DOES INDUSTRY MATTER DIFFERENTLY IN DIFFERENT PLACES?

A comparison of industry, corporate parent, and business segment effects in four OECD countries

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ABSTRACT

A central stream in business strategy research explores the locus of firm rent generation by decomposing accounting profits into effects attributable to time, industry, corporate parent, and individual business segment. This paper expands the scope of this work by examining data on firms from Australia, Canada, and the United Kingdom as well as the United States and addressing the importance of understanding geographic influences on firm profits. The empirical analysis corroborates previous findings for the United States, namely that business-specific effects predominate in explaining variance in profits, although industry and corporate parent effects are significant of important magnitude. Cross-national comparisons demonstrate that this general pattern obtains in other countries as well, although results do vary across country. Results of estimates in the manufacturing sector provide further evidence of cross-country differences and suggest that explanations for locus of profit differences across country operate at levels less aggregate than the national level. In motivating the analysis the paper describes methodological and analytical considerations that arise from the introduction of regional influences into the examination of the locus of profits.

I. INTRODUCTION

Identifying and understanding the determinants of performance differences among firms is a central issue in strategy research. Beginning with Schmalensee (1985), a stream of empirical research has assessed the locus of firm profitability by parsing variance in business unit accounting profits into components associated with year, industry, corporate parent, and business unit.[1] A general consensus emerges from this work according to which factors at the business segment level contribute most substantially to explaining variance in profits, while corporate parent and industry effects are also significant but in successively lower magnitudes. Thus far analysis of advanced economies has been limited to samples of firms in the United States and has not addressed how location may impact observed results.[2] This focus has prompted prior authors to appeal specifically for international studies to supplement the insights of research on US-based firms (McGahan and Porter, 1998). This paper provides initial evidence on differences in the locus of accounting profits in Australia, Canada, and the United Kingdom, as well as the United States. In motivating the expansion of the dataset to multiple countries, the paper describes adaptations to the predominant methodology that address the possibility of regional variation in the strength of effects. As well, the paper speculates regarding the factors that might affect the extent to which industry, corporate parent, and business-specific factors contribute to profitability and the reasons that we might expect differences or similarities in results across regional (or national) economic environments.

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[1] The term "industry effects" is used in this literature to refer to the influence on profitability owing to membership in a particular industry. Similarly, the terms "corporate parent effects" and "firm effects" imply the influence on profits accruing to membership in a particular corporate family. Authors use "business unit," "business segment," and "business specific" effects to describe the influence on profitability attributable to the part of a corporate family working in a particular industry.

[2] Khanna and Rivkin (1999) investigate the locus of profitability among a sample of developing countries, in which they estimate the contribution of business group membership (an effect more broad and conceptually different from a corporate parent effect), along with industry and business segment effects.

Consonant with prior research in this stream, this paper employs a decomposition of variance approach, according to which variance in business-segment profitability is parsed into elements attributable to year, industry, corporate parent, and business segment. Whereas computational limitations constrained research in this line to estimation techniques which required numerous restrictive assumptions, recent advances in computing technology have enabled estimation by ordinary least squares (OLS) techniques. This is particularly advantageous because OLS does not involve the restrictive assumptions demanded by the components of variance (COV) and nested ANOVA techniques used by prior authors. The estimation procedure applied in this paper follows that introduced by McGahan and Porter (1998) and followed by Khanna and Rivkin (1999).

Consistent with prior studies on the United States, this paper's examination of international evidence finds generally (though not universally) that business-specific effects predominate in explaining variance in accounting profits. Generally as well, corporate parent and industry effects are found to be significant although smaller in magnitude than business-specific effects. Corporate parent effects in this sample are slightly greater than in previous work; in part, this result can be linked to characteristics of the dataset employed. National samples do, however, evidence important differences in the locus of accounting profits. Fortunately, this study's results for the United States using the Worldscope database are strikingly similar to those obtained with a similar methodology by McGahan and Porter (1998) on Compustat data. This similarity affords us confidence in using the U.S. results as a benchmark from which to comparisons across national samples. Also consistent with previous results (McGahan and Porter, 1997 and 1998), this study finds that the locus of profitability within countries differs somewhat for manufacturing relative to other sectors of the economy. Interestingly, however, cross-national differences at the aggregate level in some cases are not reflected in the same way in the manufacturing results. For example, while the business-specific effect for Australia is higher relative to other countries for the aggregate sample, it is lower than that of other countries in the manufacturing sector. This suggests that cross-national differences in the locus of profits are not determined solely by factors that vary at the national level, but by cross-national differences at less aggregate sectoral levels.

The remainder of the paper is structured as follows: Section 2 introduces the debate about the locus of profitability and discusses precedent literature. Section 3 describes the paper's econometric procedure. This section considers adaptations to the prevailing methodology that accommodate regional variation in the salience of effects. Section 4 and Section 5 present, respectively, the data and the results, highlighting where these differ from antecedent research. Particular attention is given to the source and limitations of the data. Section 6 concludes by discussing the implications of the econometric results, speculating about the factors that might contribute to variance in level effects across regions, and addressing the interpretation of studies of variance in accounting returns.

II. EMPIRICAL PERSPECTIVES ON THE LOCUS OF PROFITABILITY

Consistent with the seminal research of Schmalensee (1985) and Rumelt (1991), this paper pursues an approach by which variance in business segment profits is decomposed into elements associated with time, industry, corporate parent, and business segment.[3] Such empirical research is characterized by disagreement over the importance of industry, corporate parent, and business specific effects. At least in part, such differences in measured effects result from

[3] A number of alternative methodologies have been developed as well. See, for example, Hansen and Wernerfelt (1989), Powell (1996), and James (1997). In order to investigate the impact of diversification on performance, Wernerfelt and Montgomery (1988) develop a related methodology based on Tobin's q. Because firm business segments are not traded separately on stock exchanges, however, it is not possible to use this methodology to separately identify the contributions of industry, corporate parent, and business segments effects.

variation in statistical methods, empirical specifications, and underlying data sources.[4] While some debate continues, recent research using the decomposition of variance approach demonstrates a set of regularities that characterize variance in business-specific profits for US firms between the mid-1970s and mid-1990s. The review in this paper focuses on research in this stream.[5]

The literature's seminal paper, Schmalensee (1985), speaks directly to the debate within industrial organization between the "classical" view, in which firm differences are assumed to be unimportant or transitory and the "revisionist" view, which proposes that persistent differences in firm efficiencies manifest themselves in differential market shares. Schmalensee contrasts each of these perspectives with the "managerial" view, which postulates that differences in managerial vision and skills can provide contributions to firm profitability that generalize across line of business. Using the 1975 Federal Trade Commission lines-of-business reports, Schmalensee tests a specification in which business line accounting profits are modeled as functions of industry membership, firm membership, and business line market shares. The significance of each of these effects is viewed as a test of hypotheses regarding the explanatory power of the three views. The importance of industry membership variables would support the "classical" view, while the importance of firm and market share effects would support the "managerial" and "revisionist" views, respectively.

Schmalensee uses F-statistics derived from ordinary least squares (fixed effects estimation) on dummy variables to test for the *existence* of level effects. Finding that the inclusion of firm effects in models of industry effects does not add to the explanatory power of

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[4] See McGahan and Porter (1998) for an excellent review of research and methodologies, which reconciles a number of the methodological and data differences in the decomposition of variance studies.
[5] Although the decomposition of variance approach constitutes the most straightforward manner of examining the locus of profitability, it is subject to a number of inherent limitations, which are broadly recognized in the literature. Primary among these are the well-documented liabilities of using accounting returns as proxies for economic rents (see, especially, Fisher and McGowan, 1983). In addition, this research is subject to imprecision with respect to the way in which firms are assigned to industry.

those models, he concludes that firm effects (labeled *corporate parent effects* in subsequent research) are not significant. Contending that components of variance estimation is more useful for assessing the relative levels of the effects, he employs this approach in order to assess the relative importance of and market share effects. The results decidedly favor the classical view, offering no support for the revisionist or managerial views. Schmalensee finds that industry effects account for nearly 20 percent of the total variance in line of business profit, whereas market share effects are significant but account for an inconsequential fraction of the variance, and firm effects are insignificant.

