

**Relative Benefits of Adoption of IFRS and Convergence between  
IFRS and U.S. GAAP: Evidence from Germany**

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# **Relative Benefits of Adoption of IFRS and Convergence with IFRS: Evidence from Germany**

## **Abstract**

This study examines and compares the change of financial statement comparability caused by a mandatory switch from U.S. GAAP to IFRS (adoption) and continued convergence between U.S. GAAP and IFRS (convergence). Using a setting unique to the German market, we find that comparability between matched German firms previously reporting under U.S. GAAP and IFRS increases after all firms report under IFRS. We also find that convergence increases the comparability between matched German firms using IFRS and U.S. firms. Overall, adoption appears to result in a greater increase in comparability than convergence. However, using a difference-in-differences method, we find that adoption does not provide a significant incremental effect on the increased comparability beyond convergence. Since adoption is believed to be more costly than convergence, the findings of this study may contribute to current deliberations by the SEC regarding a switch from U.S. GAAP to IFRS.

# **Relative Benefits of Adoption of IFRS and Convergence between IFRS and U.S. GAAP: Evidence from Germany**

## **1. Introduction**

This study examines and compares the change of financial statement comparability caused by a mandatory switch from U.S. Generally Accepted Accounting Standards (U.S. GAAP) to International Financial Reporting Standards (IFRS) and continued convergence between these two sets of standards. Prior research has examined the effects of adoption of IFRS for firms previously reporting under non-U.S. domestic standards on financial statement comparability (hereafter, “comparability”). For example, Yip and Young (2012) find that adoption of IFRS in the European Union (E.U.) countries increases the cross-border comparability among firms. Barth, Landsman, Lang, and Williams (2012) find that worldwide adoption of IFRS increases the comparability of the financial statements prepared by non-U.S. firms reporting under IFRS and U.S. firms. Prior research has also examined the effect of convergence between IFRS and U.S. GAAP on comparability. For instance, Henry, Lin, and Yang (2009) find that the accounting differences between IFRS and U.S. GAAP significantly reduce after the convergence projects between International Accounting Standard Board (IASB) and Financial Accounting Standard Board (FASB) were first launched in 2002. Similarly, Barth et al. (2012) attribute the stronger effect of the increased comparability in more recent years between non-U.S. firms reporting under IFRS and U.S. firms reporting under U.S. GAAP to the convergence projects.

Prior studies mainly focus on the impact of a switch from non-U.S. domestic standards to IFRS. To our knowledge, no studies have investigated (1) whether a mandatory switch from U.S. GAAP to IFRS increases comparability and, if so, (2)

whether adoption of IFRS provides an incremental effect on the increased comparability beyond continued convergence between U.S. GAAP and IFRS. These are important questions because U.S. regulators and standard setters continue to consider a mandatory switch from U.S. GAAP to IFRS for publicly listed firms (SEC Roadmap 2008; SEC's Work Plan 2010; 2011; 2012). At the same time, the joint efforts by both FASB and IASB (hereafter, "the Boards") to converge these two sets of accounting standards continue to reduce the accounting differences and improve their overall quality. The choice between adoption of IFRS and convergence with IFRS, as well as their relative benefits and costs, has attracted a great deal of attention and created debates among accounting regulators, standard setters, practitioners, and academics. Even the SEC has expressed inconsistent views on this topic. For instance, the former SEC Chairman, Christopher Cox, supported adoption of IFRS (SEC Roadmap, 2008). On the other hand, his successor, Mary Schapiro, showed less support for the Roadmap with regard to IFRS adoption in the U.S., as stated during her first public speech at the Senate confirmation hearings (January 15, 2009). She clearly addressed her concerns about the timeline for adoption in the U.S., independence of the IASB, quality of the standards, and, more importantly, the cost of conversion. In contrast, she has been supportive of the convergence projects between the Boards and stated that the SEC is committed to promote the establishment of high-quality accounting standards by independent standard setters and provides support for a single set of high-quality global accounting standards.

In addition, academicians have shown their different views on the choice between adoption of IFRS and continued convergence with IFRS in the U.S. Bradshaw et al. (2010) propose that continued convergence of U.S. GAAP with IFRS by joint efforts

between the Boards is preferable to adoption of IFRS in the near future. In contrast, Jamal et al. (2010) argue that it is unlikely to achieve comparability and consistency of financial reporting on a global basis and instead propose to allow U.S. firms to choose between U.S. GAAP and IFRS rather than mandating one global monopoly set of standards.

Mandatory adoption of IFRS could increase comparability between U.S. and foreign firms immediately compared to gradual convergence between U.S. GAAP and IFRS.<sup>1</sup> However, there are potential drawbacks for mandatory adoption of IFRS. First, IFRS are more principles-based compared to U.S. GAAP. A switch to IFRS from U.S. GAAP may not necessarily increase comparability because managers must exercise more professional judgment under IFRS compared to U.S. GAAP (Schipper, 2003) and reporting practices between firms may not necessarily become uniform. Second, Lin, Riccardi, and Wang (2012) find that, for a sample of German firms, a mandatory switch from U.S. GAAP to IFRS causes a decline in financial reporting quality, suggesting that an increase in comparability through a mandatory adoption of IFRS could come at the cost of lowering accounting quality. Third, adoption of IFRS would impose a significant and immediate financial burden on adopting U.S. firms (Roadmap, 2008). It could be less costly for U.S. GAAP to converge with IFRS because gradual convergence may not necessarily lead to dramatic changes in U.S. GAAP.<sup>2</sup> Moreover, the financial impact of convergence may be more manageable because all costs associated with changes to the accounting system would be incurred over a period of time.

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<sup>1</sup> Convergence projects between IASB and FASB started in 2002 and have been re-affirmed by both standard setters several times (2006, 2008, 2009, and 2011) over the last ten years. Both standard setters expect to complete all the major projects by mid 2013.

<sup>2</sup> Convergence between IFRS and U.S. GAAP could change IFRS, U.S. GAAP, or both, depending on what is believed to be a better solution for a specific accounting issue.

Since no U.S. firms have been allowed to prepare their financial statements using IFRS so far, it is not feasible to investigate the relative benefits of adoption of IFRS and convergence with IFRS using U.S. data. The German market provides researchers with a unique research setting since, for some time, the German government permitted firms to apply German GAAP, IFRS, or U.S. GAAP. When the E.U. mandated adoption of IFRS in 2005, most German firms switched to IFRS, including those that previously applied U.S. GAAP.<sup>3</sup> This created a rare setting that permits researchers to examine various accounting and economic consequences following a switch from U.S. GAAP to IFRS. We begin by identifying German firms that switched from U.S. GAAP to IFRS (“German U.S. GAAP firms”) and then construct a matched sample of German firms, based on industrial sector and firm size, that applied IFRS consistently throughout the sample period (“German IFRS firms”). We attribute any detected changes in comparability between these two samples to the actual adoption of IFRS (i.e., “the adoption effect”).<sup>4</sup> To capture the change in comparability attributable to convergence, we form a second matched sample using the same German IFRS firms and U.S. firms that reported under U.S. GAAP (“U.S. firms”) based on industry and firm size, and then estimate the change in comparability between these two groups of firms from the pre-adoption to the post-adoption period. We infer adoption of IFRS as providing an incremental benefit to comparability beyond convergence between U.S. GAAP and IFRS only if a significant effect remains after controlling for the convergence effect.

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<sup>3</sup> The E.U. permitted firms that were cross-listed in foreign capital markets to delay adoption of IFRS until no later than 2007.

<sup>4</sup> We used a difference-in-differences design to minimize the effects of other factors that may have contributed to the change in comparability of financial statements from the pre-adoption to the post-adoption period. Details are discussed in the research design section.

