present value of promised retirement benefits should be recorded using either current or projected salary levels
Percentage of completion	Not permitted	Yes
Foreign currency translation adjustment	According to the principle of prudence, no recognition of unrealized gains	Unrealized gains or losses should be recognized, with exception for long-term monetary assets

Source: Coopers & Lybrand (1993), GAAP (2000) and Alexander and Archer (2001).

Table 3
Descriptive Statistics on the Book Value and Net Income Reconciliation Adjustments between HGB and IAS^a

	All observations			Observations with nonmissing values			
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	N
Panel A: Book Value Reconciliation (N=57 Firm-years)							
<i>BV_HGB</i>	839.98	169.98	1,657.06	839.98	169.98	1,657.06	57
Deferred tax	0.28	0.48	275.20	0.29	0.76	282.88	54
Pension	-76.73	-7.70	150.43	-106.68	-29.72	168.55	41
PP&E	180.34	1.20	517.94	256.98	19.04	604.14	40
Provisions	116.32	0.00	472.67	184.17	15.27	587.04	36
Goodwill	1.88	0.00	77.49	3.83	0.75	111.57	28
Inventory	26.41	0.00	133.21	57.89	1.26	194.56	26
Leases	27.37	0.00	273.87	67.83	-0.02	433.65	23
Receivables	-0.08	0.00	28.88	-0.33	0.01	59.95	14
Financial instruments	6.57	0.00	193.72	28.81	1.92	417.66	13
Intangibles/R&D	128.49	0.00	604.72	732.38	15.96	1,335.65	10
Other	1.06	0.00	181.91	1.24	0.00	196.48	49
<i>BV_IAS</i>	1,252.64	231.25	3,156.82	1,252.64	231.25	3,156.82	57
Panel B: Net Income Reconciliation (N=31 Firm-years)							
<i>NI_HGB</i>	143.10	3.87	406.83	143.10	3.87	406.83	31
Deferred tax	-6.71	-0.23	51.34	-8.32	-0.60	57.28	25
Pension	0.00	0.00	15.21	-0.01	-0.01	25.11	12
PP&E	18.98	0.00	111.80	29.43	0.08	139.33	20
Provisions	-47.19	0.00	193.47	-162.55	-0.76	345.36	9
Goodwill	2.35	0.00	16.55	6.07	0.02	26.88	12
Inventory	2.17	0.00	12.41	9.59	-0.17	26.22	7
Leases	28.35	0.00	121.76	58.58	0.00	172.84	15
Receivables	-1.78	0.00	22.37	-9.21	-0.04	54.04	6
Financial instruments	1.81	0.00	10.06	18.69	0.37	32.31	3
Intangibles/R&D	19.47	0.00	74.26	75.46	0.95	137.14	8
Other	4.55	0.00	21.95	5.04	0.01	23.09	28
<i>NI_IAS</i>	165.00	4.59	506.57	165.00	4.59	506.57	31

^aAll numbers are in Euro million.

Variable definitions: BV_HGB is book value of equity under HGB; BV_IAS is book value of equity under IAS; NI_HGB is net income under HGB; NI_IAS is net income under IAS.

Table 4
Descriptive Statistics on Key Accounting Measures and Financial Ratios according to HGB and IAS^a

	N	Mean ^b		Median ^b		Std. dev. ^b	
		HGB	IAS	HGB	IAS	HGB	IAS
Panel A: Accounting Measures							
TA	81	3,446.07 (0.04)	3,936.73	358.93 (0.00)	495.97	10,554.16 (0.18)	12,289.10
TL	81	2,793.81 (0.17)	2,995.75	231.34 (0.00)	314.50	9,052.23 (0.61)	9,580.55
BV	84	652.69 (0.05)	929.88	126.85 (0.00)	130.78	1,546.21 (0.00)	2,700.08
Sales	81	4,319.86 (0.61)	4,298.75	504.97 (0.91)	504.99	11,832.53 (0.92)	11,692.87
NI	84	94.92 (0.32)	103.07	9.30 (0.04)	6.43	266.81 (0.05)	331.92
Panel B: Financial Ratios							
ROE	84	0.10 (0.01)	0.05	0.11 (0.00)	0.07	0.23 (0.00)	0.14
ROA	81	0.02 (0.48)	0.02	0.03 (0.00)	0.02	0.08 (0.00)	0.05
ATO	81	1.24 (0.03)	1.14	1.21 (0.00)	1.08	0.67 (0.75)	0.69
LEV	81	3.03 (0.16)	2.68	2.61 (0.23)	2.42	2.65 (0.00)	1.79
PM	81	-0.02 (0.25)	0.01	0.02 (0.08)	0.02	0.27 (0.00)	0.07
BM	84	0.71 (0.02)	0.80	0.48 (0.00)	0.48	0.92 (0.89)	0.93
EP	84	0.06 (0.02)	0.04	0.04 (0.02)	0.03	0.11 (0.32)	0.13

^aAll numbers are in Euro million.

^bThe difference in mean is based on pairwise t-tests. The difference in median is based on signed rank tests. The difference in standard deviation is based on t-tests. Two-tailed p-values are in parentheses.