As Schmalensee's study includes only one year of data, it cannot identify time-specific or business-specific effects. Using an expanded number of years (1974 – 1977) of data drawn from the same FTC line-of-business reports, Rumelt (1991) is able to expand the scope of analysis and address intertemporal variance in effects. Exploiting annual variance in industry returns, Rumelt decomposes industry effects into those which he labels transient (operationalized as industry*year interactions) and stable (operationalized simply by industry membership independent of year). While preserving the basic structure of Schmalensee's model, Rumelt modifies the business-specific specification. Rather than including market shares to proxy for factors specific to business units, Rumelt incorporates business unit specific dummies.

Rumelt's results (from both variance components and nested ANOVA) estimation differ from those of Schmalensee. Although the sum of transient and stable industry effects are approximately equal to Schmalensee's industry effect, business unit effects are found to be significant and account for a far more substantial fraction of the variation in profitability. Rumelt finds evidence as well that corporate effects do contribute to overall variance. Although these effects are somewhat larger in the nested ANOVA analysis, he reports on the basis of the variance components results that their impact is relatively small.

Studies in the most recent "generation" of this research stream expand the scope and duration of analysis, explore Rumelt's finding of curiously low corporate parent effects, and critically examine the estimation methodology. Roquebert et. al. (1996) and McGahan and Porter (1997), extend the analysis to longer and more recent time periods and, in the case of McGahan and Porter, to sectors other than manufacturing. These authors employ the Compustat files, which record business-specific activities (at the level of four-digit SIC codes) for corporations traded publicly in the United States. Compustat SIC-based business segments constitute a more broad measure of industry than do the FTC lines of business employed by Schmalensee and Rumelt. As a consequence, variance that might be attributed to industry (were industry definition more narrow) is attributed to business specific effects.

Roquebert et. al. apply Rumelt's econometric model to Compustat reports on only diversified firms in the manufacturing sector (SIC codes in the 3000s) from 1985 – 1991. They identify industry and business segment effects that are consistent with those of Rumelt, but find substantially stronger corporate parent effects than were present in other studies. As McGahan and Porter (1998) explain, this finding is related to Roquebert et. al. screening their sample to exclude non-diversified firms: Where non-diversified firms are included in the sample, their corporate parent effect is set to zero implicitly; this lowers the measured contribution of corporate parent effects to overall explained variance.[6] Hence, corporate parent effects are suppressed by the presence of nondiversified firms in the sample. Interpretation of measured corporate parent

[6] Note that the Roquebert et. al result replicates an earlier, unpublished finding of Kessides (1987), which obtains a significant corporate parent effect using the subset of Schmalensee's data that includes only firms with three or more lines of business. In reconciling differences among methods and results, McGahan and Porter (1998) replicate this finding with their own data.

effects should therefore take into consideration the extent of diversification in the sample. Excluding single segment firms yields incomplete and systematically biased industry rosters. As a result, this paper adheres to the standard of including nondiversified firms in the analysis.

McGahan and Porter employ the most comprehensive dataset in the literature, including Compustat reports from 1981 – 1994 on firms from non-manufacturing as well as manufacturing sectors. While leaving the basic structure of the Schmalensee-Rumelt econometric model unaltered, these authors innovate with respect to the method for accommodating intertemporal correlation among effects. In particular, they estimate models that do not specify industry-year interactions but that do correct for autoregression in residual business segment profits.[7] Their results strike a balance between those of Schmalensee and Rumelt. McGahan and Porter (1997) demonstrate persistent business-specific, corporate parent, and industry effects for both variance components and nested ANOVA techniques. Business segment specific effects account for the greatest fraction of explained variance, while industry effects are substantial, and corporate parent are significant but lower relative to other types of effects. The nested ANOVA technique yields similar results, although it explains a smaller fraction of the total variance.

At this point in the literature, Brush and Bromiley (1997) and McGahan and Porter (1998) examine a number of serious issues regarding the limitations associated with the nested ANOVA

[7] To be more precise, Rumelt parses out time-specific industry effects by including dummy variables for industry-year interactions; he concludes based on analysis of residuals that serial correlation in his data is insignificant for business segments and corporate parent effects. McGahan and Porter address these problems by modeling and estimating models corrected for autoregression in the residuals. This ignores the possibility that the rate of persistence changes by year (as Rumelt's methodology does for industry effects), but captures the possibility that serial correlation is present for each type of effect (which Rumelt's methodology does not). Ideally, one would want to decompose each effect into stable and year-specific components; however, including interaction effects for each year*effect component would result in the overspecification of the model.

and COV estimation procedures. In particular, the nested ANOVA procedure is constrained in that it is unable to accommodate covariance among effects. While components of variance analysis is robust to specifications of particular covariance effects, it requires the assumption that, for all firms, each effect is realized independent of all others – that is, for any particular coupling of time, industry, corporate parent, and business segment, each effect is drawn independently of all others. Empirical evidence suggests that this assumption is not defensible (McGahan and Porter, 1997). In addition, Brush and Bromiley (1997) illustrate the sensitivity and some drawbacks of the variance components technique through simulation exercises. Performing a Monte Carlo simulation on a dataset constructed to possess statistically significant and economically meaningful corporate parent effects, these authors demonstrate that COV substantially underestimates the magnitude of these effects. Finally, McGahan and Porter (1998) demonstrate that the nested ANOVA and COV techniques often disagree regarding the magnitude of effects within the same dataset.

As ordinary least squares regression requires none of the restrictive assumptions of these other techniques, it constitutes a preferred methodology. Limitations in computing power, however, prevented earlier researchers from estimating OLS models (which require the manipulation of extremely large and sparse matrices due to the thousands of dummy variables that enter into the analysis). Enabled by recent advances in computing power, McGahan and Porter (1998) present the first estimates employing ordinary least squares. McGahan and Porter are able to directly compute coefficients on dummy variables for classes of year, industry, corporate parent, and business segment effects in models of business segment profitability. The authors infer the importance of each class of effect as the magnitude of the incremental contribution to R^2 and adjusted R^2 of including each set of effects.

From McGahan and Porter's (1998) analysis and comparisons with other studies, a number of empirical regularities emerge regarding the decomposition of variance of accounting profits. The research consistently documents evidence of the existence of statistically meaningful year, industry, corporate parent, and business-specific effects for publicly held firms traded in the United States between the mid-1970s and 1990s. Business specific effects account for the greatest fraction of total explained variance, while industry and corporate parent effects contribute lesser yet substantial explanatory power, and year effects small but significant amounts to variance. Correcting for serial correlation in business segment returns does not alter the principal findings. As well, McGahan and Porter document that the relative magnitudes of effects differ across sectors of the U.S. economy. This finding raises questions about the extent to which the effects might also vary across regional economic environments, both within and across sectors, within the United States and across nation economies.

The relative importance of industry and corporate parent effects remains a source of debate in the literature: A number of authors address, in particular, the curiously small corporate parent effect obtained by Rumelt (see, Roquebert et. al., 1996; Brush and Bromiley, 1997; Brush, Bromiley, and Hendrickx, 1999; Bowman and Helfat, 2000). Brush, Bromiley, and Hendrickx (1999) develop an alternative estimation methodology in which business segment and corporate parent profits are endogenous variables simultaneously determined in a system in which industry effects and a firm-wide debt ratio are exogenous factors. In contrast to previous results, Brush, Bromiley, and Hendrickx's findings suggest that corporations have a larger effect on performance than industries.