De Franco, Kothari, and Verdi (2011) argue that accounting is essentially the mapping of economic transactions to financial statements and develop a financial statement comparability measure based on the similarity of firms' accounting functions in translating economic transactions into accounting data. Following prior studies, we perform three tests to assess comparability between German U.S. GAAP and German IFRS firms and, separately, German IFRS and U.S. firms. Specifically, our tests include: (1) the mapping of stock returns to earnings (De Franco et al. 2011; Yip and Young, 2012); (2) the mapping of earnings levels and changes to stock returns (Barth et al., 2012); and (3) information transfer around earnings announcements (Yip and Young, 2012). We then examine whether adoption of IFRS has a significant incremental benefit to improving comparability relative to convergence between U.S. GAAP and IFRS. We limit our analysis to the relative increase in comparability caused by mandatory adoption of IFRS relative to continued convergence without considering the associated costs for the following reasons. First, costs incurred by firms due to both adoption of IFRS and convergence with IFRS will vary based on firms' operating and reporting characteristics. Second, there are no extant models to estimate the expected cost of IFRS adoption in the literature and only limited empirical evidence (e.g., Kim, Liu, and Zheng, 2012).<sup>5</sup>

Using data of German firms from 2002-2008, our results suggest that comparability between matched German U.S. GAAP and German IFRS firms improves after the former switched to IFRS (i.e., the adoption effect) in 2005. This finding confirms that increased comparability can be achieved when firms switch from rules-

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<sup>5</sup> Although Kim et al. (2012) build an analytical model to examine the increase in audit fees after IFRS adoption, their model focuses on how certain firm characteristics (complexity and reporting quality) may result in variation in these costs. Additionally, audit fees are only one example of the real costs bore by firms following IFRS adoption.

based to principles-based accounting standards, despite skepticism from professionals and academics (e.g., Schipper, 2003).<sup>6</sup> We also find that comparability between matched German IFRS and U.S. firms also improves over the same time period (i.e., the convergence effect), which further supports the benefit of the convergence projects between the Boards.<sup>7</sup> Adoption of IFRS appears to result in a greater increase in comparability than convergence with IFRS. However, our difference-in-differences results indicates that a mandatory switch to IFRS from U.S. GAAP does not provide a significant incremental effect on the increased comparability beyond continued convergence between U.S. GAAP and IFRS. Our difference-in-differences research design also controls for the time-varying factors, and thus alleviates concerns that there may be natural changes in comparability from pre- to post-adoption period.

This study's contribution to the literature is threefold. First, while other studies provide evidence on the impact of adoption of IFRS from other non- U.S. domestic standards on increased comparability, this study is the first to provide empirical evidence that comparability improves after the switch to IFRS from U.S. GAAP. Second, this is the first study to investigate the relative benefit (i.e., comparability) of a mandatory switch to IFRS from U.S. GAAP relative to continued convergence with IFRS. Finally, since our findings suggest that adoption of IFRS does not provide a significant incremental benefit on increased comparability beyond convergence between U.S. GAAP and IFRS, our study provides further evidence that may contribute to U.S. regulators'

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<sup>6</sup> Although not the main focus of our study, it is necessary to establish this effect before we proceed to test for the incremental benefit of adoption of IFRS relative to convergence.

<sup>7</sup> Although convergence efforts between the FASB and IASB began in 2002, the real effects (e.g., joint accounting standard pronouncements) occurred gradually over time. It would be questionable to proceed without this initial finding, because if convergence effects were not yet significant, there would be no doubt that adoption of IFRS would provide a benefit to comparability (with respect to firms that switch from U.S. GAAP).



decision over convergence between IFRS and U.S. GAAP and adoption of IFRS. In particular, regulators may need to reevaluate if the potential costs of IFRS outweigh the expected benefits given that full adoption of IFRS imposes an immediate and potentially significant financial burden on firms relative to continued convergence, which spreads the costs out over time, and that there is the possibility that financial reporting quality could decline following a switch from U.S. GAAP to IFRS (Lin et al., 2012).<sup>8</sup>

The remainder of this study is organized as follows. The next section provides institutional background and summarizes prior research relevant to our study. The third section describes our research design features, including the comparability metrics employed in this study. The fourth section presents detail on our sample selection and data. Section five highlights our empirical results. We offer summaries and concluding remarks in section six.

## **2. Background and prior research**

### *2.1 Adoption of IFRS and Convergence between U.S. GAAP and IFRS*

The dispute over whether or not the SEC should require U.S. firms to adopt IFRS has been fueled by several arguments regarding the potential costs and benefits of IFRS adoption in the U.S. (Hails et al., 2010a). A major incentive for IFRS adoption by U.S. firms is to achieve an increased level of comparability with their foreign counterparts to facilitate international trade and investment (Ball, 2006; Hail et al., 2010a). On the other hand, convergence projects between the Boards not only aim to reduce existing accounting differences between U.S. GAAP and IFRS, but also to improve the quality of both accounting standards in order to develop a single set of high quality global

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<sup>8</sup> As discussed later, Hail, Leuz, and Wysocki (2010a) discuss reasons why it is unlikely that U.S. firms would experience similar outcomes following IFRS adoption in other countries due to their reporting environment and managerial incentives.

accounting standards. Hence, adoption of IFRS is different from convergence with IFRS, although both could increase comparability of financial statements prepared by firms reporting under these standards.

Over the last decade, in an effort to make U.S. financial statements more comparable with IFRS and develop a single set of high quality globally accepted accounting standards, the SEC and FASB have been closely working with the IASB to converge U.S. GAAP and IFRS. The Boards continue to work toward achieving this goal through amending extant accounting standards<sup>9</sup> and issuing joint pronouncements.<sup>10</sup> The Boards require that comparability—that is, the degree to which similar economic events are translated into financial statements in analogous manners—be assessed in issuing accounting standards and further recognize that comparability is the qualitative characteristic of financial reporting that enables users to interpret similarities and differences among reported items between similar organizations (FASB, 2010; IASB, 2010).

Beginning in 2007, the SEC allowed foreign registrants to report their financial statements using IFRS without reconciliation to U.S. GAAP, signaling the belief that IFRS are of high quality and that the two sets of standards have become reasonably comparable. A Roadmap (SEC, 2008) was issued to describe the SEC's long-term

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<sup>9</sup> The Boards established several short-term projects to remove the differences between U.S. GAAP and IFRS in the areas of share-based payments, fair value option, segment reporting, non-monetary assets, inventory accounting, accounting changes, borrowing costs, research and development, non-controlling interests, and joint ventures. The only area that is still in process is investment properties. According to the SEC's Work Plan Final Staff Report published on July 13<sup>th</sup>, 2012, the completed areas of focus considered by the Boards as major joint projects include business combinations, consolidations, deregulation, fair value measurement, financial statement presentation (including reporting other comprehensive income), and post-retirement benefits (including pensions). There are also several in-process major joint projects including revenue recognition, financial instruments with characteristics of equity, financial instruments, insurance contracts, leases and investment entities. The Boards expect to complete all these major joint projects by mid 2013.

<sup>10</sup> For instance, the Boards' business combinations standards, IFRS 3 (revised) and SFAS No. 141R were the first jointly issued standards that are virtually identical (IASB 2007; FASB 2007).

commitment to implementation of IFRS in U.S. capital markets if certain conditions are met.<sup>11</sup> Embedded in this commitment are the underlying consequences of IFRS adoption by U.S. firms, especially the potential impact on accounting quality and financial statement comparability. Since no U.S. firms have used IFRS to prepare their financial statements so far, there is no direct evidence on the effects of adoption of IFRS on either issue with regard to U.S. firms. With respect to indirect evidence that compares the quality of accounting information between U.S. firms and matched foreign firms, some previous studies suggest that U.S. firms report financial information that is of higher quality than their foreign counterparts (e.g., Lang, Raedy, and Wilson, 2006<sup>12</sup>; Gordon, Jorgensen, and Lithicum, 2008; Barth et al. 2012). Consistent with this finding, recent research (Lin et al., 2012) finds that German firms switching from U.S. GAAP to IFRS experience a decline in financial reporting quality. Others (e.g., Hail et al. 2010a), however, argue that it is unlikely that U.S. firms would experience a decline in accounting quality after IFRS adoption because U.S. managers have strong incentives to provide high-quality accounting information and the reporting environment (i.e., enforcement; litigation; and regulation) in the U.S. could prevent a similar outcome.

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<sup>11</sup> The Roadmap provides seven milestones to adopt IFRS in the U.S.: (1) improving Specific Accounting Standards; (2) improving the Structure and Funding of the IASB; (3) facilitating the use of interactive data (XBRL) under IFRS; (4) updating the Education and Licensing of U.S. Accountants; (5) evaluating the early adoption experiences of a limited group of companies; (6) timing of future rulemaking; (7) sequencing of companies required to use IFRS

<sup>12</sup> Note that the sample period in this study ends before many countries, including the European Union, mandated IFRS adoption. Therefore, comparisons are drawn based largely on foreign firms that applied non-U.S. domestic standards rather than those that exclusively applied IFRS. In addition to examining comparability, Barth et al. (2012) assess changes in accounting quality between foreign and U.S. firms after IFRS adoption by foreign firms. Findings suggest that although the accounting quality of foreign firms has improved, U.S. firms continue to report financial information that is of higher quality than the matched sample of foreign firms (based on similar proxies for accounting quality used by Lang et al., 2006)

Moreover, recent research provides evidence indicating that the accounting differences between IFRS and U.S. GAAP decrease after the convergence projects between IASB and FASB were launched in 2002 (Henry et al., 2009) and, more importantly, that the comparability of financial statements prepared by firms domiciled in different countries has become more comparable after worldwide adoption of IFRS. Yip and Young (2012) find that mandatory adoption of IFRS in the E.U. countries increases cross-country comparability, measured by the similarity of accounting functions, the degree of information transfer, and the similarity of the information content of accounting numbers. With regard to U.S. firms, Barth et al. (2012) investigate whether accounting information of non-U.S. firms that apply IFRS is comparable to that of U.S. firms that apply U.S. GAAP. They find that, based on both accounting system and value relevance comparability measures, comparability is greater after the non-U.S. firms adopt IFRS than when they applied domestic accounting standards. In additional tests, Barth et al. (2012) find that this increase in comparability is more pronounced in later years due to the convergence between U.S. GAAP and IFRS. Although both adoption of IFRS and convergence between U.S. GAAP and IFRS are on the agenda of SEC and FASB since the release of the SEC's Roadmap (2008), no decision has been made thus far about whether and/or when U.S. firms may be required or allowed to prepare their financial statements in accordance with IFRS. At the same time, the Boards plan to complete all the major joint projects by mid 2013.

