International equity valuation using multiples

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September, 2002

Note: This document contains preliminary results on multiples valuation in an international context. Comments and suggestions are highly appreciated. Please do not quote without permission.

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Abstract

We examine the ability of industry price multiples to approximate observed stock prices in 10 countries. The value drivers examined are reported and forecast numbers for earnings, dividends, cash flows, and sales. Our analyses suggest the following general findings. First, multiples based on earnings perform the best, those based on sales perform the worst, and dividend and cash flow multiples exhibit intermediate performance. Second, using forecasts improves performance over multiples based on reported numbers, with the greatest (smallest) improvement being observed for earnings (sales). Third, multiples based on earnings forecasts represent a reasonably accurate valuation technique, with the implied valuations for over half the firms in the different countries being within 30 percent of observed valuations. Finally, we notice a sustained decline in the performance of all value drivers after 1997, which we believe is due to increased within-industry heterogeneity in market valuations during this period. We identify a number of interesting deviations from these general patterns for some country/value driver combinations, and link those deviations to country-specific institutional features. In addition to extending the multiples valuation literature to include more countries and forecasted value drivers, this research contributes to the literature examining across-country differences in the value relevance of accounting numbers by offering a different perspective than that provided by the stock price/return valuation regressions estimated in that literature.

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1. Introduction

We describe the absolute and relative performance of industry multiples based on four value drivers in terms of the proximity of valuations based on those multiples to observed stock prices in 10 countries. The four value drivers are earnings, dividends, cash flows, and sales, and we examine both forecasted and reported numbers (obtained from IBES). The countries examined are Australia, Canada, France, Germany, Hong Kong, Japan, South Africa, Taiwan, UK, and US. We also investigate time-series trends in the performance of valuations derived from multiples over our sample period, which extends from 1987 to 2001.

We draw from and contribute to two separate streams of research. First, we extend the research that examines the ability of multiples-based valuations to approximate observed stock prices (e.g. Alford (1992)). That research has focused so far on US firms, often for small samples in specific contexts (such as initial public offerings), and has focused primarily on reported numbers; earnings represents the only value driver for which forecasts have also been considered (e.g., Kim and Ritter (1999), and Liu, Nissim, and Thomas (2002)). Considering more countries and including forecasts for more value drivers provides a more comprehensive description.

Second, we establish links to the literature examining across-country variation in the value relevance of accounting numbers (e.g., Alford, Jones, and Leftwich (1993), Ball, Kothari, and Robin (2000)). These studies compare across countries different aspects of the association between stock prices/returns and accounting numbers, typically reported earnings. We study more value drivers and also consider the improvement offered by using forecasts over reported numbers. To the extent that forecasted value drivers exclude from reported numbers certain idiosyncratic items that are unrelated to current valuations, across-country differences noticed for

reported numbers should be less evident for forecasts. Also, the multiples approach offers a different perspective, and possibly a more representative description of the value relevance of accounting value drivers, relative to that provided by the regressions estimated in prior research. Not only are multiples more likely to be used in practice, they generate valuations that are considerably more accurate than those obtained from regressions.[1] The multiples approach controls better for cross-sectional and time-series variation in discount rates and expected growth (two value-relevant variables that are omitted from both approaches) by selecting comparable firms from the same industry, generates statistics that allow more reliable comparisons across country/value driver combinations, and is less likely to overweight firms with large share prices, relative to the regression approach.

Our methodology is fairly straightforward. Each month we scan the IBES summary files to identify industries (representing the intermediate category in the Sector/Industry/Group classification) with at least six firms with available data for each value driver. We compute an industry multiple for each firm, equal to the harmonic mean of the ratio of stock price to the value driver of the remaining firms in the industry, and multiply that firm's value driver by the industry multiple to generate a predicted price. We then compute pricing errors or valuation errors (defined as actual price less predicted price, scaled by actual price) and examine the dispersion (mainly the interquartile range) of the pooled distribution of pricing errors for that country. We make the following three comparisons of pricing error dispersions: a) forecasts versus reported numbers for all four value drivers, b) reported values of the other three drivers against reported earnings, and c) forecasts for the other three drivers against forecasted earnings.

[1] For example, the interquartile range for the distribution of pricing errors from our multiple approach is generally half the interquartile range associated with pricing errors from a regression of price per share on that value driver.

Finally, we contrast the levels of dispersion for pricing errors as well as the patterns observed across different countries.

Before summarizing our results, we note some features of our sample that should be kept in mind when interpreting our results. The IBES summary file contains consensus forecasts primarily for EPS for the current year (EPS1) and the following year (EPS2). It also contains forecasts for other value drivers (including dividends, cash flows, and sales) as well as reported values for these value drivers. Only firms followed by analysts are represented in the IBES files, and many of those firms do not have forecasts or reported values for the other drivers (other than EPS). Presumably, analysts provide forecasts for other value drivers for some firms and not others, because these value drivers tend to be relatively more informative in those cases. Also, there are some differences across countries in the definition of different value drivers as well as the extent to which different industries are represented in each country.

Our investigation suggests the following general findings that are common to all countries. First, multiples based on earnings perform the best, those based on sales perform the worst, and dividend and cash flow multiples exhibit intermediate performance. This ranking is observed for both forecasts and reported numbers. Second, using forecasts improves performance over multiples based on reported numbers, with the greatest (smallest) improvement being observed for earnings (sales). Third, multiples based on earnings forecasts generate reasonably accurate valuations, with the implied valuations for over half the firms in the different countries being within 30 percent of observed stock prices.

Examination of the across-country patterns for the dispersion of pricing errors suggests the following. First, there is considerable variation in the performance of actual EPS, much of which is consistent with the differences documented in the prior literature and attributed to legal

and accounting differences. In essence, countries clustered around the US and UK along these dimensions exhibit higher value relevance for earnings. There are, however, some deviations from this overall pattern. Specifically, the precision of valuation based on actual EPS in Canada is very low, even lower than that for Germany and Japan, and the performance of earnings multiples in France is quite good, only slightly lower than that in the US. Second, even though forecasted EPS systematically outperforms reported EPS, the extent of improvement varies across countries, with countries exhibiting superior performance for reported EPS also generally exhibiting larger percent improvement for EPS forecasts. Third, some interesting exceptions to the general rule that earnings multiples outperform other value drivers include the superior performance of a) reported dividends in Japan (relative to reported earnings) and b) cash flows (both reported and forecast) for Canada, Taiwan, and the US. One possible explanation for this latter finding is that cash flow forecasts are prepared selectively for certain sectors (primarily energy) in these countries, where accruals for depreciation, depletion, and amortization might be less value relevant. Also, even though both forecast and reported dividends exhibit relatively poor performance, the improvement from using forecasted dividends is relatively large for Australia and Hong Kong. We find evidence that suggests that the results observed for these two countries is associated with the lower tax disadvantage for paying dividends.

We also examine the extent to which the performance of multiples a) is improved by selecting comparable firms from the same industry to generate multiples, and b) exhibits any time-series trends. We find that selecting comparable firms from the same industry provides an average increase in performance (reduction in the interquartile range of valuation errors) of approximately 13 and 17 percent for reported and forecast EPS, respectively. Examination of the interquartile ranges each year for the different value drivers indicates a sustained decline in

performance after 1997. Preliminary exploration of these results suggests that the decline in performance is due to increased within-industry heterogeneity in market valuations during these years.

The remainder of our paper is laid out as follows. Section 2 discusses the methodology and Section 3 describes the sample and variables. The results based on EPS valuation are provided in Section 4. Section 5 presents results for alternative value drivers, and Section 6 concludes.

2. Methodology

The implied assumption in multiple valuation is that the price of firm *i* in month *t* (p_{it}) is directly proportional to the value driver observed at that point in time:

$$p_{it} = \beta_t x_{it} + \varepsilon_{it} \qquad (1)$$

where x_{it} is the value driver for firm *i* in month *t* (e.g., consensus forecasted EPS as of month *t* for the next annual report), β_t is the multiple on the value driver which is country-industry-month specific (see below), and ε_t is the pricing error. To improve efficiency, we divide equation (1) by price:

$$1 = \beta_t \frac{x_{it}}{p_{it}} + \frac{\varepsilon_{it}}{p_{it}}. \qquad (2)$$

Baker and Ruback (1999) and Beatty, Riffe, and Thompson (1999) demonstrate that estimating the slope using equation (2) rather than equation (1) is likely to produce more precise estimates because the valuation error (the residual in equation (1)) is approximately proportional to price.

When estimating β_t, we elect to impose the restriction that expected pricing errors (E[ε/p]) be zero, even though an unrestricted estimate for β_t from equation (2) offers a lower value of mean squared pricing error. Liu, Nissim, and Thomas (2002) report that this approach

generates lower pricing errors for most firms, relative to an unrestricted estimate, but it generates substantially higher errors in the tails of the distribution. By restricting the estimates to yield unbiased pricing errors, we are in effect assigning lower weight to extreme pricing errors, relative to the unrestricted approach.[2] We are also maintaining consistency with the tradition in econometrics that unbiasedness is preferred over reduced dispersion.