While a number of alternative methodologies are conceivable, this paper employs OLS estimation techniques in a manner similar to those introduced by McGahan and Porter (1998) and followed by Khanna and Rivkin (1999), as this procedure involves the most straightforward evaluation of the importance of industry, corporate parent, and business segment effects. This choice has the added advantage of yielding results that are comparable with previous research in the decomposition of variance line. The next section presents the econometric methodology, describing extensions to accommodate data from multiple regions.

III. MODELING AND ESTIMATION

The core model

This section describes the model employed in this paper and discusses the choice of modeling technique. Table 1 lists variables and their definitions. A general consensus about the structure of the model used to examine variation in accounting profitability has emerged around Schmalensee's original formulation. This paper considers the variation articulated by McGahan and Porter as the "core model". In this specification, the accounting rate of return of each business segment is partitioned as:

$$(1) \qquad r_{i,k,t} = \mu + \gamma_t + \alpha_i + \beta_k + \phi_{i,k} + \varepsilon_{i,k,t}$$

where $r_{i,k,t}$ represents the accounting profit, measured by operating income divided by identifiable assets, of the business segment in industry *i*, with corporate parent *k*, in year *t*. Independent variables include: the average profit among all business segments across all years of the data (μ, referred to as the "grand mean"); the increment to average profit that is particular to year t (γ_t, the "year effect"); the increment particular to industry i (α_i, the "industry effect"); the increment particular to corporate parent k (β_k, the "corporate parent effect"); the increment particular to business segment i,k ($\phi_{i,k}$, the "business segment effect"); and random disturbance ($\varepsilon_{i,k,t}$). Following McGahan and Porter (1998), the model is estimated using ordinary least squares regression.

insert Table 1 about here

Accommodating data from multiple locations

While much prior research examines firms in the U.S. economy, this paper expands the dataset to include firms from multiple countries, thus raising questions about how profitability may differ across national environments. It is important to note that national (or regional) factors can exert influences on both the *level* and *locus* of profitability. While the primary interest of this paper regards the locus of profitability (i.e., the extent to which differences exist across countries in the magnitudes of industry, corporate parent, and business segment effects), it is conceptually useful to discuss briefly location-specific influences on the level of profits.

At an aggregate level, observed differences in profit levels across locations may be obtained as either as the by-products of accounting convention or as a result of real differences in economic performance. Real differences in profits across national environments would arise, for example, if a particular economic system generates firms that systematically outperform those of other countries.[8] At the same time, national economic environments may influence the increment to profit accruing to each particular class of effects. For example, building on the conceptual framework developed by Porter (1990), Thomas (1994) argues that differences in the regulatory and institutional regimes of the U.K. and France explain performance differences among firms in the pharmaceutical industry of each. While this example focuses on an interaction at the level of the nation-industry, one could generate similar cases in which profit levels are affected by country interactions with time, corporate parent, or business segment.[9]

Relative to research considering differences in profit levels across countries, conceptual literature explicitly examining the locus of firm profitability is less well developed. In the viewpoint of classical industrial organization, according to which industry structural characteristics determine

[8] For example, Albert (1993) presents a perspective from the mid-1990s for how different versions of capitalism across countries might lead to differentially performing firms.

firm performance, differences across country would not be expected. Differences in national institutional and regulatory structures may, however, give rise to differences in the observed magnitude of effects. For example, in countries with either especially weak anti-trust laws (e.g., tolerant of cartels) or especially strong industry-level regulation, differences in profits among firms in an industry would be diminished (e.g., by collusion, in the first case, or fiat, in the second). As a result of reduced intra-industry variance, countries in these cases would be characterized by lower business-segment effects and relatively higher industry effects than other countries. While not making substantive hypotheses regarding differences in the locus of profitability across countries, this paper examines the sensitivity and overall variability of the decomposition of variance findings to national contexts other than the United States.

In order to compare the extent to which the locus of profitability differs across country, however, I estimate separate models for Australia, Canada, the United Kingdom, and the United States. As evidence regarding the locus of profitability, I examine differences across country in the relative increments to R^2 (adjusted R^2) explained by introducing each class of effects. As is true for profit levels across countries, observed differences in the locus of profitability may derive from accounting differences rather than real economic differences. For this to be true, however, accounting convention would need to drive differences in the extent to which *variance* in profits are explained by industry, corporate family, or business segment.

Measurement issues

A number of measurement issues arise when considering samples of data from multiple locations. A primary consideration is that in order to be precise in measuring the importance of

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[9] Note that this reasoning could be extended to regional as well as national levels of analysis.

industry membership, it may be necessary to disaggregate regional from common (or global) industries. Consider the case where every supermarket in the Eastern part of the United States earns 10 percent profits (while competing only with other supermarkets in the East), while each supermarket in the West earns returns of 20 percent (competing only with other supermarkets in the West). Omitting an East-West regional effect from this model would obtain inappropriately low industry effects, as profit tendencies that are common within this regional industry are instead attributed differences in profits at the business-specific level. This issue is the locational equivalent of McGahan and Porter's (1997) observation that increasing the breadth of the definition of industry has the impact of increasing business segment effects relative to industry effects (by increasing variance in returns within industry). Such measurement imprecision biases downwardly industry effects in the Compustat and Worldscope data relative to data sources which utilize more precise industry definitions (e.g., the FTC line of business data) and provide profits data disaggregated by region*industry.[10]

Another difficulty that arises from the fact that data are not disaggregated by region*industry is the possibility that profit streams are attributed into inappropriate regions. Suppose that the retail sector of a clothing manufacturer is located in Canada while the rest of the firm is located in the United Kingdom. If the fixed effect for the Canadian retail clothing industry exceeds that for the U.K., a portion of profits earned by a U.K. retail clothier performing at the mean of the Canadian clothing industry will be attributed to a business-specific effect, although these actually derive from a country-specific effect. Measurement issues notwithstanding, the Worldscope dataset used in this study represents the best-available large scale data source reporting SIC level profits for firms in advanced economies.

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[10] Worldscope provides asset and income data disaggregated separately by geographic region and by SIC, but not by region*industry.

IV. DATA

As introduced above, the data for this study are drawn from the Worldscope database. Worldscope is an international database that records company profiles and detailed historical financial data for public corporations. It is maintained by the Primark Financial Information Division from the filings of public companies in their home countries. The complete database contains records on more than 13,000 companies drawn from more than 50 countries. Currently, it appears to be the only major international corporate databases that has compiled historical data on operating income and identifiable assets at the product segment as well as corporate level.[11] Based on the knowledge of the company and its public reports, Worldscope analysts assign a U.S. four digit primary SIC code to each product segment. As a result, Worldscope industry classifications should be roughly comparable across countries.

The data for this study include reports from 1992 to 1996 on firms in Australia, Canada, the United Kingdom, and the United States. These were obtained directly from Worldscope as a special download from their in-house masterfile.[12] This download includes only those firms that disaggregate operating income and assets figures by product segment within the company. It therefore constitutes a subset of the complete Worldscope dataset.[13] Non-diversified firms, i.e., firms that report only one product segment, are included in the sample if they report total operating

[11] The reporting of earnings and asset information at the product segment or industry level varies by country. Few countries require firms to report such disaggregated data. As a result, the Worldscope product segment data are at different levels of completeness for different countries. For example, the database reports product segment operating income and identifiable assets for only a few of the largest continental European firms in all years and for very few firms Japan in all years prior to 1996 (although these data are reported for a high fraction of Japanese firms in 1996). Reliable product segment-level profitability data for Australia, Canada, and the United Kingdom appear in the dataset beginning in 1992.