In summary, previous studies find that a switch from local accounting standards to IFRS has increased comparability among non-U.S. firms and between U.S. firms and non-U.S. firms. On the other hand, continued convergence between U.S. GAAP and

IFRS has reduced the accounting differences and increased comparability of financial statements reporting under between U.S. GAAP and IFRS. Though we have some evidence that a mandatory switch from U.S. GAAP to IFRS leads to lower earnings quality in Germany, it is unknown whether the benefit of improved comparability caused by IFRS adoption would offset this potential cost. Further, although both adoption of and convergence with IFRS could increase comparability, there is no evidence on whether they similarly improve comparability. This is a particularly important issue in the U.S. because accounting regulators and standard setters have included both adoption and convergence options on their agenda. In addition, it is widely believed that adoption of IFRS is much more costly than convergence with IFRS. Understanding the relative effect of adoption and convergence on increased comparability therefore may help the SEC in reaching a decision between mandatory switch from U.S. GAAP to IFRS or continued convergence with IFRS.

## *2.2 Relative benefits of adoption and convergence*

There are certainly some apparent benefits of full adoption of IFRS. For instance, adoption can increase comparability immediately compared to gradual convergence. In addition, a mandatory switch to IFRS would eliminate all the accounting differences between IFRS and U.S. GAAP while these differences may persist after the convergence between U.S. GAAP and IFRS. More importantly, a clear date for adoption of IFRS could reduce uncertainty among market participants about whether and/or when U.S. firms would be required to switch to IFRS and allow U.S. firms to adequately prepare for the transition.

However, adoption of IFRS may be less beneficial than continued convergence between U.S. GAAP and IFRS for at least three reasons. First, there is some evidence suggesting that convergence can also improve comparability, though there is no clear evidence to suggest that adoption has an incremental effect on comparability beyond convergence. Second, adoption of IFRS in the U.S. implies a mandatory switch from U.S. GAAP to IFRS, which is costly for U.S. firms. Unlike gradual convergence between both standards, adoption of IFRS imposes significant, immediate adoption costs on U.S. firms. Finally, the convergence projects between the Boards also aim to develop a single set of high quality global accounting standards that can be used to prepare financial statements for both domestic and international capital markets. This objective may not be achieved if U.S. switches to IFRS before the quality of IFRS is further improved.

There are also other arguments for the choice of convergence with IFRS. In particular, Bradshaw et al. (2010) argue that continued convergence of U.S. GAAP with IFRS through the joint efforts of the Boards is preferable to adoption of IFRS in the near future because of the following reasons. First, IFRS and U.S. GAAP are both high quality sets of accounting standards. Second, material accounting differences between IFRS and U.S. GAAP still exist; therefore, continued convergence may reconcile these differences before adoption of IFRS by U.S. firms. Third, U.S. colleges and universities have not been equipped to teach IFRS at the level necessary for adoption of IFRS in the near future. Finally, adoption of IFRS could exacerbate the current market volatility and increase transaction costs.

Previous studies have examined the effects of adoption of IFRS and convergence with IFRS on comparability separately. In addition, prior research focuses on the effect of

a switch from non-U.S. accounting standards to IFRS on comparability. Using a unique setting in Germany, this study departs from previous studies in two ways. First, we examine the effect of a switch from U.S. GAAP to IFRS on comparability. Second, this study distinguishes and compares the effects of adoption of and convergence with IFRS on comparability.

### **3. Research Design**

German firms were allowed to choose between German GAAP, IFRS, and U.S. GAAP before they were required to use IFRS in 2005. The choice between U.S. GAAP and IFRS was introduced to benefit firms trading in Germany's New Market (Leuz, 2003). After the collapse of New Market in 2002, many German firms continued or elected to use U.S. GAAP until the mandatory switch to IFRS.

#### *3.1 The Adoption and Convergence Effects*

We follow previous studies (e.g. De Franco et al., 2011; Yip and Young, 2012) and use a matched sample design for our tests. The first matched sample is based on German firms that reported under U.S. GAAP in 2002, 2003, and 2004 and adopted IFRS in 2005 ("German U.S. GAAP firms"). We then match these firms with German firms that applied IFRS throughout the entire sample period ("German IFRS firms"). Specifically, each German U.S. GAAP firm is matched to a German IFRS firm that is in the same industry (based on 2-digit SIC codes) and has the most similar size (measured as equity market value) at the end of 2004.<sup>13</sup> We classify the sample period into pre-

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<sup>13</sup> Because the focus of this study is comparability, we restrict the matching procedure in this way so that the same matched pairs of firms are examined in all years. This mitigates the concern that inferences regarding changes in comparability are due to confounding factors when the matched firm differs between years.

(2002-2004) and post-adoption (2006-2008) periods.<sup>14</sup> We then assess the change in comparability between paired firms in this sample from the pre-adoption to post-adoption period, and we attribute this change in comparability to the adoption of IFRS by German U.S. GAAP firms.

However, U.S. GAAP and IFRS have grown more similar due to continuous convergence efforts between the Boards. As such, any improvement in comparability from the pre-IFRS adoption period to post-IFRS adoption period detected by our tests may be attributable to the convergence with IFRS rather than the actual adoption of IFRS. In order to control for the convergence effect, we follow the same procedure described above and create a second matched sample that consists of German IFRS firms and U.S. firms that applied U.S. GAAP throughout the entire sample period (U.S. firms). We then assess the change in comparability between firms in the second matched sample, which we attribute to convergence.

It is also possible that there may be some inherent changes in comparability among firms between the pre- and post-adoption periods. The difference-in-differences feature of our research design is a standard approach to control for such time-varying trends. There is also a potential concern that our treatment group (the German U.S. GAAP and German IFRS matched pairs) may differ from our control group (the German IFRS and U.S. matched pairs), and these differences could partially contribute to the effect captured by our difference-in-differences design. The matching technique based on industry and firm size and the inclusion of the same German IFRS firms in both matched samples should alleviate this concern.

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<sup>14</sup> We do not include 2005 (the adoption year) in our analyses to mitigate concerns that detected changes are driven by some temporary effect during the transition to IFRS.



To examine the relative change in comparability following mandatory IFRS adoption compared to the change in comparability attributable to convergence (i.e., whether actual adoption of IFRS provides any incremental benefit to comparability beyond convergence) we pool these two matched samples and employ the following difference-in-differences model to segregate the change in comparability driven by convergence and adoption.

$$COMP_{i,t}^n = \alpha_0 + \alpha_1 POST_t + \alpha_2 LOCAL_i + \alpha_3 POST*LOCAL_{i,t} + \alpha_4 MV\_Ratio_{i,t} + \varepsilon. \quad (1)$$

In Equation (1),  $COMP^n$  represents a comparability metric ( $n = 1$  or  $2$ , discussed below) for matched pair  $i$  in period  $t$ .  $POST$  is an indicator variable equal to one if  $t$  is after 2005. We multiply the comparability metrics by negative one so that a larger (or less negative) value indicates an increase in comparability and, accordingly, we interpret a significantly positive estimate of  $\alpha_1$  as evidence an increase in comparability over time.  $LOCAL$  is an indicator variable equal to one if the matched pair  $i$  consists of German U.S. GAAP and German IFRS firms. The coefficient on  $LOCAL$  captures the adoption effect on comparability as it reflects changes in comparability after both groups of firms apply IFRS. The coefficient on  $POST$  captures the convergence effect on comparability as it reflects changes in comparability for matched German IFRS firms and U.S. firms. Our variable of interest is the interaction term  $POST*LOCAL$ , which is equal to one if matched pair  $i$  consists of German U.S. GAAP and German IFRS firms and if  $t$  is after 2005. The coefficient on this term captures the incremental increase in comparability when firms switch from U.S. GAAP to IFRS beyond what is driven by convergence. A significantly positive estimate of  $\alpha_3$  suggests that there is an incremental benefit to a full IFRS adoption, while an insignificant estimate of  $\alpha_3$  suggests that there is no incremental

benefit to comparability when firms switch from U.S. GAAP to IFRS beyond the effect that has been achieved through convergence between U.S. GAAP to IFRS. To control for the possibility that changes in firm size among the matched firms impacts comparability over time, we include *MV\_Ratio* as a control variable, measured as the ratio of the market values of German USGAAP firms to that of German IFRS firms for the German U.S. GAAP-IFRS pairs, and that of U.S. firms to IFRS firms for U.S.-German IFRS firm pairs. The market values are measured at the fiscal year end.<sup>15</sup>