β_t is the only parameter to be estimated in equation (2), and it is determined by the restriction we impose that pricing errors be zero on average, i.e., $E\left[\frac{\varepsilon_{it}}{p_{it}}\right] = 0$. Rearranging terms in equation (2) and applying the expected value operator, we obtain the harmonic mean of p_{it} / x_{it} as an estimate for β_t:

$$E\left[\frac{\varepsilon_{it}}{p_{it}}\right] = 1 - E\left[\frac{\beta x_{it}}{p_{it}}\right] = 0 \qquad \Rightarrow \hat{\beta}_t = \frac{1}{E\left[\frac{x_{it}}{p_{it}}\right]} \tag{3}$$

We multiply this harmonic mean estimate for β_t by the target firm's value driver to obtain a prediction for the target firm's equity value, and calculate the pricing error as follows:

$$\frac{\varepsilon_{it}}{p_{it}} = \frac{p_{it} - \hat{\beta}_t x_{it}}{p_{it}}. \tag{4}$$

To evaluate the performance of multiples, we examine measures of dispersion, such as the inter-quartile range, for the pooled country-specific distribution of $\varepsilon_{it} / p_{it}$.[3] That is, while the valuation errors are calculated for each country-industry-month combination separately,

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[2] Firms with large pricing errors are likely to be unusual firms, the pricing of which can be explained in practice by incorporating other relevant factors, such as market share and product characteristics. We believe that assigning relatively low weight to firms with large pricing errors is warranted, given that our estimation approach is mechanical and is designed to value typical firms.

[3] We focus on the inter-quartile range of the valuation errors because it is less sensitive to outliers. However, we obtained results that are qualitatively similar to those reported below when using alternative measures of dispersion, such as the standard deviation or alternative ranges (10%-90% and 5%-95%).

inferences regarding the performance of the multiples in each country are made using the pooled time-series cross-sectional distribution of the pricing errors in that country.

3. Sample and Data

We obtain forecast and reported (or actual) data from the IBES Summary and Actual files respectively. These files provide consensus analyst forecasts and reported numbers for different value drivers at a monthly frequency. The actual measures are from the most recently published annual report. The forecast measures are the consensus (mean) estimates during the month for the next annual report. Although in some cases forecasts for longer horizons (extending up to 10 years into the future) are available on IBES, we focus on the one-year out forecasts because they contain fewer missing values. (As discussed later, our inferences remain unchanged when using two-year- out forecasts instead of forecasts for the current year.)

Using these data, we examine the valuation performance of the forecasted and actual values of four value drivers: earnings per share (EPS), dividend per share (DPS), cash flow per share (CPS), and sales (SAL). To maintain consistency across the four variables, we deflate sales by the number of shares outstanding during the forecast month. If the firm is followed on a diluted basis, we use the IBES dilution factor to convert the first three (per share) variables to a primary basis. For Japan, earnings per share are measured after deducting dividends. Consequently, the valuation errors when using EPS as reported by IBES are relatively large for Japan. We add back dividends per share to earnings per share data provided by IBES to generate EPS values for Japan that are comparable to those provided for the remaining countries.

Data availability is the primary consideration for selecting the above four value drivers and the ten countries included in our sample. IBES currently collects forecasts for a total of 26 variables and 61 countries, but the number of observations that satisfy the sample selection

requirements discussed below for the omitted countries and variables is relatively small. Appendix A discusses the normal calculation of the four value drivers by IBES. Appendix B summarizes differences in the calculation of the variables (relative to the norm described in Appendix A) for the sample countries.

To construct the sample, we merge the summary and actual files, and then select all observations where price, outstanding shares, and the actual and forecasted values for the value driver are non-missing (IBES reports separate observations for each value driver).[4] We next create one observation from each set of company-month observations, defining eight variables corresponding to the actual and forecasted values of the four value drivers. To mitigate the effect of influential observations, we set to missing values of variables that, when deflated by price, lie outside the 1st to 99th percentiles of the pooled distribution. To maintain the largest possible sample sizes for each value driver, an observation is retained as long as at least one of the eight variables is non-missing and positive.[5] As a result, we have different sample sizes for each of the comparisons we conduct later between pairs of these eight variables. The total sample includes 1,423,382 observations from the ten countries on which we focus. The period of coverage is from March 1976 through June 2001, and there are 24,167 different firms.[6]

Our specific data requirements for each pair-wise comparison are: (1) both value drivers have positive values, and (2) for each value driver, there are at least six observations that satisfy the first requirement from the same country-industry-month combination (so that a minimum of five firms are available to calculate the industry multiple). We use the intermediate "industry"

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4 To prevent duplication, we delete all observations with secondary flag (for the actual or forecast). Also, to assure the consistency of the merging, we delete observations where the fiscal year end for the actual was not a year prior to the fiscal year end of the forecast.

5 The multiple approach requires positive value drivers for the firm being valued as well as for the firms in the group of comparables.

6 The period of coverage differs across countries and value drivers.

classification from the Sector/Industry/Group classification by IBES (see Appendix A), because visual examination of firms included in the same sector suggests it is too broad a classification to allow the selection of homogeneous firms, and tabulation of the number of firms in different groups suggests it is too narrow to allow the inclusion of sufficient comparable firms.

Using pair-wise comparisons allows us to use a substantially larger sample, relative to multivariate comparisons that require data for all value drivers, which increases the extent to which our findings can be generalized. As the results in Section 5 indicate, some of the value drivers have relatively few available observations. Therefore, restricting the sample to observations with available data for multiple value drivers would reduce the number of observations considerably.

When comparing two variables, 1 and 2, we report the two interquartile ranges for the distributions of pricing errors for both variables (IQR1 and IQR2), and then measure the relative improvement (%IMP) in performance of variable 2 over variable 1 by calculating the percentage decrease in the interquartile range (%IMP= 100% × (IQR1 – IQR2) / IQR1). We also report a t-statistic for %IMP, derived from a bootstrap approach (see Liu, Nissim, and Thomas (2002) for details), and the number of observations used in each comparison.

To understand better the variation across countries in the fraction of the sample in each industry group for the different variables, we generated frequency tables based on sector membership (sector is the most general classification within the IBES Sector/Industry/Group classification) for each country/value driver combination. The findings for forecasted EPS, DPS, CPS and SAL are provided in Panels A through D of Table 1 respectively. We focus on EPS, which is the value driver with the most available data, and discuss briefly some general patterns we observed for other value drivers.

Panel A of Table 1 suggests that there is considerable difference in industry membership across countries, much of which is consistent with a layman's view of the type of sectors that dominate in different countries. For example, Finance and Technology represents the two largest groups in the US, whereas Basic Industries and Energy represent the two largest groups in Canada. These differences suggest that the comparisons of pooled regressions across countries made in prior research are likely to be affected by differences in sector representation. The multiples approach mitigates the impact of such differences by effectively estimating the valuation relations within each industry group at each point in time.

Examination of the distribution of industry membership for the other three drivers indicates the following. First, for UK, Japan, France, Australia, and Hong Kong, the three distributions appear similar to those reported for EPS. Second, Sales forecasts in the remaining countries are provided relatively more often for the consumer services and technology sectors. Third, dividend forecasts are generally not provided for US, Canada, and Taiwan. Coverage appears to be fairly extensive in the remaining countries. Fourth, cash flow forecasts are provided more often for firms in the energy sector in US and Canada, for the finance and capital goods sectors in Germany and South Africa, and follow the same distribution as that for EPS forecasts in the remaining countries, except for Japan where no cash flow forecasts are available.

4. Valuations Based on EPS Multiples

4.1 Primary Results

For each of the ten countries, Table 2 reports in columns 2 and 3 the interquartile range of the price-deflated valuation errors based on the most recently reported annual EPS ("Actual") and the EPS forecast for the next annual report ("Forecast"). The sample sizes for each country are reported in column 1, and the countries are sorted by those sample sizes. When estimating the

multiples, we use our approach based on selecting comparable firms from the same industry classification. To identify the benefit of selecting comparable firms this way, we also report the interquartile ranges for Actual and Forecast EPS in columns 4 and 5, respectively, using multiples generated from the entire cross-section of firms in that country in that month. The numbers in columns 6 through 9 provide the extent of improvement due to using forecasts over actuals, and of using industry comparables over using all firms in the cross-section.

The results in column 2 indicate that the performance of actual EPS is highest in the US, UK, and Australia, the worst in Taiwan and Canada, and quite poor in Japan and Germany. These findings are mostly consistent with the results in prior research that have attributed these differences to variation in a) the legal system (common versus code/civil law, see, e.g., Ball, Kothari, and Robin (2000) and Francis, Khurana, and Pereira (2001)), b) the level of alignment of financial and tax accounting (e.g., Ali and Hwang (2000)), c) shareholder protection (e.g., Hung (2001)), and d) the use of accrual accounting (e.g., Hung (2001) and Francis, Khurana, and Pereira (2001)).[7] The relatively poor performance in Canada and the relatively good performance in France are two notable exceptions that contradict the general thrust of these predictions. Perhaps, the differential sector membership of these two countries (and the differential value relevance of earnings in those sectors), reported in Table 1, is partly responsible for the poor (good) performance of actual EPS in Canada (France).