[12] I am particularly grateful to Matt Menheneott of Worldscope for his efforts in providing me with these data.

[13] As there may be systematic differences between those firms that do and do not report product segment returns, it would be desirable to check whether corporate returns differ for those reporting product segment returns against those that do not. This is not possible with the current dataset, but could performed as an

income and identifiable assets. As nearly all of the firms in the Worldscope masterfile report profitability data at the corporate level, the sample extract contains nearly all off of the non-diversified firms in the Worldscope database. The fraction of diversified firms in the entire Worldscope database reporting disaggregated profitability measures is substantially lower than unity. In consequence, the resulting sample very likely underrepresents the total number of diversified firms. As non-diversified firms are defined to have a zero corporate parent effect, the overrepresentation of single segment firms in the sample is expected to bias downwards the estimated impact of corporate parent effects.

While Worldscope contains data on up to ten SIC classifications for each of the firms in its database, the sample used in this study limited in that it contains product segment data for only the six largest of the ten segments for which Worldscope records data.[14] As observations from corporate parents with six business segments constitute fewer than one percent of observations, it is unlikely that this restriction has an impact on the results relative those that would obtain were the dataset to include up to ten segments.

Table 2 summarizes the number of observations in each category for each country both before and after applying data screens. (Appendix Table 1 provides annual detail.) The dataset is screened according to the following criteria:[15] Observations are omitted if they appear in either financial (SICs in the 6000s) or government (particular SICs in the 9000s). Banks and depository institutions are excluded because returns in this sector are not comparable with those of other

exercise in the future. This is only important for this exercise, however, if we have reason to expect levels effects to differ according to relative firm performance.

[14] Like Worldscope, Compustat records up to ten data for up to ten business segments per corporate parent; prior to screening, the Roquebert et. al. and McGahan and Porter datasets include the full set of available observations. Stipulated as a condition for receiving the data, the smallest four segments are excluded from the sample; they are not aggregated into the sixth product segment.

[15] These criteria are similar to those applied by McGahan and Porter with the exception that observations are not excluded based on size.

industries (see McGahan and Porter, 1997). Segments identified with the government SIC codes are excluded because they likely represent organizations that do not participate in competitive markets. A negligible proportion of business segments are purged for having SIC codes labeled "not elsewhere" classified, and which therefore belong to an industry classification for which we have no reason to expect a sensible industry effect. A small number of observations are also omitted which record business segments in an industry that exists for only one year. An important final exclusion eliminates segments that constitute the only observation in their SIC code, as it is not possible to separate industry from business segment effects in these data. As competitive pressures are arguably different in monopoly, sectors, we may want to exclude these from analysis independent of statistical considerations. Whereas previous studies exclude segments with sales or assets less than $10 million, the current study makes no exclusions based on firm size.

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insert Table 2 about here

The screens affect different countries differently (Appendix Table 2 provides detail on observations lost due to screening.). The United States sample loses less that 20 percent of its original observations, while greater than 50 percent of initial observations are excluded for Australia. More than 95 percent of the exclusions come from the financial sector and from screens on "monopoly" sectors for which the data report only one firm in the industry. Excluding monopoly sectors eliminates more than 30 percent of observations from the Australian and Canadian samples, but affect the US and UK samples less substantially. This illustrates one of the limitations of the data; although the Worldscope database provide the most comprehensive coverage of business sector profitability data of any source I identified, its within country coverage is nonetheless incomplete. In general, larger firms report profit data disaggregated by SIC code; we would therefore expect that results for Australia and Canada are biased towards those industries in which larger firms compete.

The screened dataset contains 763 business segment observations for Australia; 1,264 for Canada; 7,048 for the United Kingdom; and 13,272 for the United States. By way of comparison, Schmalensee's dataset included 1,775 observations on manufacturing lines-of-business in the United States, while Rumelt's main dataset contained 6,931 observations across four years. McGahan and Porter's Compustat sample includes an average of 72,742 observations, an average of 5,196 per year. The annual data coverage for the United Kingdom and the United States is therefore comparable to or greater than that of previous studies; annual samples for Canada and Australia are substantially smaller, however.

Table 3 presents average measures of industry size, corporate diversification, and data segment longevity, by country. The average industry size is smaller in these data than in previous studies. While the average industry includes fewer than five segments in Australia, Canada, and the United Kingdom and fewer than seven segments in the United States, McGahan and Porter (1997) report approximately 10.1 business segments per industry for their US sample. This observation is consistent with the fact that this dataset does not cover as great a fraction of firms in the economy as does the McGahan and Porter Compustat data. Both the fraction of firms that are diversified and the degree to which diversified firms are diversification differs across countries in the data. Only approximately 30 percent of Canadian corporate parents are diversified in the sample, while nearly half of UK corporate parents are diversified. In addition, the average number of segments per diversified corporate parents is higher Australia and UK than in the US or Canada. This may have implications for the magnitude of observed corporate parents effects. On average, observations appear in the country data between 3.7 and 4.0 years.

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insert Table 3 about here

Table 4 reports the sample averages of operating income, assets, and profit for each country. (Appendix Table 3 presents annual figures.) Table 4 reports the sample averages of operating income, assets, and profit for each country across the five years of the sample. (Appendix Table 3 presents data disaggregated by year.) These figures reveal a number of differences across the national samples. Foremost among these are differences in measured assets, which derive in part from variance in the way that accounting data are reported. Specifically, while firms in Australia, Canada, and the United States report *total assets* at the business segment level, firms in the United Kingdom typically report *net assets* (equal to total assets minus current liabilities). As a result, observed average asset levels in the Worldscope data are substantially lower (and observed profitability accordingly higher) for business segments in the United Kingdom than are those of other national samples. While this fundamental accounting difference raises some concern regarding the comparability of U.K. data, it should not critically impact the results of this paper unless the way in which assets are measured has an impact on the observed contribution of business segment, corporate parent, and industry effects to explained variance in profitability. Further, while asset magnitudes are not directly comparable between the United Kingdom and other national samples, mean levels of operating income are similar among the business segments from Australia, Canada, the U.K.

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insert Table 4 about here

Among those countries whose business segment asset data reflect total assets, differences in size and profitability are observed. The United States segments are approximately one-third larger than those of Canada and twice the size of those in Australia. Profitability levels are more similar, however, ranging from nearly seven percent to nearly ten percent in the United States. It is worthwhile to note that the United States data obtained from this Worldscope sample are of similar asset and profitability levels to those used McGahan & Porter's Compustat files. Note, again, that differences in size and profitability across countries may reflect real differences in distinctions in national accounting practices that are not captured by Worldscope documentation.

V. EMPIRICAL RESULTS

Results at the national level

This section presents results of estimations of the "core model" on firms from Australia, Canada, the United Kingdom, and the United States for the five year period 1992 to 1996. Models are estimated using ordinary least squares.[16] Figures 1 – 4 report ANOVA results for Australia, Canada, the United Kingdom, and the United States, respectively. These figures are similar to those presented by Schmalensee and McGahan and Porter (1998). The four results at the topmost level of each figure reflect models in which only one class of effects is included. Each subsequently lower level incorporates one additional class of effects into the model. The second level adds industry, corporate parent, and business specific effects to models with year effects. The third level adds a third class of effects to the models of the second level. The fourth level presents results for a model that includes all classes of effects.

[16] Benchmarking on previous findings that serial correlation does not importantly alter the relative importance of effects (McGahan and Porter, 1998, and Rumelt, 1991), I do not present estimates which adjust for intertemporal correlation in the residuals.