### 3.2 Comparability Metrics

In this study, we focus on the comparability of accounting earnings.<sup>16</sup> We derive our comparability metrics from the similarity of accounting functions as developed by De Franco et al. (2011), extended to consider the mapping of various combinations of economic outcomes to accounting information as in other recent studies (Barth et al., 2012; Yip and Young, 2012). De Franco et al. (2011) posit that accounting is the process by which economic events are translated into financial statements. To that end, accounting comparability can be described as the degree to which accounting functions similarly translate economic events (proxied by stock return) into financial statement information (proxied by reported earnings). We begin by estimating the following regression of each firm's accounting function:

$$ROA_{i,t} = \alpha^i + \beta^i RET_{i,t} + \varepsilon_{i,t} \quad (2)$$

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<sup>15</sup> Yip and Young (2012) use a similar ratio to control for differences in comparability due to firm size, but base it on total assets, which is their matching criterion. We use a similar ratio based on the firms' market values since this is our matching criteria for firm size.

<sup>16</sup> Previous studies have also considered the mapping of economic outcomes to other accounting information (e.g., book value of equity and cash flows). However, these associations may reflect the inclusion of additional information beyond the reported accounting numbers.

where  $ROA_{i,t}$  is return on assets, an accounting performance measure, for firm  $i$  in period  $t$ , calculated as net income divided by total assets.<sup>17</sup>  $RET_{i,t}$  is the stock return of firm  $i$  in period  $t$ , adjusted for dividends and stock splits. The coefficients ( $\alpha^i$  and  $\beta^i$ ) represent the estimated accounting function of firm  $i$ . Following Yip and Young (2012), we estimate Equation (1) at the firm level using semi-annual data separately in the pre- and post-IFRS periods.

To illustrate construction of the first accounting system comparability metric, we explain a series of steps for a pair of German U.S. GAAP and German IFRS firms. First, for each matched pair of German U.S. GAAP firm (firm  $i$ ) and German IFRS firm (firm  $j$ ), we estimate Equation (3) separately at the firm-level to obtain the coefficients representing firm  $i$ 's accounting function ( $\alpha^i$  and  $\beta^i$ ) and the coefficients representing firm  $j$ 's accounting function ( $\alpha^j$  and  $\beta^j$ ). Second, for firm  $i$  in each semi-annual period  $t$ , we calculate the expected value of  $ROA$  using its own accounting function ( $\alpha^i$  and  $\beta^i$ ) and the corresponding matched firm  $j$ 's accounting function ( $\alpha^j$  and  $\beta^j$ ), yielding two expected ROAs ( $\widehat{ROA}_{i,t}^i$  and  $\widehat{ROA}_{i,t}^j$ ) and the absolute value of their difference, computed as  $|\widehat{ROA}_{i,t}^i - \widehat{ROA}_{i,t}^j|$ .<sup>18</sup> Third, we repeat this process for firm  $j$  in each semi-annual period, translating its economic activity into accounting ROA using both its own accounting function and the matched firm  $i$ 's accounting function, and we similarly obtain two expected ROAs ( $\widehat{ROA}_{j,t}^j$  and  $\widehat{ROA}_{j,t}^i$ )<sup>19</sup> and the absolute value of the expected ROA difference, computed as  $|\widehat{ROA}_{j,t}^j - \widehat{ROA}_{j,t}^i|$ . Fourth, we calculate the mean of the

<sup>17</sup> Datastream offers several definitions of Net Income. In our analyses, we use "Net Income before extraordinary and other non-operating items."

<sup>18</sup>  $\widehat{ROA}_{i,t}^i = \alpha^i + \beta^i RET_{i,t}$  and  $\widehat{ROA}_{i,t}^j = \alpha^j + \beta^j RET_{i,t}$ .

<sup>19</sup>  $\widehat{ROA}_{j,t}^j = \alpha^j + \beta^j RET_{j,t}$  and  $\widehat{ROA}_{j,t}^i = \alpha^i + \beta^i RET_{j,t}$ .

absolute values of the expected ROA differences of firms  $i$  and  $j$  to obtain the first comparability metric ( $COMP^1$ ), a firm-pair level measure to proxy the earnings comparability of firms  $i$  and  $j$ . We perform the above steps separately in the pre- and post-adoption periods and this process yields six  $COMP^1$  for paired firms  $i$  and  $j$  in both the pre- (2002-2004) and post-adoption (2006-2008) periods. We multiply the mean values by negative one so that a larger (or less negative) value of  $COMP^1$  indicates greater comparability. We repeat this series of steps using German IFRS firms and U.S. firms to obtain  $COMP^1$  as it relates only to convergence between U.S. GAAP and IFRS.

We next consider an expanded model as employed by Barth et al. (2012) based on the mapping of earnings levels and changes into stock returns.<sup>20</sup>

$$RET_{i,t} = \delta_0^i + \delta_1^i NI_{i,t} + \delta_2^i \Delta NI_{i,t} + \delta_3^i LOSS_{i,t} + \delta_4^i (LOSS_{i,t} * NI_{i,t}) + \delta_5^i (LOSS_{i,t} * \Delta NI_{i,t}) + \varepsilon_{i,t} \quad (3)$$

In Equation (3),  $RET$  is the stock return of firm  $i$  in period  $t$ , measured from nine months before until three months after fiscal year end and adjusted for dividends and stock splits,  $NI$  is net income per share scaled by stock price at the beginning of the fiscal year, and  $\Delta NI$  is the annual change in net income per share scaled by stock price at the beginning of the fiscal year.<sup>21</sup> We also include an indicator variable equal to one for firms with negative net income in year  $t$  ( $LOSS$ ) and allow the coefficients on earnings and change in earnings to differ for loss firms (Hayn, 1995).<sup>22</sup>

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<sup>20</sup> Since we focus on earnings-based comparability metrics, we exclude an analysis of stock price. Although a summary measure reflecting investors' capital allocation decisions, stock price inherently encompasses information based on prior periods' earnings as well as other information that is not captured by accounting earnings. Stock returns, on the other hand, are more reflective of contemporaneous information.

<sup>21</sup> While  $COMP^1$  and  $COMP^2$  both consider the mapping of the same economic outcome (returns) into accounting information (earnings), the latter extends the model used in prior studies (DeFranco et al., 2011; Yip and Young, 2012; Cascino and Gassen, 2012) to incorporate both earnings levels and changes.

<sup>22</sup> When we include future earnings, measured as Net Income scaled by beginning of the year stock price in year  $t+1$ , as an additional control variable, our inferences are unchanged.

The process to obtain our second comparability metric ( $COMP^2$  from Equation (3)) is identical to the procedure described above for  $COMP^1$  with one notable exception. Data limitations make it difficult to calculate changes in semi-annual earnings, shifting our design to estimation on an annual basis.<sup>23</sup> This makes the estimation of firm-level regressions impractical due to the low number of observations in the pre- and post-adoption periods. We therefore adjust our research design and measure comparability based on accounting information at the industry level (based on 2-digit SIC codes).<sup>24</sup> Again, we use a pair of German U.S. GAAP and German IFRS firms as an example. First, we run the regressions on the industry level separately for pre- and post-adoption periods, and separately for each subsample of firms. In other words, for each group of firm (i.e., German U.S. GAAP or German IFRS firms), we run an industry-period level estimation of Equation (3) and obtain the estimated coefficients. Then, for each paired firms  $i$  (a German U.S. GAAP firm) and  $j$  (a German IFRS firm) that are in the same industry, we calculate firm  $i$ 's predicted value of  $RET_{i,t}$  using its own coefficients and its corresponding matched firm  $j$ 's coefficients to obtain the predicted value of  $RET_{i,t}$  ( $\widehat{RET}_{i,t}^i$  and  $\widehat{RET}_{i,t}^j$ ) and the absolute value of their difference, calculated as  $|\widehat{RET}_{i,t}^i - \widehat{RET}_{i,t}^j|$  for each annual period. Third, we repeat this process for firm  $j$  in each annual period, using both its own accounting function and the matched firm  $i$ 's

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<sup>23</sup> For robustness, we re-estimate Equation (3) using semi-annual data with  $RET$  as the dependent variable with both earnings and earnings levels and changes as the independent variables, but without the loss indicator variable and interaction terms. Subsequent results are identical to those obtained from  $COMP^2$  based on the estimation of Equation (4).

