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Product Market Competition and Analyst Forecasting Activity: International Evidence[1]

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Abstract

In this study, we investigate how product market competition affects the extent of analyst following and the properties of analyst forecasts. Using a broad sample of firms from 37 countries over the 1990 to 2008 period, we find that firms that operate in more concentrated industries and with stronger pricing power are associated with greater analyst following, higher forecast accuracy, and lower forecast dispersion. Moreover, the effect of product market power on analyst following and forecast properties is more pronounced in countries with less effective competition laws and higher entry costs. These findings suggest that high industry concentration and a dominant market position enhance the earnings predictability of firms and lower their information uncertainty, and that country-level institutions that promote competition effectively constrain the power in product markets.

Keywords: product market competition; analyst following; forecast accuracy; forecast dispersion; competition laws.

JEL classification: F30; G15; M41

Product Market Competition and Analyst Forecasting Activity:

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International Evidence

Abstract

In this study, we investigate how product market competition affects the extent of analyst following and the properties of analyst forecasts. Using a broad sample of firms from 37 countries over the 1990 to 2008 period, we find that firms that operate in more concentrated industries and with stronger pricing power are associated with greater analyst following, higher forecast accuracy, and lower forecast dispersion. Moreover, the effect of product market power on analyst following and forecast properties is more pronounced in countries with less effective competition laws and higher entry costs. These findings suggest that high industry concentration and a dominant market position enhance the earnings predictability of firms and lower their information uncertainty, and that country-level institutions that promote competition effectively constrain the power in product markets.

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1. Introduction

Competition in product markets has been identified as an important industry characteristic in explaining firms' profit volatility and information uncertainty (Gaspar and Massa, 2006; Hou and Robinson, 2006; Irvine and Pontiff, 2009; Peress, 2010; Valta, 2012). A number of theoretical and empirical studies have also demonstrated that product market competition influences firms' disclosure practices (Campbell, 1979; Verrecchia, 1983; Gal-Or, 1985; Clinch and Verrecchia, 1997). Given that financial analysts use earnings properties and corporate disclosures as inputs in their forecasts, the intensity of product market competition may therefore affect the forecasts of financial analysts. Exploring this link, Gaspar and Massa (2006) and Datta et al. (2011) find that analysts' earnings forecasts are more accurate and less dispersed for firms in concentrated industries and with strong pricing power. In contrast, Ali et al. (2014) show that firms in concentrated industries are associated with greater forecast errors, higher forecast dispersion, and higher volatility of analyst forecast revisions. Given the mixed evidence, in this study, we attempt to address this unresolved issue using a cross-country sample. Specifically, we investigate (1) how product market competition affects the intensity and performance of analyst forecasting, and (2) whether the effect of competition on forecasting activity varies across the country-level institutions that govern product market competition.

We focus on a cross-country context for two reasons. First, studies on industrial organization show that high industry concentration and a strong market position reflect the survival of the fittest under dynamic competition (e.g., Demsetz, 1973; Carter, 1978). Therefore, the extant evidence on the association between competition and the properties of analyst forecasts may be driven by omitted variables that jointly explain the competition measures and the analyst forecast attributes. Our cross-country sample

allows us to investigate the relation between competition and analyst forecasting activity across different country-wide institutions governing product market competition, which mitigates the endogeneity concern. Second, previous evidence derived from U.S. samples may not be generalizable to other countries due to differences in relation to the legal institutions, business environments, and the openness of the product market. Our international sample enables us to provide out-of-sample evidence.

Firms in concentrated industries are able to earn monopolistic rents by setting prices above the normal level (Shepherd, 1972; Strickland and Weiss, 1976). Similarly, firms with a dominant market position command greater pricing power and thus are better able to maintain a high profit margin (Mueller, 1977; Eaton and Lipsey, 1981; Cheng, 2005). Moreover, firms with greater market power can pass on idiosyncratic cost shocks to consumers rather than absorbing such shocks, which reduces the firms' earnings volatility and future performance uncertainty (Gaspar and Massa, 2006; Hou and Robinson, 2006; Irvine and Pontiff, 2009). The reduced idiosyncratic risk due to strong market power encourages investors to participate in stock trading (Peress, 2010).

Firms that operate in concentrated industries and that exercise significant pricing power tend to earn greater profits and exhibit lower earnings volatility and larger trading volumes. Accordingly, financial analysts have a stronger incentive to cover these firms to increase their fees from investment recommendations, trading commissions, and investment banking services, and to meet the information demands of current and potential shareholders (O'Brien and Bhushan, 1990; Barth et al., 2001). In addition, firms exposed to intense competition are associated with greater information complexity due to the increased rate of innovation activities (Nickell, 1996; Hou and Robinson 2006), which makes the future earnings of such firms more difficult to forecast. In contrast, firms in more concentrated industries and with greater pricing

power are subject to less uncertainty about earnings, which enables financial analysts to better predict their future earnings. Moreover, if the fundamental uncertainty of future earnings is lower for firms with greater market power, analysts are likely to exhibit greater consensus on their forecasts (Barron et al., 1998; Barron and Stuerke, 1998).