The order of addition is important to interpreting the impact of effects. As in McGahan and Porter (1998), this paper focuses its discussion on the addition of effects in the following order: year, industry, corporate parent, and business-specific effects. This technique measures the importance of each effect as the incremental contribution to R^2 of the addition of dummy variables associated with that class of effects.[17] In essence, it asks how much more of the business specific variance in accounting profitability is explained by including each additional class of effects.

Lines connecting models across levels report the results of F-test of the significance of adding the next class of effect. Tests significant with greater than Pr = .90 are reported.

Tables 5a and 5b summarizes the results portrayed in Figures 1 – 4. An important initial finding is that the results obtained for the United States data in this sample are strikingly similar to those obtained by McGahan and Porter using Compustat data. Considering the differences in the data sources, the similarity in aggregate US results for the Worldscope data and the McGahan and Porter Compustat data is remarkable.[18] For business segments in the United States, the model explains a similar fraction of variance in the Worldscope and Compustat data. Industry and corporate parent effects are comparable in both U.S. samples, although the Worldscope estimates of industry effects are slightly larger. The total variance explained in the Worldscope data is also quite similar that obtained in the McGahan and Porter data (both with respect to ordinary R^2 and

[17] It is important to note that, in practice, estimation of models that include business specific dummies with either industry dummies or corporate parent dummies fail the Gauss-Markov conditions, as the full set of business specific dummies is perfectly collinear with each other class of dummy variables. As a result, the increment in explanatory power resulting from adding business specific effects to a model which includes year, industry, and corporate parent effects is inferred to be the difference between (1) the R-squared for the model which includes year, industry, and corporate parent dummies and (2) R-squared for the model which includes year and business specific effects.

[18] Because the difference in screening methodology is critically important to interpreting the levels of effects, I do not compare the results to Roquebert et al.

adjusted R^2). Benchmarking based on these similar US results provides a context for thinking about cross-country differences.

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insert Tables 5a & 5b about here

At first observation, the national samples evidence a rough commonality in the magnitudes of measured effects. Year effects explain a rather small proportion of variance and often enter insignificantly into the models. Business segment effects generally predominate, while industry effects and corporate parent effects explain important but less substantial fractions of the variance in profits. Overall R^2 is also relatively similar across national samples, ranging from 52.5 percent for Canada to 77.7 percent for Australia. While we cannot reject the hypothesis that important differences in accounting procedures or data measurement affect the results of this analysis, the resemblance of estimated effects across national samples suggests that some worthwhile findings might come from examining these data.

These similarities notwithstanding, differences across national samples in the relative magnitudes of effects are evident and are in some cases quite stark. Industry effects in Canada constitute one example. While industry effects range between 11 percent and 19 percent of ordinary R^2 in other national samples and register magnitudes less than half those of business segment effects, Canadian industry effects exceed 30 percent and are nearly twice the size of measured business segment effects. These differences are even more conspicuous when considering adjusted R^2.

The United Kingdom presents an exception with regard to corporate parent effects. While in all other national samples, corporate parent effects are less than half as great as business segment effects (considering either ordinary or adjusted R^2), corporate parent effects are approximately as substantial as business segment effects in the U.K. data. In part, this result is driven by the fact that the U.K. sample contains the highest fraction of diversified firms in the dataset. Whereas the corporate parent effect is implicitly set to zero for more than 65 percent of firms in each of the other national samples, only slightly more than 50 percent of the U.K. sample has no measured corporate parent effect.[19]

Results for manufacturing sectors

Firms in the manufacturing sector constitute an interesting subsample for closer examination. While earlier research examines only firms in manufacturing industries the McGahan and Porter COV and OLS results suggest that effects in the manufacturing sector (SICs in the 3000s) differ systematically from those found in other sectors of the economy. Specifically, their comparison of OLS results report similar corporate parent effects but slightly lower industry and business specific effects in manufacturing than in other sectors. As well, their OLS models explain a smaller fraction of variance in manufacturing than in other sectors.

Tables 6 and 7 presents summary data on firms in manufacturing sectors in each country. Table 8 abstracts the results of ANOVA output for estimations using these data. For United States manufacturing industries, there results are generally consistent with previous findings back to Rumelt (1991): business specific effects predominate, while corporate parent and industry effects are consequential but contribute less to explanatory power. For manufacturing as well as for the aggregate sample, the Worldscope U.S. data obtain effects that are similar to those found

[19] If the use of net assets (as opposed to total assets, which are used in all other country samples) increases the correlation among business segment profits in diversified U.K. firms, then the accounting peculiarity to which these data are subject will also increase measured corporate parent effects. This result would obtain, for example, if U.K. firms allocate current liabilities across segments in order to "smooth" observed profitability across segments to a greater degree than firms in other national samples engage in profit smoothing with operating income and total assets.

by McGahan and Porter's OLS analysis on Compustat data. Similar to these, the Worldscope sample obtains slightly lower industry effects (although higher corporate parent and business segment effects) in the manufacturing sector than in the aggregate national sample. Each class of effects is observed to be slightly larger in the Worldscope data than in the Compustat data.

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insert Tables 6 and 7 about here

Before contrasting manufacturing results with aggregate results or comparing results across countries, it is important to consider the qualities of the national manufacturing samples. Limiting the sample to business segments with SICs in the 3000s significantly reduces the number of observations in each sample. The resultant impact on the qualities of the Australian and Canadian samples is especially dramatic. These manufacturing samples for these countries include fewer than 200 total observations, representing fewer than 20 industries, and at most 5 diversified firms. It is most remarkable, then, that the data for the reduced manufacturing samples generally reproduce patterns observed in the aggregate national samples. For example, explanatory power of both industry and business segment effects remain substantial in each sample. In the Australian manufacturing sample, the fraction of variance explained by business specific effects nearly matches that explained in the aggregate sample. Similarly, industry effects are found to have comparable magnitudes in the Canadian aggregate and manufacturing results.

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insert Tables 8a and 8b about here

While results for manufacturing samples are roughly similar to national aggregate results, some findings diverge from this pattern. In particular, observed industry effects in the Australian manufacturing sample and business specific effects in the Canadian manufacturing sample greatly exceed those found in aggregate national results.

Observed corporate parent effects are also smaller in the Australian and Canadian manufacturing data. This result can be traced at least in part to the extremely low fraction of firms diversified within the manufacturing sector. For the United Kingdom and the United States, in which the fraction of diversified firms in manufacturing is not appreciably lower than in the aggregate sample, measured corporate parent effects are similar.

VI. DISCUSSION

This paper extends the literature on the locus of firm profits by comparing year, industry, corporate parent, and business specific effects across Australia, Canada, the United Kingdom, and the United States. Foremost, the analysis (1) corroborates previous findings regarding the magnitudes of each class of effects in explaining variance in firm profits in the United States and (2) demonstrates a pattern of roughly similar results when the scope of the analysis is extended to other advanced economies. The Worldscope data used in this paper and the Compustat data used by McGahan and Porter are sufficiently different datasets that they provide a useful test of problems in sampling and distribution: that the results of the OLS models in the separate studies return relatively similar aggregate and manufacturing results for the United States supports the hypothesis that the set of effects obtained represents a robust, statistically meaningful empirical pattern. These similarities also constitute a point of reference from which to consider cross-national differences. Generally (although not universally), these results suggest that certain empirical regularities hold across national economic environments: Business specific effects contribute most substantially to explaining variance in profits, while corporate parent and industry effects are successively smaller. Cross-national aggregate data evidence important departures from the general pattern as well. In the case of Canada, for example, industry effects contribute more to explanatory power than other effects, whereas for Australia, the UK, and the US business specific effects are roughly twice as large as industry effects.