<sup>24</sup> This approach is similar to other current studies. For example, Lang, Maffett, and Owens (2010) use a similar approach, and their evidence suggests that industry-based comparability measures are linked to firm-level measures of the information environment (analyst following, forecast accuracy, forecast dispersion, and bid-ask spreads). Lang et al. (2010) also show consistent results when they rely only a subset of firms with adequate data for firm-level tests. Cascino and Gassen (2012) likewise find results based on industry-level analysis to be positively linked to forecast accuracy and negatively correlated with forecast dispersion, supporting the use of industry-level tests as comparability metrics.

accounting function, and we similarly obtain two expected *RET*s ( $\widehat{RET}_{j,t}^j$  and  $\widehat{RET}_{j,t}^i$ ) and the absolute value of their difference, calculated as  $|\widehat{RET}_{j,t}^j - \widehat{RET}_{j,t}^i|$ . Fourth, we calculate the mean of the absolute values of the expected *RET* differences of firms *i* and *j* to obtain the second comparability metric ( $COMP^2$ ). We multiply the mean values by negative one so that a larger (or less negative) value of  $COMP^2$  indicates greater comparability. We repeat this series of steps using German IFRS firms and U.S. firms to obtain  $COMP^2$  as it relates only to convergence between U.S. GAAP and IFRS.

### *3.3 Information Transfer*

To the extent that comparability among firms improves due to changes in accounting standards, market participants should be able to better utilize information released by one firm in assessing the accounting information of another. We next examine whether market participants' use of the information released from one firm to reevaluate equity value of similar firms is incrementally improved by full adoption of IFRS relative to convergence. Information transfer occurs when new information about one firm is released into the market and market participants use this information to adjust the stock prices of non-announcing firms accordingly. Numerous studies find that the stock return of one firm may be affected by the contemporaneous disclosure of information by other firms in the same industry or that are followed by the same analysts. Prior studies have documented information transfer in the contexts of earnings announcements (Firth, 1976; Foster, 1981; Clinch and Sinclair, 1987; Han and Wild, 1990; Freeman and Tse, 1992; Ramnath, 2002), stock splits (Tawatnuntachai and D'Mello, 2002), and managers' earnings forecasts (Baginski, 1987; Han, Wild, and Ramesh, 1989; Kim, Lacina, and Park, 2008). Most relevant to our setting, Yip and

Young (2012) document an increase in information transfer between European firms from 17 countries following the mandatory adoption of IFRS, consistent with the supposition that comparability improves when firms in different countries report under the same accounting standards.

Following Yip and Young (2012), we employ the following regression model to test for changes in information transfer:

$$|CAR\_NA_{i,t}| = \gamma_0 + \gamma_1 INFORMATION_{j,t} + \gamma_2 POST_t + \gamma_3 INFORMATION * POST_{j,t} + \gamma_4 NUMEST_{j,t} + \gamma_5 LOSS_{j,t} + INDUSTRY + \varepsilon \quad (4)$$

*CAR\_NA* is the cumulative abnormal return of a non-announcing firm *i*, which captures the market reaction of non-announcing firms surrounding corresponding announcing firm's earnings announcement. *INFORMATION* is equal to either the matched announcing firm *j*'s absolute abnormal stock returns or analyst forecast error, as will be described below in detail. We use the absolute value of these measures because there is no directional prediction of market reaction of one firm to another related firm's earnings announcement (Byard et al., 2011; Yip and Young 2012). *POST* is an indicator variable equal to one if year *t* is after 2005. *NUMEST* is equal to the number of analysts providing forecast information for firm *i* in year *t* and controls for varying levels of analyst following that may influence the market's use of new information. *LOSS* is an indicator variable equal to one if firm *i* reports negative earnings in year *t*, and *INDUSTRY* represents dummy variables to control for industry fixed-effects.

We estimate Equation (4) separately for each matched sample of firms (i.e., the German U.S. GAAP and German IFRS matched pairs and the German IFRS and U.S. matched pairs) to identify whether or not adoption or convergence separately impact

firms' information transfer. Thus, a significantly positive estimate of the coefficient on the interaction term *INFORMATION\*POST* suggests greater information transfer due to either adoption or convergence, depending on whether the regression is estimated using German U.S. GAAP and German IFRS or German IFRS and U.S. matched pair firms, respectively.

We then estimate the following equation to determine if adoption of IFRS provides an incremental benefit to information transfer in excess of convergence.

$$|CAR\_NA_{i,t}| = \gamma_0 + \gamma_1 INFORMATION_{j,t} + \gamma_2 POST_t + \gamma_3 INFORMATION*POST_{j,t} + \gamma_4 NUMEST_{j,t} + \gamma_5 LOSS_{j,t} + \gamma_6 LOCAL + \gamma_7 LOCAL*POST + \gamma_8 LOCAL*INFORMATION_{j,t} + \gamma_9 LOCAL*POST*INFORMATION_{j,t} + INDUSTRY + \varepsilon . \quad (5)$$

We estimate Equation (5) for the entire sample, including all three categories of firms. In this regression model, *LOCAL* is equal to one if the matched firms *i* and *j* are German U.S. GAAP and German IFRS firms and zero otherwise. Our coefficient of interest is the three-way interaction term *LOCAL\*POST\*INFORMATION*, which captures the incremental benefit of adoption of IFRS over convergence between U.S. GAAP and IFRS. A significantly positive estimate of the coefficient on this term would suggest that adoption of IFRS provides an incremental benefit to information transfer beyond convergence. We next discuss the details for the construction of *CAR\_NA* and *INFORMATION*.

To calculate *CAR\_NA*, we begin by estimating the following model:

$$RET_{i,t} = \alpha^i + \beta^i RET_{m,t} + \varepsilon , \quad (6)$$



$RET_{i,t}$  is the stock return of firm  $i$  on day  $t$ , and  $RET_{m,t}$  is the stock return of the firm's domestic market on day  $t$ .<sup>25</sup> The coefficients  $\alpha^i$  and  $\beta^i$  of equation (6) are estimated separately for each fiscal year for the window from Day -185 to Day -6, where Day 0 is the earnings announcement date of the announcing firm. The abnormal stock return of firm  $i$  on day  $t$  is calculated as  $U_{i,t} = RET_{i,t} - (\alpha^i + \beta^i RET_{m,t})$ . The cumulative abnormal return of a non-announcing firm is the sum of its abnormal returns on the three days (Day -1 to Day +1) surrounding the release of the earnings announcement by the announcing firm.

Following prior studies (Byard et al. 2011; Yip and Young 2012; Wang 2013), we employ two measures to proxy for *INFORMATION*. The first is measured as the absolute value of abnormal stock returns of announcing firm ( $ABS\_CAR\_A$ ) surrounding its earnings announcement. Abnormal stock returns surrounding an earnings announcement should reflect the information released into the market by announcing firms, especially considering that firms often release non-earnings and non-financial disclosures along with their earnings announcement (Francis et al., 2002). We use the same estimation window (-185, -6) to estimate equation (6) and calculate cumulative abnormal returns (-1, +1) for announcing firm. Alternatively, we use the announcing firm's analyst forecast error ( $ABS\_FE\_A$ ) to proxy for *INFORMATION*. We measure analyst forecast error as the absolute value of the difference between actual earnings and the most recent median earnings forecast, scaled by stock price at the beginning of the year.

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<sup>25</sup> For German firms, the market return index is DAX. For U.S. firms, the market return index is weighted average market return.

## 4. Sample and Data

The primary samples of firms in this study include German U.S. GAAP firms that switched mandatorily to IFRS in 2005, a matched sample of German IFRS firms, and a second matched sample of U.S. firms. We obtain accounting standards data for the two samples of German firms from Worldscope in order to identify those firms that switched from U.S. GAAP to IFRS in 2005, as well as those firms that reported consistently under IFRS.<sup>26</sup> We identify 74 German firms that reported using U.S. GAAP before switching to IFRS in 2005. We eliminate 8 firms with insufficient data requirements and 3 firms that do not have IFRS firms in the same 2-digit SIC industry. We then match these 63 firms to German IFRS firms based on industry (2-digit SIC code), fiscal year-end, and size (based on the closest market value of equity at the end of 2004, the year before German U.S. GAAP firms adopted IFRS). Of these firms, we eliminate 16 firms whose closest match based on market value is inadequate.<sup>27</sup> Thus, the final sample consists of 47 pairs of German U.S. GAAP and German IFRS firms. We form our second matched sample using the same criteria, but match the German IFRS firms with U.S. firms. We obtain all data used in our analyses for both German and U.S. firms from WorldScope and DataStream. Table 1 summarizes our sample selection process.