Nevertheless, a countervailing argument suggests that analysts can provide more profitable investment recommendations by following less predictable firms due to the greater demand for private information about these firms. Financial analysts may have a greater incentive to gather private information and expand their efforts to improve forecast accuracy when earnings predictability is low (O'Brien and Bhushan, 1990; Kross et al., 1990; Das et al., 1998). Another factor that obscures the relation between competition and analysts' forecasts is information disclosures. One line of theoretical research contends that firms with a strong market position may disclose less to avoid revealing proprietary information to current and potential competitors (Campbell, 1979; Gal-Or, 1985). A competing view posits that firms with strong market power may provide more voluntary disclosures due to lower proprietary costs (Verrecchia, 1983; Clinch and Verrecchia, 1997). Ultimately, the overall relation between product market competition and analyst following and forecast properties is an empirical question.

We measure product market competition at the industry level using the Herfindahl-Hirschman index and at the firm level using the industry-adjusted price-cost margin. Using a sample of 53,226 firm-years across 37 countries over 1990-2008, we find that analyst coverage is higher for firms in more concentrated industries and with greater pricing power, and that analysts provide more accurate and less dispersed forecasts for such firms. Importantly, the competition measures exhibit incremental explanatory power over the historical earnings volatility, which implies that industry-level concentration and firm-level pricing power have broader implications for firms' underlying performance and information uncertainty than the effects captured by

historical earnings volatility. This finding supports the notion that a less competitive industry and a dominant position within an industry improve firms' earnings predictability and reduce their information complexity. Moreover, the above associations are more pronounced in countries with weaker competition laws and higher entry barriers, which suggests that country-wide institutions have a first-order effect in shaping competitive environments and that product market power is more resilient in the absence of strong institutions that foster free competition. Furthermore, exploiting the deregulation of the electricity and gas industries of 13 European countries, we find that analyst following and forecast accuracy are lower and forecast dispersion is higher in the post-deregulation period than in the pre-deregulation period. Our results are robust to using alternative competition measures, industry-level analyses, different sample selection procedures, and alternative estimation methods.

This study contributes to the literature in two ways. First, we add to the literature on the relation between competition and analyst forecasts by exploring the cross-country variations in the relation. Our evidence provides useful insights into the production of analysts' information under the different institutions that govern competition in the product market. Second, Peress (2010) shows that firms' dominant power in product markets stimulates investors' trading activity and enhances the informativeness of stock prices. Our results suggest that the improved efficiency of analyst forecasting is a possible mechanism through which product market power enhances price informativeness.

The remainder of this study is structured as follows. In Section 2, we develop the hypotheses. Section 3 describes the data and sample selection. Section 4 reports the empirical analyses and sensitivity analyses. Section 5 concludes the study.

2. Hypothesis Development

2.1 Product market competition and analyst forecasting activity

A strong market position established by high entry barriers or collusion among competitors enables firms to make above-normal profits and delay the decline of high levels of profitability to the norm (Shepherd, 1972; Strickland and Weiss, 1976; Mueller, 1977; Cheng, 2005). Market power works as a natural hedge to smooth out cash flow fluctuations by allowing firms to pass on a large proportion of idiosyncratic shocks to their customers (Gaspar and Massa, 2006; Hou and Robinson, 2006; Irvine and Pontiff, 2009). Moreover, the presence of market power further enables firms to deter the entrance of new competitors and avoid competition, thereby reducing the uncertainty about their future performance (Gaspar and Massa, 2006; Irvine and Pontiff, 2009).[3]

The effect of competition on firms' underlying earnings streams and information uncertainty has important implications for the production of analysts' information. The information demands of current and potential shareholders are greater for firms with strong market power because market leaders attract more investor attention and have higher trading volumes (Barber and Odean, 2008; Peress, 2010). To the extent that it reduces earnings volatility and improves the predictability of future earnings, strong market power lowers the cost of generating accurate analyst forecasts (Lys and Soo, 1995). Moreover, the co-movement between industry performance and individual firm performance is greater in more concentrated industries (Piotroski and Roulstone, 2004), which makes industry news more useful in predicting the future earnings of industry members. Stated another way, it is more difficult to interpret the public information on firms operating in competitive industries.

[3] Conversely, the financial strength of firms also affects their product market performance (Bolton and Scharfstein, 1990). When a firm's financial leverage is high and its internal financing is restricted, the financial constraint leads the firm to make sub-optimal investments and encourages its rivals to attempt to gain market share by increasing their investments (Campello, 2003, 2006; Haushalter et al., 2007; Fresard, 2010).