The results reported in column 3 show that moving from actual EPS to EPS forecasts improves performance in all 10 countries, indicating that the results observed in the US (e.g., Kim and Ritter (1999) and Liu, Nissim, and Thomas (2002)) hold in other countries as well. The

[7] Ball, Kothari, and Robin (2000) argue that the differential price-earnings association across countries is more fundamentally driven by differences in the demand for accounting information. So, for example, the better performance of earnings based valuations in the U.S., U.K. and Australia, which are characterized by broad public stock ownership, is due to a higher demand for quality financial statements, which serve as the major source of information for small stockholders.

extent of improvement, as measured by the %IMP values reported in column 6, indicates that there is quite some variation around the average improvement of 15.62 percent. The countries with the best performance for actual EPS also tend to exhibit the most improvement. Again, two exceptions to this trend are Canada and France: Canada (France) with relatively low (high) performance for actual EPS exhibits high (low) improvement when we switch to forecast EPS. These results are consistent with actual EPS for firms in the Canadian sample containing substantial one-time components that are eliminated in forecast EPS, and with actual EPS for firms in the French sample containing relatively few one-time components because of the use of reserves to smooth income (see, e.g., Choi, Frost and Meek (1999)). Smooth income implies a relatively small difference between near future forecasts and currently reported numbers. This feature is likely to be more relevant for Germany, which also turns in a relatively low improvement of 10.4 percent.

The magnitude of valuation errors documented here differs slightly from those reported in prior research. Liu, Nissim, and Thomas (2002) examine the valuation performance of a comprehensive list of value drivers for U.S. firms and report interquartile ranges for valuation errors based on EPS forecasts and actuals that are smaller than the corresponding statistics in Table 1. One potential reason for this difference is that the sample in Liu, Nissim, and Thomas (2002) includes relatively mature and stable firms, because of the requirement that sample firms have positive values for all value drivers (including cash flow measures, which tend to be negative for growth firms). In contrast, the sample in the current study is more representative because it includes a much larger proportion of the population.

To evaluate the performance improvement obtained by selecting comparable firms from the same industry, we repeat the analysis using multiples derived from all firms in that country-

month, rather than firms from the same industry, and report the interquartile ranges for actual and forecast EPS in columns 4 and 5 of Table 2. Comparing the levels in columns 4 and 5 with those in columns 2 and 3, respectively, indicates that the interquartile ranges are lower when industry multiples are used. Before computing the percent improvement in performance due to using industry comparables, we report %imp1 in Column 7, which is the improvement of forecasts over actuals, when multiples are calculated over all firms. The average improvement of about 12 percent is lower than the average improvement reported in column 6, indicating that the superiority of forecasts is more evident when industry comparables are used.

The percent improvement reported in columns 8 and 9 (%imp2 and %imp3) describe the benefits of using industry comparables for actual and forecast EPS, respectively. The extent of improvement is large and significant (t-statistics are not reported) for all 10 countries, confirming the importance of using industry comparables. Also, the improvements in column 9 are generally larger than those in column 8 (all but South Africa), suggesting that the use of industry comparables is especially beneficial for EPS forecasts. The magnitude of improvement reported in these two columns, however, varies considerably across the countries. We expect the magnitude of improvement to increase when growth and risk vary across industries but are similar within industries. The improvement is especially large for the U.S.; when using cross-sectional multiples, the performance of EPS in the U.S. is no longer superior, consistent with the results of previous studies that do not use industry benchmarks (e.g., Alford et al. (1993)). The improvement is especially small for Japan, consistent with firms in different industries being fundamentally not that different from each other because of the large equity cross holdings in Japanese firms. The relatively small improvement from using industry comparables for U.K. and

Australian firms suggests that firms in different industries are quite similar for these two countries.

The forecasts we use are for the current annual period for which year-end results have not yet been reported. As a result, these forecasts represent a combination of actual numbers for the interim periods for which reported numbers are already available and forecasts for the interim periods not yet reported. To identify the performance improvements provided by using forecasts that do not contain any reported numbers, we compare in Table 3 the interquartile ranges for the two-year out EPS forecast (forecast EPS2) with actual EPS. The larger magnitudes for %imp reported in Table 3, relative to those reported in column 6 of Table 2 (21.37 percent compared with 15.62 percent) indicate the benefits of using two-year-out forecasts, relative to forecasts for the current period.

To offer further details regarding the interquartile results reported in the forecast column of Table 3, we provide in Figure 1 a graphical representation of the distribution of pricing errors for forecast EPS2. The horizontal axis contains the mid points of ranges of width equal to 0.1 (e.g. 0.05 refers to the range between 0 and 0.1) and the different lines represent the percent of the sample in each country that lie within that range. The superior performance of Australia, UK and US and the relatively inferior performance of Germany, Japan, and Taiwan are clearly visible. For example, combining the percentages contained in the two ranges identified by –0.05 and 0.05 suggests that approximately 26 percent of the sample for the three better-performing countries generates valuations that lie within ± 10 percent of observed prices. In contrast, only about 17 percent of the sample generates pricing errors within ± 10 percent for the three worst performers. Including the two ranges on either side (-0.15 and 0.15) suggests that about 50 percent of the sample lies within ± 20 percent for the three best performers. We believe this level

of accuracy in generating valuations, using a relatively simple heuristic technique, is remarkable, and indicates the high value relevance of forecasted EPS, especially in certain countries.

4.2 Changes Over Time

The globalization of financial markets and harmonization of accounting information has grown during the sample period. Not only has the IASB caused reported numbers in many countries to converge to those reported in the UK and US, the US has also taken some steps to move toward the international standard (e.g., in 1997, the FASB changed the calculation of EPS to conform better to the international standard). We examine whether the average (across years) results reported so far mask a trend where the value relevance of EPS has become more similar across countries. We report in Figure 2 the interquartile ranges for actual (Panel A) and forecast EPS (Panel B) for each year in the sample period.

Although international data are available from IBES since 1987, we drop the year 1987 since the number of observations for that year is substantially smaller than those in subsequent years. We also drop the year 2001 since the coverage for this year is incomplete. To reduce the volume of data, we focus on the six countries with the largest number of observations (US, UK, Japan, Canada, France, and Germany). The improvement from using forecast EPS relative to the actual (%imp) in each year is reported in Panel C, and the number of firm-months underlying each country-year observation is reported in Panel D.

For the first ten years (1988 through 1997), there is no clear trend in the level of valuation errors from using either EPS actuals or forecasts. In the last three years (1998 through 2000), however, there is a clear increasing trend in the magnitude of valuation errors for both actual and forecast EPS. In essence, the ratio of EPS to stock price for firms in the same industry became less homogeneous after 1997, and this decline in homogeneity occurred in all markets. This trend in unlikely to be due to a sudden surge in younger firms, because the number of observations

during the period 1998-2000 declined rather than increased for the US, and it was relatively stable for each of the other five countries (see Panel D). This trend is also not likely to be due to an increase in the use of mark-to-market accounting (or to any other accounting change that increases the magnitude of transitory earnings), because it is even stronger for earnings forecasts which are less likely to be affected by such transitory items.

While the systematic and pervasive nature of these declines suggest that it is unlikely to be an artifact caused by changes in accounting that resulted in more transitory items, we repeated the analysis using a) two-year-out earnings forecast (EPS2), and b) actual and forecast dividends (DPS). Unlike the EPS forecasts in Figure 2, which contain actual numbers for the portion of the current year already reported, EPS2 is a pure forecast since it covers the next full year. And dividends should be relatively unaffected by changes in accounting rules. We find the same increasing trends (results available upon request) for EPS2 as well as for actual and forecasted DPS.

The declining performance is also not likely to be due to increased measurement error in IBES data (either in measuring the variables or in the industry classification). We observe similar trends when (1) calculating the multiples using all observations from each country (rather than from the relevant country-industry group), and (2) using COMPUSTAT instead of IBES data, and measuring earnings before and after special items. One explanation that is consistent with the higher pricing errors observed during the three years 1998-2000 is that stock prices strayed from fundamentals (but not in a uniform manner) during this period.

Panel C plots the time-series for the improvement in the valuation from using EPS forecasts instead of EPS actuals. Three interesting trends appear in these results. First, before 1994, the US, UK and Canada exhibit fairly steady patterns that are consistently higher than the

improvement numbers reported for France and Germany. In effect analyst forecasts are relatively more value relevant in the first three countries. The second trend we observe is a steady decline after 1994 in the improvement exhibited by analysts for US, UK, and Canada. The third trend is that after 1994 there appears to be a convergence in the trends for these three countries and those reported for France, Germany, and Japan. None of these trends appear to be caused by a change in the number of firms followed, because that number is relatively stable for four out of the six countries during the entire sample period (see Panel D).

5. Multiples Based on Alternative Value Drivers (Other than EPS)

The analysis conducted so far on EPS is repeated on the other three value drivers. The results for dividends, cash flows, and sales are reported in Tables 4, 5, and 7, respectively. The format of these tables is as follows. In Panel A, we report interquartile ranges for actual and forecast values for the value driver, and then report the improvement observed for forecasts over actuals. In Panel B, we compare forecasts for that value driver with EPS forecasts, and in Panel C we compare actuals for that value driver with actual EPS. Given our interest in examining the largest possible samples, we include all firms with available data for the two value drivers being compared in each Panel. As a result, the sample sizes are different across the Panels. Comparison of these sample sizes with those in Table 2 suggests that the fraction of our initial samples with forecasts for the remaining three drivers varies across countries. And, as mentioned earlier, countries with fewer forecasts for a particular value driver tend to have those forecasts overrepresented in certain sectors.