[Table 1]

Table 2 presents descriptive statistics for variables used in our comparability analyses. To mitigate the effects of outliers on our inferences, we winsorize all continuous variables used in our analyses at the top and bottom 1%. Panel A shows that

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<sup>26</sup> We are aware of possible accounting standard classification errors in Worldscope (e.g., Daske, Hail, Leuz, and Verdi, 2012). However, to the extent firms included in our sample as using IFRS are misclassified, results regarding changes in comparability would be biased against our findings.

<sup>27</sup> Specifically, we calculate a ratio of the matched pair firms' market values and exclude those matched pairs where this ratio is less than 0.50 (Barth et al., 2012).

average return, net income divided by beginning share price and market capitalization for all three groups of firms are not statistically different. However, German IFRS firms have higher average total assets than German U.S. GAAP firms and U.S. firms. Panel B shows similar results except that US firms have higher average change in net income per share than German U.S. GAAP and IFRS firms.

[Table 2]

For the information transfer analysis, we form two matched samples for announcing firms and non-announcing firms. One is between German U.S. GAAP firms and German IFRS firms; the other matched sample is between German IFRS firms and U.S. firms. We impose several restrictions when pairing non-announcing and announcing firms. First, an announcing firm's earnings announcement window must not overlap with any other firms to ensure that the non-announcing firm is reacting only to the matched firm's information. Second, the earnings announcement date of the non-announcing firms must be later in the same year as the matched announcing firm. Finally, we match announcing and non-announcing firms within the same industry (based on 2-digit SIC code), and pair the three largest announcing firms with smaller non-announcing firms, based on equity market value, in the same industry. This is because smaller firms are more likely to react to information released by larger firms in their industry, but not necessarily vice versa (Wang, 2013). The matched sample between German U.S. GAAP firms and German IFRS firms has 952 observations while the matched sample between German IFRS firms and U.S firms has 1,543 observations.

## **5. EMPIRICAL RESULTS**

### ***5.1 Comparability Metrics and Adoption and Convergence Effects***

We first report the results of changes in comparability based on our comparability metrics between German U.S. GAAP and German IFRS firms (Table 3) and German IFRS firms and U.S. firms (Table 4). We apply a *t*-test (Wilcoxon *z*-test) to test for statistical significance of the difference in the means (medians) of our comparability metrics in our sample between the pre-adoption and post-adoption periods.

Panel A of Table 3 reports the results of our comparability measure  $COMP^1$ , which is based on the mapping of stock return into earnings, for German U.S. GAAP and German IFRS firms. The results suggest that comparability between German U.S. GAAP and German IFRS firms increased significantly. Specifically, the mean (median) of  $COMP^1$  increased from -0.159 (-0.068) in the pre-adoption period to -0.076 (-0.039) in the post-adoption period; both differences are statistically significant at the 0.01 level. Panel B of Table 3 similarly reports the results based on  $COMP^2$ , our comparability metric based on the mapping of earnings levels and annual change in earnings into stock returns. The mean (median) of  $COMP^2$  increased from -0.679 (-0.330) to -0.414 (-0.142), and the difference is statistically significant at the 0.05 (0.01) level.

[Table 3]

We next turn to the change in comparability from the pre-adoption to post-adoption periods between German IFRS and U.S. Firms, which we attribute to convergence. Panel A of Table 4 reports the results based on  $COMP^1$ . Our results indicate that the mean (median) of  $COMP^1$  increased from -0.157 (-0.095) in the pre-adoption period to -0.071 (-0.039) in the post-adoption period. The increases in both mean and median are statistically significant at the 0.01 level. The results of  $COMP^2$  are reported in Panel B of Table 4, showing that the mean (median) increased from -1.081 (-0.580) in the

pre-adoption period to -0.706 (-0.385) in the post-adoption period, and the increases are statistically significant at the 0.05 level for the mean and at the 0.01 level for the median.

[Table 4]

The first set of results as reported in Table 3 suggests that the comparability between German U.S. GAAP and German IFRS firms improved significantly once all firms report under IFRS. These results are attributable to actual adoption of IFRS. Additionally, our second set of results as reported in Table 4 suggests that the comparability between German IFRS and U.S. firms increased over the sample period. As both groups of firms reported under the same accounting standards throughout the sample period used in this study, the results suggest that convergence between U.S. GAAP and IFRS has led to significantly increase in comparability. These results therefore raise the question of whether or not adoption of IFRS may have an incremental benefit to comparability beyond convergence between U.S. GAAP and IFRS. We next to turn to a difference-in-differences research design to empirically examine this issue.

## **5.2 Regression Results: Incremental Effect of Adoption**

Table 5 reports the results based on Equation (1), which separates the adoption and convergence effects, using our two comparability metrics. The number of observations differs because we measure  $COMP^1$  on a semi-annual basis, whereas  $COMP^2$  is an annual basis measure. The coefficient on  $POST$  is significantly positive when comparability is measured by either  $COMP^1$  or  $COMP^2$  ( $p < 0.001$ ). These results suggest that comparability is greater in the post-adoption period, consistent with our earlier univariate results. The coefficient on  $LOCAL$  is positive but insignificant when comparability is measured by  $COMP^1$ , but is significantly positive when comparability is

measured by *COMP*<sup>2</sup>, consistent with the notion that firms domiciled in the same country are more comparable than firms across different countries, *ceteris paribus*. The interaction term *POST\*LOCAL*, our variable of interest, captures the incremental benefit to comparability beyond convergence when firms actually adopt. Using both *COMP*<sup>1</sup> and *COMP*<sup>2</sup>, the coefficient on this term *POST\*LOCAL* is insignificant. Thus, adoption of IFRS appears to provide no significant benefit to financial statement comparability incremental to what is achieved through convergence.

[Table 5]

### **5.3 Regression Results: Information Transfer**

Finally, we report the results of our information transfer tests. Table 6 reports the information transfer results for (1) the matched sample of German U.S. GAAP and German IFRS firms, (2) the matched sample of German IFRS and US firms, and (3) the pooled sample using an expanded model to test the incremental effect of adoption relative to convergence on information transfer. For the sample of matched German U.S. GAAP and German IFRS firms, the results suggest that information transfer improved once all firms used IFRS. Specifically, the coefficient on *POST\*INFORMATION* is significantly positive ( $p < 0.001$ ), although only when *INFORMATION* is measured using *ABS\_CAR\_A*. For the sample of matched German IFRS and U.S. firms, however, the coefficient on *POST\*INFORMATION* is insignificant when *INFORMATION* is measured using either *ABS\_CAR\_A* or *ABS\_FE\_A*, suggesting that convergence may not be a significant driver of improvements in information transfer.

Turning to the incremental benefit of IFRS adoption relative to convergence on information transfer, the findings are consistent with our first set of results using

comparability metrics. Specifically, the coefficient on the interaction term *LOCAL\*POST\*INFORMATION* is insignificant in both model specifications, suggesting there is no incremental benefit to adoption of IFRS over convergence with regard to information transfer.

[Table 6]

## **6. Summary and Conclusion**

Using a setting unique to Germany, this study investigates whether adoption of IFRS provides an incremental effect on the improvement of comparability of financial statements beyond convergence between U.S. GAAP and IFRS. Our study is motivated by some recent studies (Yip and Young, 2012; Barth et al. 2012) that find that worldwide adoption of IFRS has increased financial statement comparability among non-U.S. firms and between U.S. and non-U.S. firms. Although both adoption of IFRS and convergence between U.S. GAAP and IFRS are found to have increased financial statement comparability, no studies have investigated whether adoption provides an incremental effect on the increased comparability beyond convergence.

Using two financial statement comparability metrics, we find that comparability increased for both samples, indicating that both adoption and convergence increase comparability of financial statements prepared by U.S. GAAP and IFRS. Using a difference-in-differences design to segregate the comparability improvement due to adoption and convergence, we find that there is no significant incremental benefit to adoption of IFRS when convergence is present. Similarly, when we test for changes in information transfer, we find consistent result.

We believe the above findings have some important implications. First, adoption is believed to be much more costly than convergence, although the convergence projects appear to have a similar effect on financial statement comparability. Second, adoption may not be the only option to achieve comparability for all countries. Although more than 100 countries in the world have either permitted or required their firms to prepare their financial statements using IFRS, some countries (e.g. U.S., China, and Japan) have chosen to converge their local standards with IFRS to achieve the comparability benefits without imposing on firms the costs associated with IFRS adoption. Finally, given ongoing deliberation in the U.S. on whether or not firms should be required to switch from U.S. GAAP to IFRS, our findings should be of interest to standard setters and regulators as they consider alternative options to facilitate international trade and investment activities.

The results of this study should be considered preliminary and interpreted with caution for two reasons. First, the reporting environment is different between Germany and the U.S. Therefore, while the experience of a mandatory switch from U.S. GAAP to IFRS for German firms provides us with a setting to examine the relative benefit of adoption of IFRS to convergence with IFRS, the outcome in the U.S. may not be similar. Second, the sample used in this study is relatively small, so the extent to which our results may be generalized is questionable.