This study also replicates the important result that effects vary across sector within countries. This is demonstrated here by estimations on firms in manufacturing industries. In the national data for the Canada, for example, business specific effects explain 16.7 percent of variance in profits, whereas they explain 29.9 percent within the manufacturing sector. This implies that industrial composition is one factor that accounts for differences in effects at the level of the national economy. If, for example, particular sets of industries are characterized by high industry effects, aggregate national differences may emerge from countries having different proportions of those industry sets.

By comparing the locus of accounting profitability across economic sectors both within as well as across countries, we can more make more precise statements about whether how effects are different in different countries. Suppose results obtain in which the magnitudes of industry, corporate parent, and business segment effects differ across countries but are essentially similar across economic sectors within countries. This would support the hypothesis that national-level factors (either real or accounting-related) influence the measured locus of profitability. The data in this paper tell a slightly more complex story. The U.K. and U.S. results, for example, obtain similar magnitudes for both national aggregate and manufacturing sector estimations. Somewhat differently, however, business segments effects in Canada and industry effects in Australia are substantially larger in the aggregate samples than in the manufacturing samples. Further, while

Canadian industry effects exceed those of all other countries in the national aggregate samples, industry effects in the manufacturing are greatest for Australia.

These findings suggest that parsimonious explanations for cross-national differences in the locus of profitability may not operate at the level of the country. Rather, they suggest that any explanation of cross-country differences in locus of firm profitability include propositions to explain variance in effects at the country*sector level. Overall, there is little conceptual and empirical literature in business policy which considers differences in the locus of profitability across countries – although the results of such examination would be of potential benefit for both the academic and business and public policy-making communities. It is hoped that the results of this paper may spur deeper inquiry into this subject.

The introduction of geographic considerations to the analysis yields, as well, methodological implications for the locus of profitability literature. It would be conceptually ideal to parse income streams region within country and to generate regional fixed effects to directly assess the impact of location on firm profitability. Unfortunately, however, the data available to this (as well as prior studies) neither allow us to decompose national samples into regional units nor to attribute income and assets by region*industry. Thus, all business segments in the same SIC within a country are classified as within the same "industry" and measured as if they were subject to the same influences on profits. If, however, national industries consist of relatively separate, localized markets, differences in market-average profits across regions will be misattributed as business specific variations. The result that effects vary across country as well as sector implies that distortions arise from specifying industry at the national level when true effects vary by region. The result of measuring industry imperfectly will be smaller industry effects and larger business-specific effects than would be obtained were industry more precisely measured.

The multi-national decomposition of variance exercise performed in this paper is useful both for identifying empirical regularities in the data (upon which theory may build) and for identifying interesting areas for further exploration. In this study, the differences in the magnitudes of effects across country suggest deeper inquiry, as do the differences across sectors within country. The divergent findings for the United States and Canada, both at the national level and within manufacturing, suggest that there may be fundamental differences in the influence of national economic environments on the locus of profits even for firms competing in the same markets. In addition, the use of OLS techniques to estimate effects directly represents a significant improvement over variance components and nested ANOVA methods. While research to date has focused on examining the extent to which classes of effects explain profit variance, a potentially insightful approach would examine the coefficients on industry, corporate parent, and business segment more directly as these are direct measures of the impact of each of these levels on profits.

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TABLE 1
Definitions of variables

Variable	Definition
r	Accounting profit, defined as ratio of operating income to net assets
γ_t	Set of dummy variables for year
α_i	Set of dummy variables for industry, where industry classifications 4-digit SICs
β_k	Set of dummy variables for corporate parents
$\phi_{i,k}$	Set of dummy variables for business segments, where business segments are indexed by corporate parent * industry
θ	Set of dummy variables representing regions (countries). Regional effects may be fixed effects or may interact with time, industry, corporate parent or business segments.
ρ	Measure of serial correlation
ε	Random error, uncorrected for serial correlation
ω	Random error, corrected for serial correlation

TABLE 2
Number of unique observations in each category of effect across all years, by country

Category of effect	Australia	Canada	UK	USA
Pre-screened data				
Number of industries	230	262	745	858
Number of firms	184	277	1,036	2,280
Number of diversified firms (corporate parents)[a]	108	154	689	1,192
Number of business segments	442	503	2,360	4,087
Total observations in all years	***1,620***	***1,882***	***8,292***	***15,135***
Screened data				
Number of industries	56	86	411	510
Number of firms	121	218	905	2,084
Number of diversified firms (corporate parents)[a]	36	60	438	717
Number of business segments	194	309	1,782	3,398
Total observations in all years	***690***	***1,142***	***6,096***	***12,390***

[a] Note that the number of corporate parents in the sample is equal to the number of *diversified* firms. This arises because a corporate parent effect cannot be identified separately from a business segment effect for non-diversified firms.

TABLE 3
Average measures of industry size, corporate diversification, and data segment longevity, by country (screened data only)
Aggregate national samples

	Australia	Canada	UK	USA
Number of segments per industry	3.5	3.6	4.3	6.7
Fraction of firms that are diversified	29.8%	27.5%	48.4%	34.4%
Number of segments per diversified corporate parent	3.02	2.52	3.00	2.83
Number of years that business segment appears in sample	3.56	3.70	3.42	3.64

TABLE 4
Average business segment profitability, by country
Aggregate national samples

	Australia	Canada	UK	USA	McGahan & Porter (1994)
Operating income ($millions)	52.0	61.4	51.9	120.3	N/A
Identifiable assets ($millions)	577.3	863.4	327.5	1,139.8	1,161
Profit (operating income / identifiable assets)	6.8%	8.1%	17.8%	9.9%	9.0%

TABLE 5A
Contribution to explanatory power (ordinary R^2) by type of effect:[a]

	Australia	Canada	UK	USA	McGahan & Porter 1981-1994	McGahan & Porter 1985-1994
Year	0.6%	0.4%	0.1%	0.1%	0.8%	0.2%
Industry	19.1%	30.3%	11.4%	14.5%	9.6%	11.4%
Corporate Parent	9.8%	9.0%	22.9%	13.5%	12.0%	14.2%
Business Specific	48.8%	16.8%	24.5%	40.0%	37.7%	41.1%
Full Model	77.7%	56.5%	58.8%	68.1%	60.1%	66.9%

TABLE 5B
Contribution to explanatory power (adjusted R^2) by type of effect:[a]

	Australia	Canada	UK	USA	McGahan & Porter[b] 1981-1994
Year	0.0%	0.1%	0.0%	0.0%	0.8%
Industry	12.2%	24.8%	5.0%	10.9%	8.9%
Corporate Parent	5.5%	5.9%	18.7%	9.3%	8.8%
Business Specific	51.0%	9.4%	18.1%	35.8%	32.5%
Full Model	68.7%	40.2%	41.8%	52.5%	51.0%

[a] Note that the contribution to explanatory power is measured as the increment to ordinary or adjusted R^2 resulting from adding the class of effect to a model which contains only those effects listed above it in the table. For example, the increment attributed to industry effects is computed as the increase in explanatory power of a model which contains both industry and year effects over a model containing only year effects. The increment to year effects refers to the R^2 for a model which includes only year effects, that is the incremental explanatory power relative to a model with no effects.
[b] McGahan and Porter report adjusted R^2 only for their complete sample.