5.1 Valuations Based on DPS Multiples

As dividend forecasts are not available for the US and Canada, we focus on the other eight countries in Table 4. Dividend forecasts appear to be available most frequently for Japan,

quite often for UK firms, and are not as frequent in the remaining six countries. The results in Panel A suggest that using DPS forecasts instead of actuals improves the valuation. The magnitudes of improvement (%IMP) are, however, lower than those reported for EPS (average improvement of 10.84 percent for DPS compared with 15.62 percent for EPS). This result is not surprising since dividends tend to be sticky in general and thus dividend forecasts do not comove with prices as much as earnings forecasts do. Two exceptions are Australia and Hong Kong, with improvement of about 19 percent. In these two countries, there is no tax disadvantage to paying dividends (dividends in Hong Kong are tax free, and Australia has a generous dividend imputation system). Absent a signaling tax cost, dividends may become less sticky. Accordingly, actual dividends in Australia and Hong Kong may include relatively large transitory components, and the difference between actual and forecasted dividends may be relatively large. If dividend forecasts focus on the permanent component of dividends (it is difficult to forecast the transitory component), the large improvement from using DPS forecast instead of actual observed in Australia and Hong Kong could be due to the lower implied dividend tax rates.

To examine the above explanation, we create a subsample consisting of all firm-year observations with positive values for both DPS and EPS in the current year, and non-missing value for DPS in the previous year. The resulting sample includes 1,135 observations for Australian firms, 539 observations for Hong Kong firms, and 11,861 observations for the other six countries. The interquartile range of the change in DPS deflated by current EPS (i.e., $(DPS_t - DPS_{t-1})/EPS_t$) is 0.350 for Australian firms, 0.334 for Hong Kong firms, and 0.148 for all other firms. Thus, DPS clearly contains a larger transitory component in Australia and Hong Kong relative to the other countries. The median payout ratio is 71.6% for Australian firms, 41.1% for Hong Kong firms, and 34.7% for all other firms. The high payout ratio for Australian firms is

consistent with evidence that the generous tax imputation credit in this country leads to a negative tax rate on dividends for many investors (see, e.g., Harris, Hubbard and Kemsley (2001)).

The results presented in Panel B of Table 4 examine the decline in performance when dividend forecasts are used instead of earnings forecasts. The negative and significant values reported for %IMP confirm that EPS forecasts perform better than DPS forecasts for all eight countries. The improvement observed is highest in UK, France, and Taiwan and lowest in Japan, South Africa, and Hong Kong.

Panel C of Table 4 presents the results of comparing DPS actuals with EPS actuals. The number of observations in Panel C is smaller than that in Panel B because the frequency of observations with non-positive values (which are excluded from the analysis) is higher for actuals. The results are generally similar to those in Panel B. However, for Japan, actual DPS outperforms actual EPS by a relatively large margin (the interquartile range of valuation errors from using actual DPS is about 6.9 percent smaller than that based on actual EPS). The superior performance of dividends in Japan is consistent with the evidence in Dewenter and Warther (1998), which indicates that dividend policy in Japan is more responsive to performance than U.S. dividend policy. Dewenter and Warther (1998) argue that the stronger and more timely link between performance and dividends in Japan is due to institutional differences in the structure of corporate ownership and the nature of corporate group interactions, which cause Japanese firms to be subject to less information asymmetry and fewer agency conflicts than U.S. firms.

5.2 Valuations Based on CPS Multiples

Before discussing the results in Table 5, we stress that unlike other value drivers, the definition of cash flows differs across countries. As indicated in Appendix B, the extent to which accruals are removed from net income varies from Taiwan, where cash flows equal the net

change in cash (before debt), to UK and South Africa where only depreciation is added back. Intermediate definitions of cash flow observed include the addition to net income of both deferred taxes and depreciation (Canada), the addition of interest, taxes and depreciation (Australia) and adding back depreciation but subtracting investment expenditures (Germany). Also, as mentioned earlier, cash flow forecasts appear to be prepared more for firms in certain sectors (e.g. cash flow forecasts are provided more often for firms in the energy sector in US and Canada, and for the finance and capital goods sectors in Germany and South Africa). This variation in the definitions of cash flow combined with the self-selection evident in certain countries suggests that our results from analysis of cash flow multiples should not be generalized beyond the specific contexts discussed here.

The results reported in Panel A are consistent with our general conclusion that forecasts outperform actuals. The values of %IMP reported for the nine countries examined (no cash flow forecasts are available for Japan) vary around the average of about 14 percent, and are all statistically significant.

Examination of the results in Panel B indicate that while EPS forecasts tend to outperform cash flow forecasts in most countries (indicated by negative and significant values of %IMP), the opposite pattern is observed for US, Canada and Taiwan. We note that the interquartile ranges reported for US firms' EPS forecasts in Panel B are considerably larger than those reported for the overall sample in Table 2. The value relevance of earnings forecasts for US firms (and sectors) with cash flow forecasts tends to be below the overall average. In essence, cash flow forecasts in the US are concentrated in certain sectors where EPS is less value relevant. While the interquartile range for EPS forecasts for Canada reported in Panel B (0.598) is also lower than that reported for the overall sample in Table 2 (0.542), this difference is not as

large as that for US firms. And the corresponding comparison for Taiwan forecasts indicates that the subset of firms with cash flows forecasts has an interquartile range similar to that reported in Table 2. We conclude that EPS forecasts outperform cash flow forecasts in general; however, cash flow forecasts exhibit a slight edge for a subset of firms/sectors.

5.3 Valuations Based on SAL Multiples

As with cash flow forecasts, we note that there is considerable variation across countries in the fraction of firms with EPS forecasts that have sales forecasts. Also, for countries with fewer sales forecasts, there is considerable self-selection in terms of the sectors that are more likely to contain firms with sales forecasts. In particular, the technology and consumer services sectors contain a disproportionately higher number of firms with sales forecasts. Therefore, the results reported below may not be relevant outside the context considered here.

To convert sales to per share data, we deflate it by the number of shares outstanding during the forecast month as reported by IBES. Unlike the number of shares outstanding used in the calculation of EPS, DPS, and CPS, the number of shares outstanding reported by IBES does not adjust for changes in the number of shares outstanding during the period that the Sales are recognized, and it includes only the class of shares on which estimates are being made (per-share data reflects shares outstanding of the combined share classes).

To assess the potential impact of measurement error associated with our per share adjustments, we compare the valuation accuracy from using net income forecasts (another total measure provided by IBES) with that based on EPS forecasts. For most countries, EPS is calculated as net income divided by the weighted-average number of shares. Thus, the primary difference between valuation based on earnings per share and valuation based on net income (deflated by the number of shares outstanding during the forecast month) is the difference between the correct time-weighted measure of shares outstanding and the proxy we use. As

shown in Panel A of Table 6, the difference in the valuation accuracy between net income and EPS is relatively small for most countries, suggesting that the impact of measurement error in the number of shares outstanding is typically not material. However, for three countries with relatively small number of observations (the UK, Germany and South Africa), the difference is quite large. To provide further evidence, we conducted the analysis again using forecasted pre-tax earnings, instead of forecasted net income, which has many more observations for the UK. As reported in Panel B of Table 6, the difference between EPS and pre-tax earnings is also relatively small for most countries, especially for the UK.

The results in Panel A of Table 7 indicate that sales forecasts exhibit only slightly better performance than actual sales. The %IMP numbers are all smaller than those observed for the other three value drivers, and the average improvement is just under 5 percent. Comparison of Sales forecasts with EPS forecasts, reported in Panel B, indicate that sales forecasts perform quite poorly, relative to EPS forecasts. The performance tends to be worse in countries such as Australia and UK, where sales forecasts are more common and are provided for all sectors. The %IMP values are all more negative than in the other comparisons with EPS forecasts, indicated by an average of about –36 percent. The comparisons of actual sales versus actual EPS reported in Panel C provide results similar to those observed in Panel B, except the superiority of EPS numbers is not as high in this Panel (the average %IMP is about –26 percent). Overall, these results suggest that even in countries where sales forecasts appear to be selectively provided for certain sectors, multiples based on sales tend to generate relatively large valuation errors.

6. Conclusion

For firms in 10 different countries, we analyze valuations generated using industry multiples based on the four most common value driver forecasts (and actuals) available:

earnings, cash flows, dividends, and sales. The results extend substantially our knowledge of the absolute and relative accuracy with which these valuations approach observed stock prices. We confirm the general result observed in prior research that earnings forecasts provide remarkably accurate valuations. Whereas the prior literature had documented the relatively superior performance of reported earnings over other value drivers, we are able to show that the same relative superior performance of earnings also extends to forecasted numbers for the same value drivers.

Examination of the levels of performance exhibited by actual and forecast values for the four value drivers offer results that confirm some of the conclusions of prior research on the value relevance of reported numbers in different countries. However, we also observe some results that are contrary to those reported in prior research. Some of these findings are possibly due to differences in the methodology employed. The multiples approach we use allows better controls for omitted value-relevant variables (such as growth and risk) and provides considerably more accurate valuations on average, relative to the regression approach employed in prior research.

Appendix A
Variable definition (by IBES)

Sector Industry Group Classification

I/B/E/S uses a proprietary classification scheme to categorize companies into homogenous groups according to business lines. In the United States a scheme similar to the S&P 500 Industry groupings is followed. For non-US companies a system loosely based on the Morgan Stanley Capital International Industry Classifications is used. I/B/E/S's classification system segregates companies at three different levels (Sector, Industry, Group). Sectors are subdivided into Industries, which are in turn subdivided into Groups.

Cash Flow Per Share (CPS)

A corporation's cash flow from operations, before investing and financing activities, divided by the weighted average number of common shares outstanding for the year.