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**Table 1**  
Sample Selection and Description

<i>Panel A: Sample Selection</i>	<b>Semi-Annual Sample</b>	<b>Annual Sample</b>
German U.S. GAAP firms identified from Worldscope	99	99
Exclusions:		
Firms that did not adopt IFRS in 2005	(25)	(25)
Firms with missing price or earnings data	(8)	(5)
Firms that cannot be matched to German IFRS firms based on industry	(3)	(2)
Firms with inadequate match based on size	(16)	(15)
Firms in industries with less than two firms	N/A	(7)
<b>Total number of firms in main sample</b>	<b>47</b>	<b>45</b>

*Panel B: Industry Composition for Firms used to measure COMP<sup>1</sup>*

<b>Industry</b>	<b>2-digit SIC</b>	<b>Frequency</b>	<b>Percent</b>
Pharmaceuticals & Chemicals	28	1	2.13
Steel, Iron, and Minerals	33	1	2.13
Industrial Equipment	35	7	14.89
Elecontrinc Equipment	36	6	12.77
Motor Vehicles and Equipment	37	1	2.13
Medical Instruments and Supplies	38	5	10.64
Insurance	63	1	2.13
Real Estate	67	1	2.13
Professional Services	73	19	40.41
Motion Pictures	78	1	2.13
Management Services	87	4	8.51
<b>Total</b>		<b>47</b>	<b>100</b>

*Panel C: Industry Composition for Firms used to measure COMP<sup>2</sup>*

<b>Industry</b>	<b>2-digit SIC</b>	<b>Frequency</b>	<b>Percent</b>
Industrial Equipment	35	7	15.56
Elecontrinc Equipment	36	7	15.56
Medical Instruments and Supplies	38	7	15.56
Professional Services	73	20	44.43
Management Services	87	4	8.89
<b>Total</b>		<b>45</b>	<b>100.00</b>

This sample presents the sample selection and composition information. Panel A shows how our initial sample is determined. Panel B details the sample composition by industry for firms included in computing our first comparability metric, COMP<sup>1</sup>. Firms that are missing semi-annual earnings data are excluded from this sample. Panel C details the sample composition by industry for firms included in our second comparability metric, COMP<sup>2</sup>. These measures are based on industry-level analysis. Accordingly, we exclude firms that are in industries with less than two firms.

Table 2  
Descriptive Statistics Relating to Variables Used in Analyses

<i>Panel A: Variables Used in Semiannual, Firm-level Comparability Measure (COMP<sup>1</sup>)</i>											
	German GAAP firms (n = 546)			German IFRS firms (n = 546)			US firms (n = 540)			<i>t</i> -test <sup>#</sup>	<i>t</i> -test <sup>##</sup>
	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev		
<i>RETURN</i>	-0.080	-0.014	0.439	-0.049	-0.020	0.416	-0.035	0.027	0.502	-1.20	0.41
<i>NI/P</i>	-0.062	0.012	0.358	-0.039	0.017	0.244	-0.027	0.017	0.168	-1.27	1.09
<i>ASSETS</i>	1243	63	5253	2895	86	13317	566	49	2193	-2.70	-4.04
<i>MV</i>	445	48	1488	504	50	1556	466	64	1262	-0.64	-0.50
<i>Panel B: Variables Used in Annual, Industry-level Comparability Measure (COMP<sup>2</sup>)</i>											
	German GAAP firms (n = 255)			German IFRS firms (n = 265)			US firms (n = 267)			<i>t</i> -test <sup>#</sup>	<i>t</i> -test <sup>##</sup>
	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev		
<i>MV</i>	182	45	480	176	35	388	239	53	840	0.15	1.11
<i>NIPS</i>	-0.141	0.141	2.323	-1.750	0.150	9.206	-0.564	0.208	4.025	2.71	1.96
<i>RETURN</i>	-0.125	-0.092	0.686	-0.137	-0.151	0.697	-0.088	-0.048	0.706	0.20	0.79
<i>NI/P</i>	-0.047	0.036	0.277	-0.092	0.040	0.370	-0.059	0.034	0.367	1.55	0.99
$\Delta$ <i>NI/P</i>	0.061	0.015	0.426	0.100	0.010	0.730	0.123	0.016	0.637	-0.73	0.56
<i>LOSS</i>	0.373	0.000	0.484	0.355	0.000	0.479	0.386	0.000	0.488	0.42	0.74

<sup>#</sup>, <sup>##</sup> indicates tests between German GAAP firms and German IFRS firms and between German IFRS firms and U.S. firms, respectively

This table presents descriptive statistics for variables used in computing our comparability metrics. We separate the table for those variables used for semi-annual, firm-level analysis (Panel A) and annual, industry-level analysis (Panel B). In Panel A, *RETURN* is semi-annual stock return; in Panel B, *RETURN* is computed from nine months before until three months after fiscal year end. *NI/P* is net income per share scaled by the stock price at the beginning of the fiscal period. *ASSETS* is total assets, in thousands. *MV* is the company's total market value, in thousands. *NIPS* is net income per share.  $\Delta$ *NIPS* is annual change in net income per share. *LOSS* is an indicator variable equal to one if the firm reports negative net income. All amounts are converted to Euros.

**Table 3**

Changes in Comparability for German U.S. GAAP and German IFRS firms

<i>Panel A: Comparability measure 1 for German U.S. GAAP and German IFRS matched pairs</i>								
	POST = 0 (n = 268)			POST = 1 (n = 262)			<i>t</i> -test	<i>z</i> -test
	Mean	Median	Std Dev	Mean	Median	Std Dev		
PredDiff1_USGAAP	0.183	0.067	0.291	0.078	0.033	0.131	5.33	5.75
PredDiff1_IFRS	0.148	0.057	0.204	0.073	0.039	0.105	5.29	3.93
<i>COMP</i> <sup>1</sup>	-0.159	-0.068	0.204	-0.076	-0.039	0.104	5.84	5.06
<i>MV_Ratio</i>	2.950	1.056	10.485	1.624	0.852	2.216	2.00	4.17

  

<i>Panel B: Comparability measures 2, 3, and 4 for German U.S. GAAP and German IFRS matched pairs</i>								
	POST = 0 (n = 117)			POST = 1 (n = 134)			<i>t</i> -test	<i>z</i> -test
	Mean	Median	Std Dev	Mean	Median	Std Dev		
PredDiff2_USGAAP	0.469	0.276	0.590	0.643	0.091	2.197	0.83	4.42
PredDiff2_IFRS	0.890	0.281	1.801	0.232	0.112	0.356	4.14	6.75
<i>COMP</i> <sup>2</sup>	-0.679	-0.330	0.954	-0.414	-0.142	0.978	2.17	5.98
<i>MV_Ratio</i>	3.047	1.102	11.164	1.728	1.017	2.184	1.34	2.22

This table presents the results of our comparability metrics and tests for significant differences between pre- and post-adoption periods for German U.S. GAAP and German IFRS firms. Panel A reports the results based on our first comparability metric, *COMP*<sup>1</sup>, calculated based on Equation (2). *PredDiff1\_US GAAP* denotes the absolute predicted value differences for a German U.S. GAAP firm based on applying its own and its corresponding matched IFRS firm's coefficients from Equation (2). *PredDiff1\_IFRS* denotes the absolute predicted value differences for a German IFRS firm based on applying its own and its corresponding U.S. GAAP firm's coefficients from Equation (3). *COMP*<sup>1</sup> is our first comparability metric computed as the mean of these absolute predicted differences. *MV\_Ratio* is the ratio of the market value of German U.S. GAAP firm to that of German IFRS firm in the matched pair, calculated at fiscal year-end.

Panel B reports similar results based on our second comparability metric. *PredDiff2\_USGAAP* denotes the absolute predicted value differences for a German U.S. GAAP firm based on applying its own and its corresponding matched IFRS firm's coefficients from Equation (3). *PredDiff2\_IFRS* denotes the absolute predicted value differences for a German IFRS firm based on applying its own and its corresponding German U.S. GAAP firm's coefficients from Equation (3). *COMP*<sup>2</sup> is our second comparability metric, computed as the mean of these absolute predicted value differences.

