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# Do your Findings Depend on your Data(base)? A Comparative Analysis and Replication Study Using the Three Most Widely Used Databases in International Business Research

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## ARTICLE INFO

## ABSTRACT

Theoretical and empirical advances in international business (IB) depend heavily on archival data obtained from databases. As there has been scant research on the implications of database choice in IB research, we analyzed data from the three most-widely used databases in the field: Compustat Global, Osiris and Worldscope. We examined data coverage across several geographic regions and countries, analyzed descriptive statistics and regression results, and replicated a study by O'Brien (2003), who theorized and found a negative firm performance effect of innovation strategy matched with high levels of debt governance. Based on our empirical results, we found the presence of what we call a "database effect" – researchers likely would come to a different conclusion based on the database used – particularly for developing country results. The database effect is confirmed using multiple estimation techniques and also in our replication study. Our replication study also found evidence that O'Brien's (2003) findings do indeed apply to countries outside of the United States. However, in China, we found statistically significant contrasting results in two databases, requiring a need for more theoretical reflection of firm governance of innovation in different institutional contexts.

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## 1. Introduction

Over 50 years ago, Merton (1957) emphasized how empirical research informs and initiates theory. More recently, Ketchen et al. (2013) highlighted how differences in the way variables are defined and measured may have both theoretical and empirical implications. For management research, particularly in international business (IB), the use of different databases for firm-level data implies inherent differences in data definitions, data sources, firm and geographic coverage. Coupled with differences in national reporting requirements and accounting practices, it stands to reason that IB-related research heightens the potential adverse effects of choosing one database over another, even though the choice very often is one of database availability and cost.

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The three most-widely used databases for IB research are Compustat Global (also called Global Vantage, distributed by Standard & Poor's), Osiris (distributed by Bureau van Dijk), and Worldscope (distributed by Thomson Reuters)[1]. To date, there has been little systematic attention given to the extent to which the data and results obtained using different databases are comparable generally and virtually none that we are aware of devoted to these three databases. In this study, we give substantial systematic attention to these three databases and describe the implications for IB research.

There are a number of key reasons why the potential adverse effects of database choice are heightened for IB research. First, non-uniformity in reporting and inconsistency in data standardization procedures to ensure comparability across countries may create discrepancies when trying to replicate results using different databases. Even an assumption that data provided by different data sources are comparable within Western Europe or North America, with standardized reporting practices and more homogenous sample frames (e.g., FTSE- or NYSE-traded firms, S&P 500 firms), has been questioned. For example, in the United States (US), researchers have found differences in ownership data (Anderson and Lee, 1997), mutual fund data (Elton et al., 2001), and analysts' forecast data (Abarbanell and Lehavy, 2000) reported by different sources. Similarly, Yang et al. (2003) found differences in the data reported by Compustat North America and Valueline (which only covers US firms).

Second, each of the three databases we examined uses different primary sources to compile its respective data (annual reports versus regulatory filing versus third-party suppliers). Compustat Global uses company-specific documentation and then standardizes the data to account for national differences in reporting practices (Standard and Poor's, 2011). Osiris makes use of a variety of data sources and providers, including other compilations of firm-level data that are unique to a particular country or industry (e.g., the Korea Information Service, Fitch Ratings, and Dun & Bradstreet TSR for Japan)—information is collected and processed by each provider. Osiris also makes use of World Vest Base (WVB) to obtain and analyze firm documents (Bureau van Dijk, 2011). Worldscope uses company-specific documentation and trained analysts to transfer the data into consistent formats for comparable cross-country analyses (Thomson Reuters, 2011).

Third, firm and country samples available from Compustat Global, Osiris and Worldscope also differ despite each database claiming to be relatively comprehensive in terms of global firm "coverage". *Potential* coverage is not identical and, as we discuss below, the *actual* coverage is far from identical. Country-specific differences in firm and country coverage may lead to biased conclusions, and inconsistent yearly samples may pose challenges for researchers using panel data. Alarmingly, one of the databases we examined entirely drops firms from inclusion in their database if they are subsequently delisted (from a stock exchange) or otherwise not subsequently covered. These differences in variable and firm data availability affect whether firms are included in the research sample, which introduces potential sample bias. These inconsistencies may be particularly consequential for the study of certain global geographic regions, which may receive less widespread and consistent coverage in secondary databases.

To address these concerns, we analyzed the comparability of data obtained from Compustat Global, Osiris and Worldscope. We documented data coverage by specific global regions and countries, compared descriptive statistics for common variables, and estimated regressions using reasonable variations in the type of estimation techniques used and in the geographic regions chosen for these regressions. We undertook this analysis using samples of firms that were included in all three of the databases (what we call "matched samples") and for samples of firms that would have been drawn if each of these databases were used on its own (what we call "unmatched samples"). This permitted us to compare the consistency of reporting across databases in the matched sample and to evaluate if database choice would yield different results through unmatched samples. Finally, we replicated a study by O'Brien (2003) on the firm performance implications of innovation strategy and debt governance. Our analyses allowed us to assess if and under which conditions a "database effect" occurred, which means that researchers likely would come to a different conclusion based on the database used.

Highlights of our findings are the following. First, each database provides a substantially different quantity of firms across different geographic regions. Second, differences in methodology related to the type of estimation technique used for regression analyses can either heighten or temper the differences in how common firm-specific variables affect firm performance, measured by return on assets and by a firm's market-to-book ratio. Third, database choice may not only affect empirical results for samples of firms from particular geographic regions such as Latin America and East Asia, but also may determine whether a study is even feasible in these locations using a particular database because of the paucity of data points available. Finally, our replication analysis suggests that database choice can have significant implications for empirical results. Developed-country results showed consistency across databases while developing-country results did not show consistency, and thus we observed a database effect for developing countries. We also found in our replication study statistically significant results across two databases that directly contrast results hypothesized and found by O'Brien (2003) in the US and found by us (in this study) in other countries. Overall, our results suggest that (the growing) research on firms from developing countries may be particularly vulnerable and or prone to spurious empirical results due to database choice. Below, we discuss these inconsistencies in more detail along with their implications for theoretical and empirical IB research.

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[1] These databases are by far the dominant sources of secondary data. As we discuss below we identified 879 articles making use of these data sources in major academic business journals during the period 2005–2012. We do not consider more specialized databases such as the Securities Database Corporation (SDC) mergers and acquisitions database, nor the Thomson Reuters Asset 4 Social Responsibility database, nor country-specific databases such as the NEEDS database on Japanese firms. We did not include DataStream, another commonly used database as it is used almost exclusively in research in finance, accounting, and economics. Indeed, we found that only 1.5% of studies using DataStream were in management. Further, Datastream primarily was used for country-level data and access to Worldscope data (both are Thomson Reuters products).