Dividends Per Share (DPS)

A corporation's common stock dividends on an annualized basis, divided by the weighted average number of common shares outstanding for the year. In the US dividend per share is calculated before withholding taxes. But for some non-US companies, DPS is calculated after withholding taxes.

Earnings Per Share (EPS)

A corporation's net income from continuing operations (i.e., income after backing out discontinued operations, extra-ordinary charges, and other non-operating items) divided by the weighted average number of shares outstanding for the year.

Sales (SAL)

The Sales measure is a corporation's net revenue, generally derived from core business activities. For non-financial companies, the calculation of net revenue in most markets generally involves subtracting transportation and related operational costs from gross revenue/sales. Revenue recognition practices vary significantly from market to market, though generally the recording of revenue is based upon sales invoices issued during the accounting period. For banks, revenue is generally defined as net interest income plus net non-interest income. Net interest income is defined as interest income minus interest expenses. Net non-interest income includes primarily fees and commissions. For insurance companies, revenue is generally defined as net technical income plus net financial income. Net technical income is generally defined as technical income minus technical expenses. Technical income includes income from premiums and commissions received, reinsurer's share of claims paid, transferred net technical reserves, and reinsurer's share of technical reserves. Net financial income is generally defined as financial income minus financial expenses. Net financial income includes net interest income, net dividend income, and net foreign exchange gains.

Appendix B
Across-country variation in institutional features and definition of value drivers

country	legal system	rule of law	equity investor protection	creditor protection	market cap to GDP	accounting origin	tax-book conformity	accrual index	disclosure index	auditing	earnings per share	cash flows per share	dividends per share	total sales
Australia	1	10	4	1	0.36	1	0	0.82	75	0.42	normal	EBITDA	normal	normal
Canada	1	10	4	1	0.42	1	0	0.82	74	0.35	normal	EBD + deferred tax	normal	normal
France	0	8.98	2	0	0.26	0	1	0.64	69	0.14	before preferred dividends	EBD + interest + provisions	normal	normal
Germany	0	9.23	1	3	0.23	0	1	0.41	62	0.1	after DVFA adjustments	DVFA/SG: (EBD-fixed asset investments + other adj.)	normal	normal
Hong Kong	1	8.22	4	4	1.12	1	0	0.64	69	0	normal	normal	normal	normal
Japan	0	8.98	3	2	0.98	0	1	0.55	65	0.01	incl. XI, less dividends	not reported	normal	normal
South Africa	1	4.42	4	3	1.23	1	0	0.68	70	0.36	normal	EBD	normal	normal
Taiwan	0	8.52	3	2	0.63		na	na	65	0.02	incl. XI	net change in cash before debt	normal	normal
UK	1	8.57	4	4	0.87	1	0	0.82	78	0.54	normal	NI + depr.	normal	normal
US	1	10	5	1	0.55	1	0	0.86	71	0.24	normal	normal	normal	normal
Legal system: 1 for common law, 0 for civil law														
Rule of law: from low (0) to high (10), source La Porta et al (1997)														
Equity investor protection and creditor protection, source La Porta et al (1997)														
Market cap to GDP: based on 1990 numbers, source Francis et al (2001)														
Accounting origin: 1 for Anglo-Saxon, 0 for Continental, source Francis et al(2001)														
Accrual index: measures the deviation from cash flows, source Hung (2001), Francis et al (2001)														
Disclosure index: measures the financial items disclosed in financial reports, source Franncis et al (2001),														
Auditing: measures the among of money spent on audits (as a percentage of GDP), source Francis et al (2001)														
Value drivers: per share earnings, cash flows, and dividends, and total sales, source IBES manual. “Normal” refers to the description provided in Appendix A.														
EBD=earnings before depreciation, EBITDA=earnings before interest, taxes, depreciation and amortization, XI=extraordinary items, NI=net income														

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Figure 1
Distribution of pricing errors from industry multiples based on 2-year out EPS

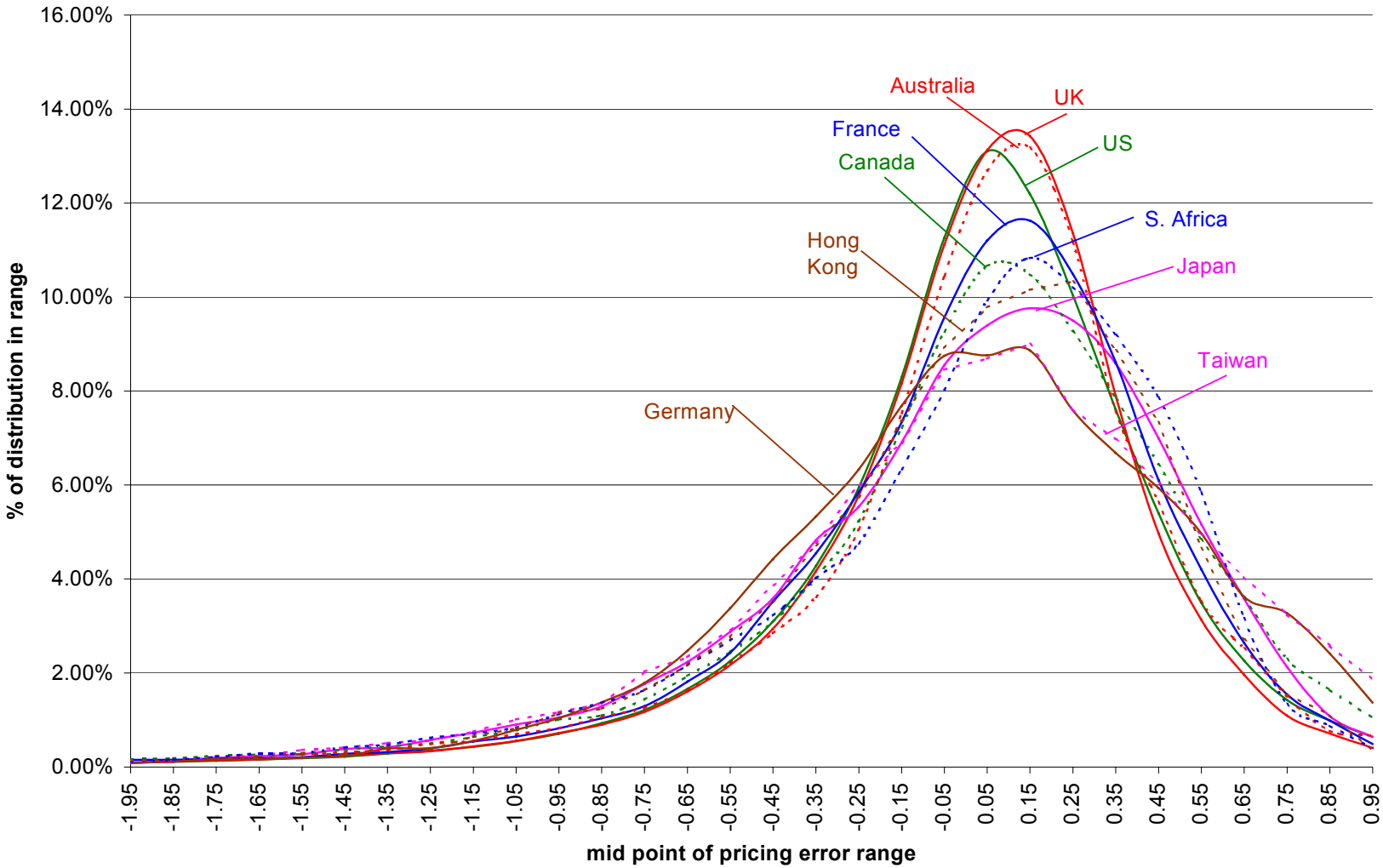
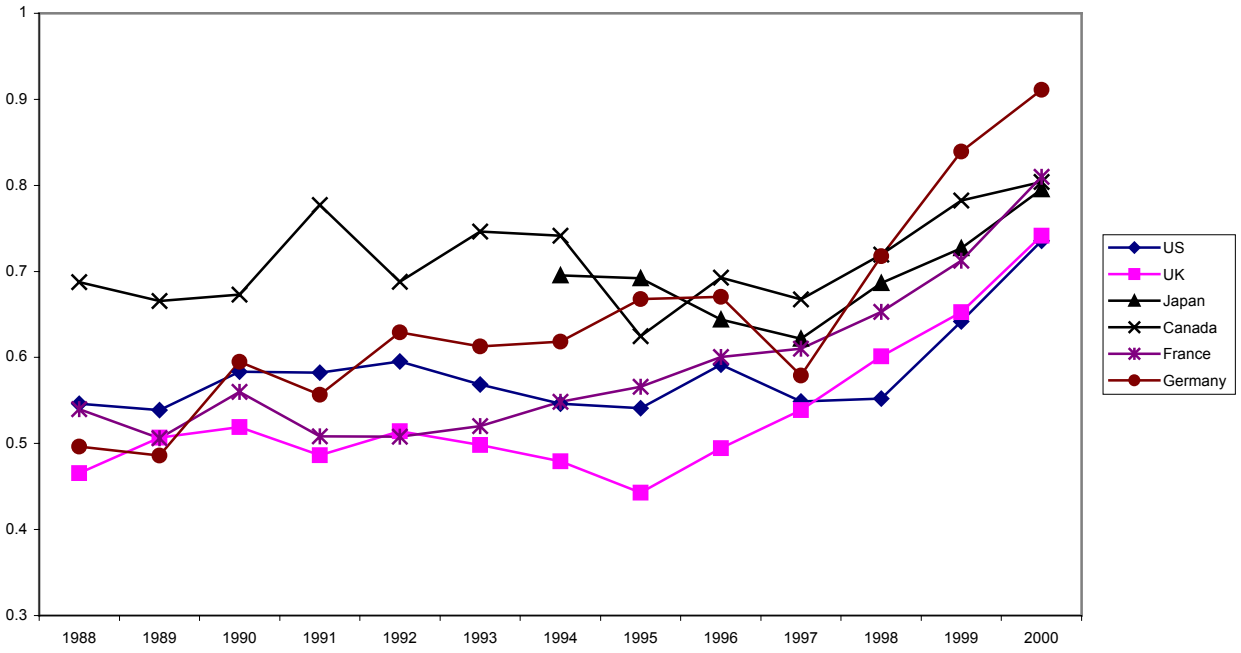
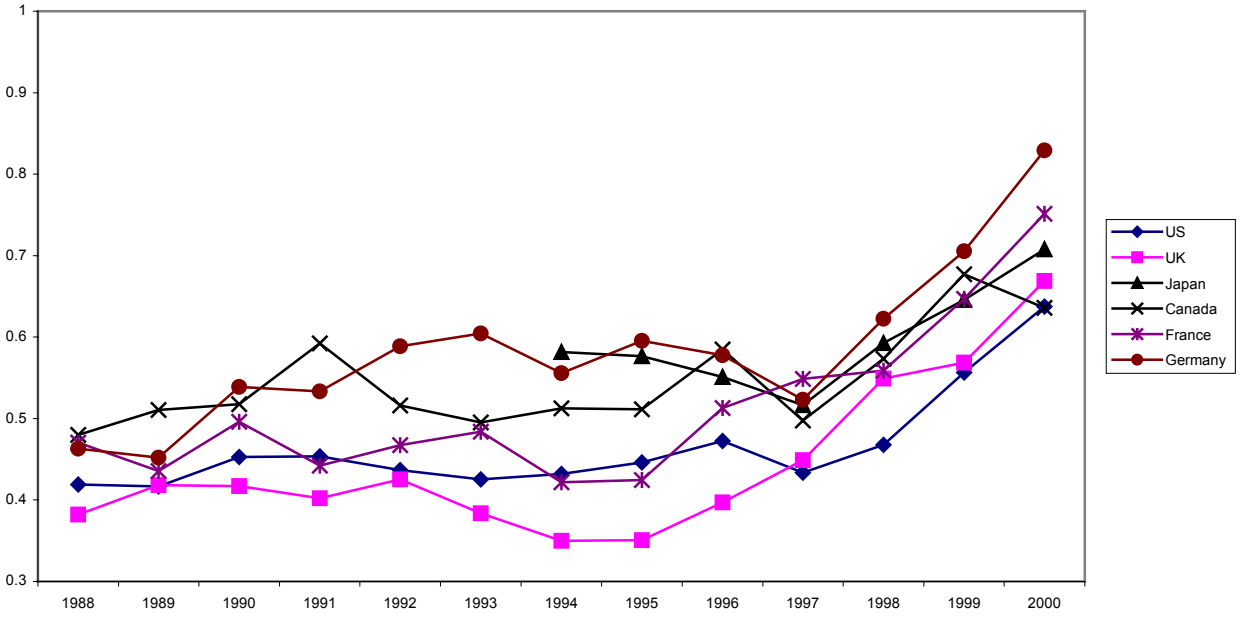