**Table 4**

## Changes in Comparability for German IFRS and U.S. Firms

<i>Panel A: Comparability measure 1 for German IFRS and U.S. matched pairs</i>								
	POST = 0 (n = 257)			POST = 1 (n = 262)			t-test	z-test
	Mean	Median	Std Dev	Mean	Median	Std Dev		
PredDiff1_US	0.149	0.092	0.166	0.073	0.040	0.097	6.40	6.91
PredDiff1_IFRS	0.162	0.092	0.184	0.069	0.037	0.102	7.21	7.67
$COMP^1$	-0.157	-0.095	0.166	-0.071	-0.039	0.092	7.37	7.80
$MV\_Ratio$	2.141	1.382	2.929	1.962	1.379	2.157	0.80	1.68

  

<i>Panel B: Comparability measures 2, 3, and 4 for German IFRS and U.S. matched pairs</i>								
	POST = 0 (n = 128)			POST = 1 (n = 134)			t-test	z-test
	Mean	Median	Std Dev	Mean	Median	Std Dev		
PredDiff4_US	0.783	0.467	1.326	0.594	0.304	1.018	1.30	2.04
PredDiff4_IFRS	1.360	0.533	2.275	0.784	0.214	1.524	2.42	4.43
$COMP^4$	-1.081	-0.580	1.318	-0.706	-0.385	1.019	2.58	3.76
$MV\_Ratio$	2.162	1.395	2.769	2.477	1.505	4.302	0.70	0.44

This table presents the results of our comparability metrics and tests for significant differences between pre- and post-adoption periods for German IFRS and U.S. firms. Panel A reports the results based on our first comparability metric,  $COMP^1$ , calculated based on Equation (2).  $PredDiff1\_US$  denotes the absolute predicted value differences for U.S. firms based on applying its own and its corresponding IFRS firm's coefficients from Equation (2).  $PredDiff1\_IFRS$  denotes the absolute predicted value differences for a German IFRS firm based on applying its own and its corresponding U.S. firm's coefficients from Equation (2).  $COMP^1$  is our first comparability metric computed as the mean of these absolute predicted value differences.  $MV\_Ratio$  is the ratio of the market value of U.S. firm to that of German IFRS firm in the matched pair, calculated at fiscal year-end.

Panel B reports similar results based on our second comparability metrics.  $PredDiff2\_US$  denotes the absolute predicted value differences for U.S. firms based on applying its own and its corresponding IFRS firm's coefficients from Equation (3).  $PredDiff2\_IFRS$  denotes the absolute predicted value differences for a German IFRS firm based on applying its own and its corresponding U.S. firm's coefficients from Equation (3).  $COMP^2$  is our second comparability metric, computed as the mean of these absolute predicted value differences.

**Table 5**  
Tests of the Incremental Benefit of IFRS Adoption

	COMP <sup>1</sup>		COMP <sup>2</sup>	
	Estimate	p-value	Estimate	p-value
Intercept	-0.152	<.0001	-1.097	<.0001
<i>POST</i>	0.086	0.0002	0.373	0.0035
<i>LOCAL</i>	0.001	0.9849	0.396	0.0042
<i>POST*LOCAL</i>	-0.007	0.8211	-0.098	0.6113
<i>MV_Ratio</i>	-0.003	0.0708	0.007	0.095
Model	6.148		6.799	
R-square	0.085		0.049	
Number of Observations	1052		513	

This table reports the results of our difference-in-differences approach from estimating Equation (1) to capture the incremental comparability benefit of IFRS adoption in the presence of convergence between U.S. GAAP and IFRS.

$$COMP_{i,t}^n = a_0 + a_1POST_t + a_2ADOPT_t + a_3POST*ADOPT_{i,t} + a_3MV\_Ratio_{i,t} + \varepsilon \quad (1)$$

$COMP_{i,t}^n$  denotes one of two comparability metrics ( $COMP^n$ ;  $n = 1$  or  $2$ ) for matched pair  $i$  in period  $t$ . In the table, the subscripts  $i$  and  $t$  are omitted.  $COMP^1$  is based on semi-annual, firm-level analysis and  $COMP^2$  is based on annual, industry-level analysis.  $POST$  is an indicator variable equal to one for observations after 2005;  $ADOPT$  is an indicator variable equal to one for matched pairs consisting of German U.S. GAAP and German IFRS firms;  $POST*ADOPT$  is an indicator variable equal to one for matched pairs consisting of German U.S. GAAP and German IFRS firms for observations after 2005.  $MV\_Ratio$  is the ratio of market values for matched pair  $i$ , computed as the market value of a German U.S. GAAP firm to that of a German IFRS firm or the market value of a U.S. firm to that of a German IFRS firm.



**Table 6**  
**Tests of Information Transfer**

	<i>German U.S. GAAP and German IFRS firm pairs</i>				<i>German IFRS and U.S. firm pairs</i>				<i>Pooled Sample: Incremental Effect</i>			
	<i>INFORMATION =</i>				<i>INFORMATION =</i>				<i>INFORMATION =</i>			
	<i>ABS_CAR_A</i>		<i>ABS_FE_A</i>		<i>ABS_CAR_A</i>		<i>ABS_FE_A</i>		<i>ABS_CAR_A</i>		<i>ABS_FE_A</i>	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.035	0.001	0.041	<.0001	0.035	<.0001	0.035	<.0001	0.034	<.0001	0.037	<.0001
<i>INFORMATION</i>	0.018	0.350	-0.012	0.077	-0.041	0.327	-0.063	0.054	-0.047	0.256	-0.083	0.008
<i>POST</i>	-0.019	<.0001	-0.012	0.000	-0.006	0.151	-0.004	0.205	-0.006	0.149	-0.004	0.214
<i>POST*INFORMATION</i>	0.134	0.004	-0.050	0.599	0.076	0.248	0.139	0.503	0.076	0.251	0.100	0.585
<i>NUMEST</i>	0.001	<.0001	0.001	<.0001	0.000	0.716	0.000	0.715	0.000	0.042	0.000	0.039
<i>SIZE</i>	-0.003	0.081	-0.004	0.015	0.000	0.915	0.000	0.666	-0.001	0.458	-0.001	0.129
<i>LOSS</i>	0.006	0.033	0.008	0.019	0.002	0.518	0.003	0.319	0.004	0.063	0.005	0.021
<i>LOCAL</i>	-	-	-	-	-	-	-	-	0.002	0.656	0.003	0.288
<i>LOCAL*POST</i>	-	-	-	-	-	-	-	-	-0.014	0.012	-0.009	0.044
<i>LOCAL*INFORMATION</i>	-	-	-	-	-	-	-	-	0.073	0.113	0.075	0.014
<i>LOCAL*POST*INFORMATION</i>	-	-	-	-	-	-	-	-	0.063	0.444	-0.209	0.297
<i>Industry dummies</i>	YES		YES		YES		YES		YES		YES	
Model	13.015		8.864		6.582		5.914		12.758		7.412	
R-square	0.0801		0.0751		0.0315		0.0315		0.0412		0.0381	
Number of Observations	952		952		1,543		1,543		2,495		2,495	

This table reports the results of our regression models to test for the improvement in information transfer due to adoption (based on German U.S. GAAP and German IFRS firm pairs) and convergence (based on German IFRS and U.S. firm pairs) based on estimating Equation (5), and the incremental effect of adoption (based on the pooled sample), based on estimating Equation (6).

Equation (4) is described below:

$$|CAR_{NA_{i,t}}| = \gamma_0 + \gamma_1 INFORMATION_{j,t} + \gamma_2 POST_t + \gamma_3 INFORMATION*POST_{j,t} + \gamma_4 NUMEST_{j,t} + \gamma_5 LOSS_{j,t} + INDUSTRY + \varepsilon$$

Equation (5) is described below:

$$|CAR\_NA_{i,t}| = \gamma_0 + \gamma_1 INFORMATION_{j,t} + \gamma_2 POST_t + \gamma_3 INFORMATION*POST_{j,t} + \gamma_4 NUMEST_{j,t} + \gamma_5 LOSS_{j,t} + \gamma_6 LOCAL + \gamma_7 LOCAL*POST_{i,t} + \gamma_8 LOCAL*INFORMATION_{i,t} + \gamma_9 LOCAL*POST*INFORMATION_{i,t} + INDUSTRY + \varepsilon .$$

*CAR\_NA* is cumulative abnormal return of a non-announcing firm to capture the market reaction of non-announcing firms surrounding corresponding announcing firm's earnings announcement. *INFORMATION* is equal to either the matched announcing firm's absolute value of abnormal stock returns (*ABS\_CAR\_A*) or analyst forecast error (*ABS\_FE\_A*). *ABS\_CAR\_A* is the absolute value of abnormal stock returns of announcing firm surrounding its earnings announcement. *ABS\_FE\_A* is the absolute value of announcing firm's analyst forecast error, measured as the difference between actual earnings and the most recent median earnings forecast, scaled by stock price at the beginning of the year. *POST* is an indicator variable equal to one if year *t* is after 2005, *NUMEST* is equal to the number of analysts providing forecast information for firm *i* in year *t*, *LOSS* is an indicator variable equal to one if firm *i* reports negative earnings in year *t*, and *INDUSTRY* represents dummy variables to control for industry fixed-effects.