Variable definitions: TA is total assets; TL is total liabilities; BV is book value of equity; Sales is sales revenue; NI is net income; ROE is return on equity, which equals NI divided by BV; ROA is return on assets, which equals NI divided by TA; ATO is assets turnover, which equals Sales divided by TA; LEV is leverage, which equals TL divided by BV; PM is profit margin, which equals NI divided by Sales; BM is book to market, which equal BV divided by total market value of equity at year end; EP is earnings to price, which equals NI divided by total market value of equity at year end.

Table 5

Relative Value Relevance of Book Value and Net Income under HGB and IAS

Model: $P_{it} = a_0 + a_1 BV_{it} + a_2 NI_{it} + e_{it}$

	BV Only Models ^a			NI Only Models ^a			BV and NI Models ^a			
	Intercept	BV	Adj.R ² %	Intercept	NI	Adj.R ² %	Intercept	BV	NI	Adj.R ² %
Panel A: Million Euros			N=79			N=78				N=80
HGB	91.22 (0.40)	2.62 (0.00)	83.2%	203.49 (0.01)	17.62 (0.00)	86.7%	161.81 (0.14)	0.76 (0.01)	11.84 (0.00)	83.6%
IAS	223.58 (0.08)	1.82 (0.00)	77.1%	349.27 (0.00)	15.67 (0.00)	80.1%	252.63 (0.05)	1.51 (0.00)	1.88 (0.32)	76.6%
IAS-HGB	132.36 (0.80)	-0.80 (0.00)	-6.1% (0.18)	145.78 (0.22)	-1.95 (0.11)	-6.6% (0.01)	90.81 (0.59)	0.75 (0.05)	-9.96 (0.00)	-7.0% (0.01)
Panel B: Per Share			N=78			N=75				N=75
HGB	13.07 (0.06)	1.77 (0.00)	64.3%	12.50 (0.03)	16.41 (0.00)	85.1%	11.48 (0.07)	0.75 (0.02)	10.17 (0.00)	68.6%
IAS	9.79 (0.09)	1.60 (0.00)	75.1%	18.15 (0.00)	15.70 (0.00)	86.8%	11.36 (0.05)	1.26 (0.00)	4.31 (0.02)	73.1%
IAS-HGB	-3.28 (0.72)	-0.17 (0.34)	10.8% (0.09)	5.65 (0.46)	-0.71 (0.50)	1.7% (0.30)	-0.12 (0.99)	0.51 (0.17)	-5.86 (0.05)	4.5% (0.24)
Panel C: Lagged Market Value Deflated			N=60			N=58				N=59
HGB	0.68 (0.00)	0.38 (0.00)	85.2%	0.83 (0.00)	1.95 (0.00)	18.8%	0.63 (0.00)	0.20 (0.00)	2.79 (0.00)	88.6%
IAS	0.68 (0.00)	0.34 (0.00)	86.9%	0.93 (0.00)	0.80 (0.04)	6.0%	0.68 (0.00)	0.32 (0.00)	0.43 (0.36)	86.9%
IAS-HGB	-0.00 (1.00)	-0.04 (0.09)	1.7% (0.33)	0.10 (0.22)	-1.15 (0.08)	-12.8% (0.16)	0.05 (0.61)	0.12 (0.02)	-2.36 (0.00)	-1.7% (0.41)

^aTwo-tailed p-values are in parentheses. The tests in coefficients are based on t-tests. The tests in adjusted R-squares are based on Young tests (Young 1989).

Variable definitions: P is total market value of equity at year end; BV is book value of equity; NI is net income.

Table 6
Incremental Value Relevance of IAS Adjustments to Book Value and Net Income^a

Full Model: $P_{it} = a_0 + a_1 BV_HGB_{it} + a_2 BV_DIF_{it} + a_3 NI_HGB_{it} + a_4 NI_DIF_{it} + e_{it}$

	Intercept	BV_HGB	BV_DIF	NI_HGB	NI_DIF	Adj.R²%	N
Panel A: Million Euros							
BV Only Model	166.21 (0.20)	2.20 (0.00)	0.65 (0.06)			81.2%	81
NI Only Model	107.29 (0.27)			18.74 (0.00)	-12.23 (0.00)	87.2%	80
BV and NI Model	97.58 (0.31)	0.37 (0.17)	0.45 (0.16)	15.28 (0.00)	-12.33 (0.00)	87.4%	80
Panel B: Per Share							
BV Only Model	10.27 (0.08)	1.54 (0.00)	1.86 (0.00)			75.0%	78
NI Only Model	12.55 (0.04)			16.15 (0.00)	-1.09 (0.71)	82.7%	77
BV and NI Model	11.08 (0.08)	0.57 (0.06)	1.20 (0.03)	11.14 (0.00)	3.19 (0.38)	85.4%	76
Panel C: Lagged Price Deflated							
BV Only Model	0.68 (0.00)	0.33 (0.00)	0.38 (0.01)			86.7%	60
NI Only Model	0.64 (0.00)			4.19 (0.00)	-2.31 (0.01)	88.0%	58
BV and NI Model	0.67 (0.00)	0.15 (0.06)	0.14 (0.53)	2.21 (0.02)	-1.64 (0.07)	88.9%	58

^aTwo-tailed p-values are in parentheses.

Variable definitions: BV_HGB is book value of equity under HGB; BV_DIF equals book value of equity under IAS minus book value of equity under HGB; NI_HGB is net income under HGB; NI_DIF equals net income under IAS minus net income under HGB.