Figure 2
Time-series of interquartile ranges for valuation errors from EPS multiples

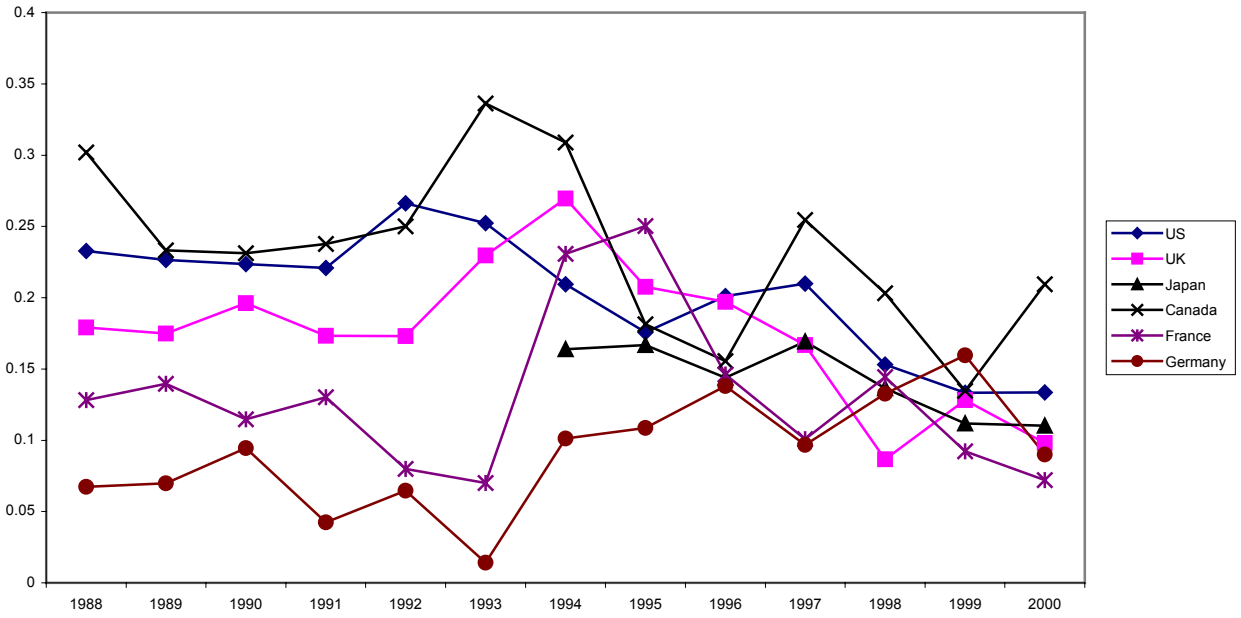
Panel A: EPS Actual



Panel B: EPS forecast



Panel C: Improvement form using EPS forecast relative to EPS actual



Panel D: Number of observations

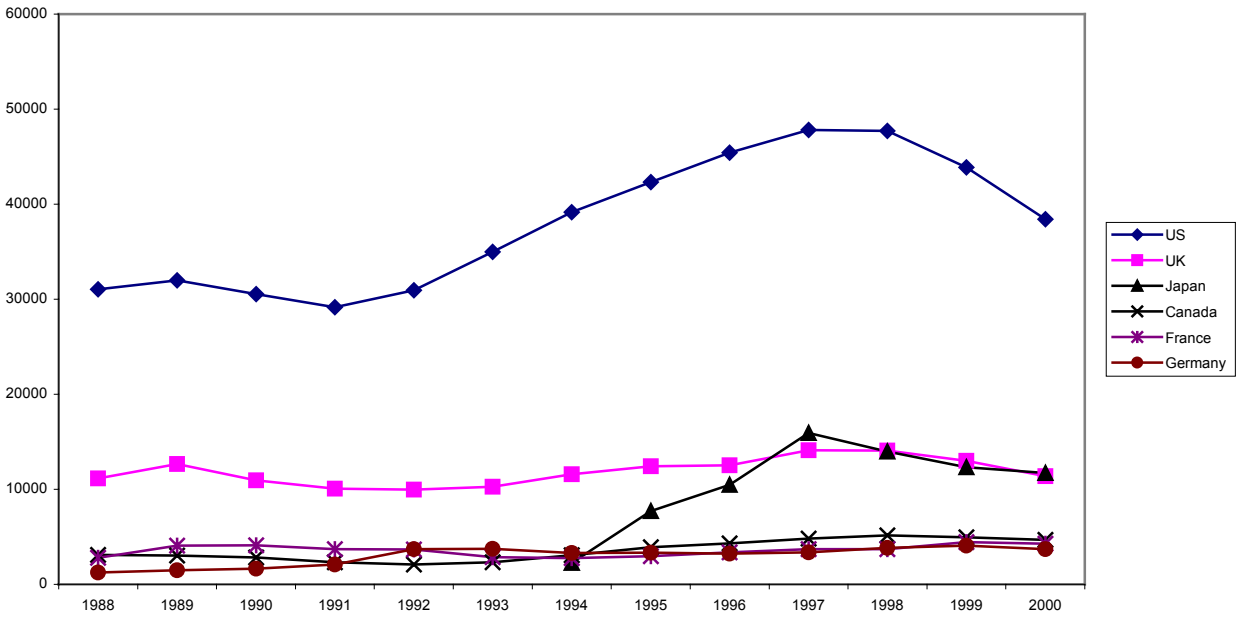


Table 1
Distribution of forecasts across different sectors in each country

Panel A: EPS

Sector	US	UK	JAPAN	CANADA	FRANCE	GERM.	AUSTR.	TAIWAN	SA	HK	Mean
FINANCE	21%	14%	6%	15%	19%	18%	21%	10%	19%	36%	18%
HEALTH CARE	8%	3%	3%	1%	4%	5%	2%	0%	1%	0%	3%
CONSUMER NON-DURABLES	6%	11%	12%	5%	13%	11%	9%	19%	12%	12%	11%
CONSUMER SERVICES	15%	25%	18%	17%	25%	14%	19%	3%	11%	24%	17%
CONSUMER DURABLES	4%	2%	5%	0%	2%	5%	1%	2%	0%	0%	2%
ENERGY	5%	2%	1%	21%	2%	0%	9%	0%	0%	0%	4%
TRANSPORTATION	2%	1%	4%	0%	1%	0%	0%	4%	0%	1%	1%
TECHNOLOGY	16%	7%	9%	6%	6%	4%	1%	13%	7%	9%	8%
BASIC INDUSTRIES	7%	10%	14%	23%	8%	10%	27%	22%	41%	0%	16%
CAPITAL GOODS	10%	22%	27%	6%	21%	28%	12%	28%	9%	14%	18%
PUBLIC UTILITIES	6%	2%	1%	7%	0%	6%	0%	0%	0%	1%	2%
MISCELLANEOUS/UNDESIGNAT	0%	2%	0%	0%	1%	1%	1%	0%	0%	3%	1%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Panel B: DPS