TABLE 6
Number of unique observations in each category of effect across all years, by country, Manufacturing sector only (SICs in the 3000s)

Category of effect	Australia	Canada	UK	USA
Number of industries	13	19	136	185
Number of firms	28	44	312	823
Number of diversified firms (corporate parents)[a]	3	5	133	230
Number of business segments	32	49	555	1,219
Total observations in all years	***107***	***176***	***1,869***	***4,450***

[a] Note that this row reflects the number of firms diversified *within the manufacturing sector.* As all non-manufacturing segments are excluded from the sample, firms diversified into other sectors but not diversified within the manufacturing sector appear as non-diversified firms. Remember, as well, that the number of corporate parents in the sample is equal to the number of *diversified* firms in the sample. This arises because a corporate parent effect cannot be identified separately from a business segment effect for non-diversified firms.

TABLE 7
Average measures of industry size, corporate diversification, and data segment longevity, by country
Manufacturing sector only (SICs in the 3000s)

Average	Australia	Canada	UK	USA
Number of segments per industry	2.5	2.6	4.1	6.6
Fraction of firms diversified (within manufacturing)	10.7%	11.4%	42.6%	27.9%
Number of segments per diversified corporate parent	2.33	2.00	2.83	2.72
Number of years that business segment appears in sample	3.34	3.59	3.37	3.65

TABLE 8A
Contribution to ordinary R^2 in manufacturing sector (SICs in the 3000s) by type of effect:[a]

	Australia	Canada	UK	USA	McGahan & Porter[b]
Year	2.7%	2.5%	0.1%	0.5%	1.1%
Industry	42.7%	31.1%	7.7%	12.7%	7.1%
Corporate Parent	0.6%	4.6%	21.0%	15.0%	12.0%
Business Specific	45.9%	29.9%	25.2%	40.8%	35.2%
Full Model	91.9%	68.1%	54.0%	68.9%	55.4%

TABLE 8B
Fraction of adjusted R^2 in manufacturing sector (SICs in the 3000s) by type of effect:[a]

	Australia	Canada	UK	USA	McGahan & Porter[b]
Year	-1.2%	0.2%	0.0%	0.4%	
Industry	36.8%	23.9%	0.4%	8.9%	Not
Corporate Parent	-0.7%	3.3%	16.4%	11.4%	Provided
Business Specific	53.0%	27.2%	17.6%	36.4%	
Full Model	87.9%	54.6%	34.4%	57.2%	

[a] Note that the contribution to explanatory power is measured as the increment to ordinary or adjusted R^2 resulting from adding the class of effect to a model which contains only those effects listed above it in the table. For example, the increment attributed to industry effects is computed as the increase in explanatory power of a model which contains both industry and year effects over a model containing only year effects. The increment to year effects refers to the R^2 for a model which includes only year effects, that is the incremental explanatory power relative to a model with no effects.
[b] These are replicated from McGahan and Porter's results for the manufacturing sectors uncorrected for serial correlation (Column 1, Table 5,1998).

FIGURE 1
Results for Australia
ANOVA statistics from ordinary least squares estimation on core model[a]

Null Model

	(Model 1-1) Year Effects	(Model 1-2) Industry Effects	(Model 1-3) Business-Specific Effects	(Model 1-4) Corporate Parent Effects
F-value =	1.0500	2.7590	8.9120	1.7810
p-value =	0.3806	0.0001	0.0001	0.0042
R^2 =	0.0061	0.1931	0.7762	0.0870
adj R^2 =	0.0003	0.1231	0.6891	0.0381

	(Model 1-5) Year & Industry Effects	(Model 1-6) Year & Business-Specific Effects	(Model 1-7) Year & Corporate Parent Effects
F-value =	2.6210	8.6840	1.6780
p-value =	0.0001	0.0001	0.0069
R^2 =	0.1971	0.7766	0.0915
adj R^2 =	0.1219	0.6872	0.0369

	(Model 1-8) Year, Industry, & Business-Specific Effects[b]	(Model 1-9) Year, Industry, & Corporate Parent Effects	(Model 1-10) Year, Corporate Parent, Business-Specific Effects[b]
F-value =	8.6840	2.5730	8.6840
p-value =	0.0001	0.0001	0.0001
R^2 =	0.7766	0.2890	0.7766
Adj R^2 =	0.6872	0.1766	0.6872

	(Model 1-11) Year, Industry, & Corporate Parent, & Business Segment Effects[b]
F-value =	8.6840
p-value =	0.0001
R^2 =	0.7766
adj R^2 =	0.6872

[a] Where a test for multiple linear restrictions is significant at greater than the .90 level, the extent of significance is listed next to arrows connecting the appropriate models.

[b] Note that these models are estimated with year and business segment dummies only. Incorporating dummy variables for each listed class of effects would result in overspecification. As a result, all tests of exclusion restrictions involving these models are, by nature, insignificant.

FIGURE 2
Results for Canada
ANOVA statistics from ordinary least squares estimation on core model[a]

Null Model

>.99 >.99 >.99

	(Model 2-1) Year Effects	(Model 2-2) Industry Effects	(Model 2-3) Business-Specific Effects	(Model 2-4) Corporate Parent Effects
F-value =	1.3290	5.3950	3.4430	4.2290
p-value =	0.2571	0.0001	0.0001	0.0001
R^2 =	0.0047	0.3028	0.5601	0.1874
adj R^2 =	0.0012	0.2466	0.3974	0.1431

>.99 >.99 >.95 >.99 >.90

	(Model 2-5) Year & Industry Effects	(Model 2-6) Year & Business-Specific Effects	(Model 2-7) Year & Corporate Parent Effects
F-value =	5.2540	3.4560	4.1000
p-value =	0.0001	0.0001	0.0001
R^2 =	0.3077	0.5654	0.1933
adj R^2 =	0.2492	0.4018	0.1462

>.99 >.99 >.99 >.99

	(Model 2-8) Year, Industry, & Business-Specific Effects[b]	(Model 2-9) Year, Industry, & Corporate Parent Effects	(Model 2-10) Year, Corporate Parent, Business-Specific Effects[b]
F-value =	3.4560	4.4270	3.4560
p-value =	0.0001	0.0001	0.0001
R^2 =	0.5654	0.3975	0.5654
Adj R^2 =	0.4018	0.3077	0.4018

>.99

	(Model 2-11) Year, Industry, & Corporate Parent, & Business Segment Effects[b]
F-value =	3.4560
p-value =	0.0001
R^2 =	0.5654
adj R^2 =	0.4018

[a] Where a test for multiple linear restrictions is significant at greater than the .90 level, the extent of significance is listed next to arrows connecting the appropriate models.

[b] Note that these models are estimated with year and business segment dummies only. Incorporating dummy variables for each listed class of effects would result in overspecification. As a result, all tests of exclusion restrictions involving these models are, by nature, insignificant.

FIGURE 3
Results for United Kingdom
ANOVA statistics from ordinary least squares estimation on core model[a]

Null Model

>.90 >.99 >.99 >.99

	(Model 3-1) Year Effects	(Model 3-2) Industry Effects	(Model 3-3) Business-Specific Effects	(Model 3-4) Corporate Parent Effects
F-value =	2.3490	1.7800	3.4580	4.7000
p-value =	0.0520	0.0001	0.0001	0.0001
R^2 =	0.0015	0.1138	0.5880	0.2663
adj R^2 =	0.0009	0.0498	0.4180	0.2096

>.99 >.99 >.99

	(Model 3-5) Year & Industry Effects	(Model 3-6) Year & Business-Specific Effects	(Model 3-7) Year & Corporate Parent Effects
F-value =	1.7790	3.4490	4.6750
p-value =	0.0001	0.0001	0.0001
R^2 =	0.1148	0.5882	0.2672
adj R^2 =	0.0503	0.4177	0.2100

>.99 >.99 >.99 >.99

	(Model 3-8) Year, Industry, & Business-Specific Effects[b]	(Model 3-9) Year, Industry, & Corporate Parent Effects	(Model 3-10) Year, Corporate Parent, Business-Specific Effects[b]
F-value =	3.4490	3.2220	3.4490
p-value =	0.0001	0.0001	0.0001
R^2 =	0.5882	0.3433	0.5882
Adj R^2 =	0.4177	0.2368	0.4177

>.99

	(Model 3-11) Year, Industry, & Corporate Parent, & Business Segment Effects[b]
F-value =	3.4490
p-value =	0.0001
R^2 =	0.5882
adj R^2 =	0.4177

[a] Where a test for multiple linear restrictions is significant at greater than the .90 level, the extent of significance is listed next to arrows connecting the appropriate models.