Sector	US	UK	JAPAN	CANADA	FRANCE	GERM.	AUSTR.	TAIWAN	SA	HK	Mean
FINANCE	N/A	15%	7%	N/A	18%	19%	28%	16%	20%	39%	20%
HEALTH CARE	N/A	2%	3%	N/A	4%	5%	2%	0%	1%	0%	2%
CONSUMER NON-DURABLES	N/A	12%	12%	N/A	14%	8%	9%	7%	16%	16%	12%
CONSUMER SERVICES	N/A	27%	18%	N/A	26%	16%	24%	0%	15%	27%	19%
CONSUMER DURABLES	N/A	3%	5%	N/A	2%	5%	0%	0%	0%	0%	2%
ENERGY	N/A	1%	1%	N/A	1%	0%	5%	0%	0%	0%	1%
TRANSPORTATION	N/A	2%	4%	N/A	1%	0%	0%	2%	0%	0%	1%
TECHNOLOGY	N/A	7%	9%	N/A	5%	3%	0%	10%	8%	5%	6%
BASIC INDUSTRIES	N/A	9%	13%	N/A	6%	8%	20%	34%	31%	0%	15%
CAPITAL GOODS	N/A	22%	27%	N/A	21%	31%	9%	32%	10%	12%	21%
PUBLIC UTILITIES	N/A	1%	1%	N/A	0%	5%	0%	0%	0%	1%	1%
MISCELLANEOUS/UNDESIGNAT	N/A	0%	0%	N/A	0%	0%	0%	0%	0%	0%	0%
Total	N/A	100%	100%	N/A	100%	100%	100%	100%	100%	100%	

Panel C: CPS

Sector	US	UK	JAPAN	CANADA	FRANCE	GERM.	AUSTR.	TAIWAN	SA	HK	Mean
FINANCE	0%	7%	N/A	11%	7%	4%	21%	7%	33%	43%	15%
HEALTH CARE	1%	3%	N/A	0%	5%	5%	3%	0%	0%	0%	2%
CONSUMER NON-DURABLES	0%	12%	N/A	4%	16%	9%	10%	18%	12%	14%	11%
CONSUMER SERVICES	13%	31%	N/A	14%	29%	23%	25%	1%	14%	29%	20%
CONSUMER DURABLES	0%	3%	N/A	0%	3%	5%	0%	0%	0%	0%	1%
ENERGY	69%	2%	N/A	33%	1%	0%	8%	0%	0%	0%	13%
TRANSPORTATION	0%	2%	N/A	0%	0%	0%	0%	3%	0%	0%	1%
TECHNOLOGY	0%	7%	N/A	1%	8%	1%	1%	13%	16%	5%	6%
BASIC INDUSTRIES	8%	9%	N/A	26%	7%	7%	25%	27%	26%	0%	15%
CAPITAL GOODS	0%	22%	N/A	4%	24%	41%	7%	32%	0%	9%	15%
PUBLIC UTILITIES	9%	2%	N/A	6%	0%	5%	1%	0%	0%	1%	3%
MISCELLANEOUS/UNDESIGNAT	0%	0%	N/A	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	N/A	100%	100%	100%	100%	100%	100%	100%	

Panel D: SAL

Sector	US	UK	JAPAN	CANADA	FRANCE	GERM.	AUSTR.	TAIWAN	SA	HK	Mean
FINANCE	7%	5%	7%	0%	8%	6%	19%	7%	0%	47%	11%
HEALTH CARE	13%	4%	3%	11%	6%	7%	4%	0%	0%	0%	5%
CONSUMER NON-DURABLES	4%	13%	12%	0%	15%	2%	10%	15%	35%	6%	11%
CONSUMER SERVICES	23%	30%	18%	22%	26%	23%	25%	2%	20%	30%	22%
CONSUMER DURABLES	3%	2%	5%	0%	2%	5%	0%	3%	0%	0%	2%
ENERGY	5%	2%	1%	19%	0%	0%	7%	0%	0%	0%	3%
TRANSPORTATION	2%	2%	3%	0%	1%	0%	0%	4%	0%	0%	1%
TECHNOLOGY	29%	9%	8%	35%	14%	18%	2%	24%	26%	7%	17%
BASIC INDUSTRIES	4%	9%	14%	0%	7%	7%	23%	20%	19%	0%	10%
CAPITAL GOODS	6%	21%	27%	0%	21%	30%	8%	25%	0%	7%	15%
PUBLIC UTILITIES	5%	3%	1%	13%	0%	1%	2%	0%	0%	4%	3%
MISCELLANEOUS/UNDESIGNAT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Table 2
Valuation errors from EPS multiples

Country	sample size	comparison group is: industry		all firms		%imp	%imp1	%imp2	%imp3
		Actual	Forecast	Actual	Forecast	3 vs. 2	5 vs. 4	2 vs. 4	3 vs. 5
	1	2	3	4	5	6	7	8	9
United States	612,876	0.572	0.456	0.687	0.563	20.30%	18.10%	16.80%	19.00%
United Kingdom	165,081	0.535	0.440	0.589	0.503	17.90%	14.60%	9.10%	12.50%
Japan	80,182	0.697	0.599	0.738	0.643	14.10%	12.80%	5.60%	6.90%
Canada	53,173	0.717	0.542	0.841	0.702	24.40%	16.50%	14.70%	22.80%
France	49,574	0.599	0.518	0.695	0.616	13.50%	11.30%	13.80%	16.00%
Germany	41,210	0.673	0.603	0.792	0.732	10.40%	7.60%	15.10%	17.60%
Australia	30,562	0.531	0.436	0.596	0.516	17.90%	13.40%	10.90%	15.50%
Taiwan	26,007	0.753	0.627	0.806	0.705	16.70%	12.60%	6.60%	11.00%
South Africa	25,343	0.626	0.570	0.816	0.741	8.90%	9.20%	23.30%	23.10%
Hong Kong	22,549	0.620	0.545	0.742	0.692	12.10%	6.70%	16.40%	21.20%
Average	110,656	0.632	0.534	0.730	0.641	15.62%	12.28%	13.23%	16.56%

Valuation error equals the actual price less the predicted price, scaled by the actual price. The predicted price is calculated by multiplying the value driver for that firm by the multiple, where the multiple is the harmonic mean of the ratio of the price to value driver for the remaining firms in the comparison group. For each of the ten countries, the table reports the interquartile range (IQ) of the price-deflated valuation errors for two valuation drivers: the most recent annual EPS reported (Actual) and the EPS forecast for the upcoming year. When calculating multiples, two comparison groups are used: all other firms in the same industry, and all other firms in the cross-section of that country. The improvement in valuation error (%imp) is described by making pairwise comparisons in columns 6 through 9 for the four sets of interquartile ranges. $\%imp\ x\ vs.\ y = \frac{IQ_y - IQ_x}{IQ_y}$. All 40 comparisons are associated with t-statistics, based on a bootstrap approach, that are highly significant.

Table 3
Valuation errors from EPS multiples
Comparing two-year-out EPS forecast (forecast EPS2) with reported EPS

Country	actual	EPS2 Forecast	%IMP	t-stat	N
United States	0.577	0.411	28.90%	1271.1	550,296
United Kingdom	0.535	0.403	24.70%	616.5	156,739
Japan	0.679	0.547	19.40%	264.3	61,355
Canada	0.730	0.485	33.60%	505.0	51,932
France	0.597	0.474	20.50%	187.1	43,380
Germany	0.680	0.577	15.10%	178.8	39,562
Australia	0.536	0.404	24.60%	209.1	30,381
Taiwan	0.731	0.593	19.00%	140.5	21,898
South Africa	0.624	0.545	12.60%	93.6	24,638
Hong Kong	0.621	0.526	15.30%	90.4	21,300
Average	0.631	0.497	21.37%	355.6	100,148

For each of the ten countries, the table reports the interquartile range of the price-deflated valuation errors when the valuation is based on the most recently reported annual EPS ("Actual"), and when it is based on the EPS forecast for the next full year ("Forecast2"). %IMP is the percentage decrease in the interquartile range from using the forecasted EPS relative to actual EPS. t-stat is the t-statistic associated with %IMP.

Table 4
Valuation errors from dividend per share (DPS) multiples

Panel A: DPS forecast versus DPS actual

Country	Actual	Forecast	%IMP	t-stat	N
United Kingdom	0.716	0.654	8.60%	202.8	71,889
Japan	0.636	0.624	2.00%	59.5	121,443
France	0.802	0.713	11.00%	107.9	18,386
Germany	0.708	0.668	5.70%	41.8	10,122
Australia	0.589	0.473	19.60%	132.0	14,772
Taiwan	0.740	0.659	11.00%	16.8	891
South Africa	0.673	0.604	10.20%	62.0	8,525
Hong Kong	0.764	0.622	18.60%	106.3	7,378
Average	0.704	0.627	10.84%	91.1	31,676

Panel B: DPS forecast versus EPS forecast

Country	EPS	DPS	%IMP	t-stat	N
United Kingdom	0.496	0.666	-34.40%	-415.3	73,989
Japan	0.613	0.630	-2.70%	-32.2	85,877
France	0.563	0.749	-33.10%	-181.8	19,856
Germany	0.613	0.716	-16.80%	-85.4	11,920
Australia	0.431	0.506	-17.30%	-88.5	16,413
Taiwan	0.517	0.719	-39.10%	-37.9	1,862
South Africa	0.581	0.626	-7.70%	-32.8	9,782
Hong Kong	0.602	0.644	-7.10%	-29.8	8,001
Average	0.552	0.657	-19.78%	-113.0	28,463

Panel C: DPS actual versus EPS actual

Country	EPS	DPS	%IMP	t-stat	N
United Kingdom	0.565	0.710	-25.70%	-274.5	70,155
Japan	0.686	0.639	6.90%	79.9	79,779
France	0.621	0.795	-28.10%	-119.4	16,920
Germany	0.623	0.711	-14.10%	-70.9	9,754
Australia	0.448	0.582	-29.80%	-137.4	14,430
Taiwan	0.662	0.753	-13.60%	-16.8	963
South Africa	0.601	0.649	-8.00%	-36.2	8,673
Hong Kong	0.648	0.748	-15.40%	-56.0	6,908
Average	0.607	0.698	-15.98%	-78.9	25,948

Each panel reports, for each country (first column), the interquartile range of the price-deflated valuation errors for two alternative value drivers (the second and third columns), the percentage decrease in the interquartile range from using the value driver in the third column relative to the value driver in the second column (%IMP), and t-statistic associated with %IMP (t-stat).

Table 5
Valuation errors from cash flow per share (CPS) multiples

Panel A: CPS forecast versus CPS actual

Country	Actual	Forecast	%IMP	t-stat	N
United States	0.741	0.620	16.30%	90.2	10,086
United Kingdom	0.703	0.598	14.90%	143.1	40,786
Canada	0.657	0.536	18.40%	131.6	16,991
France	0.753	0.695	7.70%	65.0	16,864
Germany	0.733	0.666	9.20%	35.8	5,957
Australia	0.672	0.545	18.90%	96.7	11,800
Taiwan	0.731	0.630	13.80%	54.1	6,989
South Africa	0.912	0.674	26.10%	26.8	841
Hong Kong	0.772	0.765	0.90%	3.2	3,364
Average	0.742	0.637	14.02%	71.8	12,631

Panel B: CPS forecast versus EPS forecast

Country	EPS	CPS	%IMP	t-stat	N
United States	0.626	0.578	7.70%	30.1	7,922
United Kingdom	0.480	0.610	-27.10%	-237.5	42,806
Canada	0.598	0.519	13.20%	80.2	15,040
France	0.573	0.687	-19.70%	-95.0	15,931
Germany	0.598	0.643	-7.60%	-25.6	5,857
Australia	0.495	0.571	-15.40%	-79.3	12,754
Taiwan	0.628	0.618	1.50%	7.0	7,235
South Africa	0.524	0.710	-35.50%	-37.5	894
Hong Kong	0.596	0.772	-29.70%	-80.8	3,733
Average	0.569	0.634	-12.51%	-48.7	12,464

Panel C: CPS actual versus EPS actual

Country	EPS	CPS	%IMP	t-stat	N
United States	0.696	0.652	6.30%	21.2	7,541
United Kingdom	0.546	0.701	-28.30%	-242.9	40,169
Canada	0.729	0.645	11.50%	74.7	14,234
France	0.642	0.738	-14.80%	-65.7	14,371
Germany	0.635	0.743	-17.10%	-40.1	4,914
Australia	0.516	0.656	-27.10%	-87.8	11,292
Taiwan	0.740	0.703	5.10%	17.7	6,579
South Africa	0.643	0.960	-49.20%	-31.4	734
Hong Kong	0.674	0.762	-13.10%	-26.3	2,879
Average	0.647	0.729	-14.08%	-42.3	11,413

Each panel reports, for each country (first column), the interquartile range of the price-deflated valuation errors for two alternative value drivers (the second and third columns), the percentage decrease in the interquartile range from using the value driver in the third column relative to the value driver in the second column (%IMP), and t-statistic associated with %IMP (t-stat).

Table 6
Potential errors in # of shares used to compute forecast EPS
Comparison of valuation errors from forecast EPS vs. forecast of net income (NI) and pre-tax profit (PRE) multiples

Panel A: NI forecast versus EPS forecast

Country	EPS	NI	%IMP	t-stat	N
United Kingdom	0.563	0.652	-15.90%	-91.6	9,978
Japan	0.616	0.617	-0.10%	-2.9	70,036
France	0.593	0.608	-2.60%	-27.9	23,458
Germany	0.616	0.789	-28.10%	-112.9	9,001
Australia	0.477	0.507	-6.10%	-47.9	17,793
Taiwan	0.615	0.641	-4.30%	-37.6	17,330
South Africa	0.516	0.724	-40.30%	-31.7	740
Hong Kong	0.654	0.660	-0.90%	-10.2	10,582
Average	0.581	0.650	-12.29%	-45.3	19,865

Panel B: PRE forecast versus EPS forecast

Country	EPS	PRE	%IMP	t-stat	N
United Kingdom	0.518	0.545	-5.30%	-95.1	75,109
Japan	0.620	0.673	-8.50%	-157.3	77,003
France	0.553	0.635	-14.80%	-58.2	5,156
Germany	0.706	0.769	-8.90%	-9.4	1,239
Australia	0.554	0.609	-9.90%	-56.3	9,058
Taiwan	0.541	0.591	-9.20%	-18.2	1,440
South Africa	0.590	0.679	-15.00%	-13.7	256
Hong Kong	0.513	0.653	-27.40%	-47.9	2,051
Average	0.574	0.644	-12.38%	-57.0	21,414

Each panel reports, for each country (first column), the interquartile range of the price-deflated valuation errors for two alternative value drivers (the second and third columns), the percentage decrease in the interquartile range from using the value driver in the third column relative to the value driver in the second column (%IMP), and t-statistic associated with %IMP (t-stat).

Table 7
Valuation errors from sales (SAL) multiples

Panel A: Sales forecast versus Sales actual

Country	Actual	Forecast	%IMP	t-stat	N
United States	0.93	0.878	5.60%	94.7	56,022
United Kingdom	0.872	0.837	4.00%	60.8	47,102
Japan	0.837	0.829	1.00%	31.5	72,032
Canada	1.215	1.14	6.20%	14	1,638
France	0.966	0.918	4.90%	65.9	20,497
Germany	1.091	1.01	7.40%	49.9	9,269
Australia	0.912	0.837	8.20%	63.8	11,784
Taiwan	0.828	0.829	-0.10%	-1.2	14,292
South Africa	0.975	0.949	2.60%	6.4	941
Hong Kong	1.03	0.93	9.70%	34.8	3,843
Average	0.966	0.916	4.95%	42.1	23,742

Panel B: Sales forecast versus EPS forecast

Country	EPS	SAL	%IMP	t-stat	N
United States	0.706	0.873	-23.70%	-164.4	40,019
United Kingdom	0.54	0.844	-56.30%	-395.3	44,071
Japan	0.613	0.819	-33.60%	-336.2	63,103
Canada	0.738	0.958	-29.80%	-25.3	902
France	0.626	0.886	-41.50%	-206.2	18,029
Germany	0.749	0.991	-32.20%	-76.5	7,103
Australia	0.532	0.812	-52.50%	-154.7	10,789
Taiwan	0.646	0.825	-27.70%	-85.5	12,842
South Africa	0.706	0.89	-26.10%	-18.7	720
Hong Kong	0.639	0.899	-40.70%	-60	3,218
Average	0.650	0.880	-36.41%	-152.3	20,080

Panel C: Sales actual versus EPS actual

Country	EPS	SAL	%IMP	t-stat	N
United States	0.777	0.917	-18.00%	-140.3	38,285
United Kingdom	0.606	0.866	-42.90%	-288.6	42,581
Japan	0.685	0.849	-24.00%	-172.4	58,759
Canada	0.846	0.971	-14.70%	-14.2	808
France	0.699	0.938	-34.30%	-124.2	16,728
Germany	0.833	1.046	-25.70%	-65.3	6,440
Australia	0.586	0.853	-45.60%	-106.7	10,195
Taiwan	0.742	0.833	-12.20%	-48.1	11,955
South Africa	0.867	0.867	-0.10%	-0.2	787
Hong Kong	0.696	1.009	-45.10%	-72	2,977
Average	0.734	0.915	-26.26%	-103.2	18,952

Each panel reports, for each country (first column), the interquartile range of the price-deflated valuation errors for two alternative value drivers (the second and third columns), the percentage decrease in the interquartile range from using the value driver in the third column relative to the value driver in the second column (%IMP), and t-statistic associated with %IMP (t-stat).