[b] Note that these models are estimated with year and business segment dummies only. Incorporating dummy variables for each listed class of effects would result in overspecification. As a result, all tests of exclusion restrictions involving these models are, by nature, insignificant.

FIGURE 4
Results for United States
ANOVA statistics from ordinary least squares estimation on core model[a]

Null Model

>.99 >.99 >.99

	(Model 4-1) Year Effects	(Model 4-2) Industry Effects	(Model 4-3) Business-Specific Effects	(Model 4-4) Corporate Parent Effects
F-value =	1.8940	3.9670	5.6490	3.2580
p-value =	0.1085	0.0001	0.0001	0.0001
$R^2 =$	0.0006	0.1453	0.6809	0.1665
adj $R^2 =$	0.0003	0.1087	0.5604	0.1154

>.99 >.99 >.99 >.95

	(Model 4-5) Year & Industry Effects	(Model 4-6) Year & Business-Specific Effects	(Model 4-7) Year & Corporate Parent Effects
F-value =	3.9510	5.6450	3.2570
p-value =	0.0001	0.0001	0.0001
$R^2 =$	0.1458	0.6811	0.1673
Adj $R^2 =$	0.1089	0.5605	0.1159

>.99 >.99 >.99 >.99

	(Model 4-8) Year, Industry, & Business-Specific Effects[b]	(Model 4-9) Year, Industry, & Corporate Parent Effects	(Model 4-10) Year, Corporate Parent, Business-Specific Effects[b]
F-value =	5.6450	3.5560	5.6450
p-value =	0.0001	0.0001	0.0001
$R^2 =$	0.6811	0.2814	0.6811
Adj $R^2 =$	0.5605	0.2023	0.5605

>.99

	(Model 4-11) Year, Industry, & Corporate Parent, & Business Segment Effects[b]
F-value =	5.6450
p-value =	0.0001
$R^2 =$	0.6811
adj $R^2 =$	0.5605

[a] Where a test for multiple linear restrictions is significant at greater than the .90 level, the extent of significance is listed next to arrows connecting the appropriate models.

[b] Note that these models are estimated with year and business segment dummies only. Incorporating dummy variables for each listed class of effects would result in overspecification. As a result, all tests of exclusion restrictions involving these models are, by nature, insignificant.

APPENDIX TABLE 1A
Number of unique observations in each category of effect, by country and year
Pre-screened data

	Number of industries				Number of corporate parents				Number of business segments			
Year	Aus	Can	UK	USA	Aus	Can	UK	USA	Aus	Can	UK	USA
1992	177	211	594	739	89	129	491	930	311	375	1,452	2,790
1993	179	215	633	741	93	128	565	970	311	391	1,642	2,946
1994	184	213	646	764	97	124	606	1,004	331	390	1,753	3,081
1995	185	213	655	774	101	120	611	1,011	339	383	1,761	3,166
1996	192	188	646	777	96	109	605	992	328	343	1,684	3,152
All	230	262	745	858	108	154	689	1,192	442	503	2,360	4,087

APPENDIX TABLE 1B
Number of unique observations in each category of effect, by country and year
Screened data

	Number of industries				Number of corporate parents				Number of business segments			
Year	Aus	Can	UK	USA	Aus	Can	UK	USA	Aus	Can	UK	USA
1992	40	65	297	405	28	37	264	548	127	218	1,042	2,239
1993	42	66	328	423	26	45	312	576	129	235	1,204	2,402
1994	46	69	341	436	29	48	335	587	146	240	1,306	2,517
1995	47	69	339	456	28	44	334	579	151	234	1,311	2,621
1996	43	63	328	450	24	42	303	540	137	215	1,233	2,611
All	56	86	411	510	36	60	438	717	194	309	1,782	3,398

APPENDIX TABLE 2
Losses of data due to screening, by country, reason and year

COUNTRY Number of observations *Reason for exclusion*	**1992**	**1993**	**1994**	**1995**	**1996**	**Total**
AUSTRALIA						
N, pre-screened data	311	311	331	339	328	1,620
SIC in 6000s	61	57	59	64	53	294
SIC in 9000s	0	0	0	0	0	0
Only observation in SIC	116	122	126	124	123	611
SIC only exists for one year	7	3	0	0	15	25
N, screened data	127	129	146	151	137	690
CANADA						
N, pre-screened data	375	391	390	383	343	1,882
SIC in 6000s	15	10	9	8	5	47
SIC in 9000s	0	0	0	0	0	0
Only observation in SIC	126	145	140	135	117	663
SIC only exists for one year	16	1	1	6	6	30
N, screened data	218	235	240	234	215	1,142
UNITED KINGDOM						
N, pre-screened data	1,452	1,642	1,753	1,761	1,684	8,292
SIC in 6000s	126	149	160	150	146	731
SIC in 9000s	0	0	0	0	0	0
Only observation in SIC	269	283	286	299	286	1,423
SIC only exists for one year	15	6	1	1	19	42
N, screened data	1,042	1,204	1,306	1,311	1,233	6,096
UNITED STATES						
N, pre-screened data	2,790	2,946	3,081	3,166	3,152	15,135
SIC in 6000s	248	258	269	258	242	1,275
SIC in 9000s	2	2	0	2	2	8
Only observation in SIC	281	284	291	282	280	1,418
SIC only exists for one year	20	0	4	3	17	44
N, screened data	2,239	2,402	2,517	2,621	2,611	12,390
ALL COUNTRIES						
N, pre-screened data	4,928	5,290	5,555	5,649	5,507	26,929
SIC in 6000s	450	474	497	480	446	2,347
SIC in 9000s	2	2	0	2	2	8
Only observation in SIC	792	834	843	840	806	4,115
SIC only exists for one year	58	10	6	10	57	141
N, screened data	3,626	3,970	4,209	4,317	4,196	20,318

APPENDIX TABLE 3
Average operating income, assets, and profit
Screened data, by country and year

	Australia			Canada			United Kingdom			United States		
	Op. Inc. ($M)	Assets ($M)	Profit	Op. Inc. ($M)	Assets ($M)	Profit	Op. Inc. ($M)	Assets ($M)	Profit	Op. Inc. ($M)	Assets ($M)	Profit
1992	52.0	610.7	6.2%	46.5	757.3	7.8%	50.0	364.2	15.3%	105.6	1158.5	9.1%
1993	49.7	575.6	4.5%	42.7	980.6	6.1%	47.2	280.0	16.7%	105.2	1087.7	9.4%
1994	41.0	508.5	6.3%	59.0	788.4	8.8%	47.9	303.7	17.3%	122.1	1095.6	10.1%
1995	63.4	575.6	8.7%	79.6	823.6	9.4%	51.7	321.9	17.8%	129.3	1133.7	10.5%
1996	53.8	616.0	7.9%	79.2	967.0	8.5%	62.9	367.5	21.3%	139.1	1223.6	10.4%
Mean	52.0	577.3	6.8%	61.4	863.4	8.1%	51.9	327.5	17.8%	120.3	1139.8	9.9%