Analysts' forecast accuracy measures how well analysts understand and predict the prospects of firms. Because strong market power insulates firms from idiosyncratic shocks, it increases the predictability of earnings and enhances the precision of analysts' forecasts. When firms' earnings are less volatile, their historical earnings are more informative about their underlying economic fundamentals and are more related to their future earnings. If competition influences the degree of uncertainty about firms' underlying profitability, then it should be easier for analysts to forecast the earnings of firms in less competitive industries and firms with a stronger market position.

The dispersion in analyst earnings forecasts is viewed as an indicator of information uncertainty, which potentially stems from either the uncertainty about a firm's future performance or from a poor information environment (e.g., Barron and Stuerke, 1998; Zhang, 2006). Specifically, forecast dispersion reflects the complexity in understanding a firm's ability to generate future cash flows (Datta et al., 2011). Provided that market power reduces the information uncertainty faced by investors, we expect the divergence of analysts' individual forecasts to be lower for firms that enjoy greater market power. Overall, we predict that firms in more concentrated industries and firms with greater pricing power will attract more analysts and have greater forecast accuracy and less forecast dispersion.

Nevertheless, the link between competition and analyst forecasting remains ambiguous due to several confounding factors. First, the demand for earnings forecasts may increase when future earnings are less predictable. Stated alternatively, analysts may have incentives to expand their efforts to gather information on firms with more volatile earnings and higher information uncertainty (Kross et al., 1990; Lys and Soo, 1995; Das et al., 1998; Barth et al., 2001). Second, product market competition influences firms' disclosure practices. To protect their abnormal rents and maintain market power, firms that enjoy a dominant market position may restrict proprietary

information, thus leading to fewer disclosures. Nonetheless, proprietary costs may be of less concern to firms that command greater market power, which suggests that these firms are less likely to withhold proprietary information. However, the extant empirical evidence on the role of competition is inconclusive. For example, Clarkson et al. (1994) and Guo et al. (2004) both find that the competitive costs of disclosure are the major cost-based determinants of the extent of disclosure. Harris (1998) and Botosan and Harris (2000) find that firms in concentrated industries disclose fewer details about their segment performance. Bamber and Cheon (1998) report that management earnings forecasts are less precise for firms that exert a higher level of market power. Ali et al. (2014) find that firms in concentrated industries provide fewer and less precise disclosures. Taken together, the existing research indicates that the nature of the overall effect of competition on analyst forecasting activity remains an open question.

2.2 The effect of country-level competition environments

There is substantial variation in the degree of product market competition across countries. For instance, Khanna and Yafeh (2007) reveal that most of the emerging markets are dominated by rent-seeking business groups that wield considerable power in the product markets. In contrast, U.S. firms exercise relatively weak power in product markets because U.S. anti-trust laws prevent extreme industry concentration and explicit collusion among competitors (as evidenced, for instance, by the breakup of AT&T and the birth of the "Baby Bells"). The increasing market share taken by imported goods also makes the U.S. product market more competitive than those of other countries (Irvine and Pontiff, 2009).

The extent of product market competition is primarily shaped by country-level legislation and regulations (Djankov et al., 2002; Dyck and Zingales, 2004; Healy et al., 2014). Competition is more intense in countries where the laws and regulations on

competition effectively remove domestic impediments to competition, such as overt and tacit collusion among competitors, anti-competitive practices that discourage new entry, and restrictions on foreign trade and investment. In this respect, the promotion of free competition would quickly undermine the strong market power enjoyed by incumbent firms. Conversely, product market power is more resilient when country-wide regulations and policies are less conducive to competition. If the economic link between competition and analyst forecasting activity is valid, then we would expect product market power to have a greater effect on analyst forecasting activity in countries with weak competition environments.

3. Sample, Data, and Variable Descriptions

3.1 Sample and data

Our initial sample consists of all listed companies in 37 selected countries for the period from 1990 to 2008. We require each country to have at least 100 firm-year observations and at least one non-missing value for the two country-level institutional variables: the effectiveness of competition law (*COMPLAW*) and the level of entry cost (*ENTCOST*).

We retrieve stock price and financial data from the *Worldscope* database and analyst data from the historical *IBES* international database. To avoid bias in the measurement of product market competition as a result of the data requirements, we construct the competition variables, such as the Herfindahl-Hirschman index and industry-adjusted price-cost margin, using the full set of firms from our sample countries covered by the *Worldscope* database. After matching the analyst data with the stock price and financial data, we exclude observations in regulated industries, including financial institutions (SIC 6000-6999), utility firms (SIC 4810-4819 and 4910-4949), and government-owned companies (SIC 9000-9999), and observations

with missing values for the main and control variables.[4] Our final sample consists of 53,226 firm-year observations.

3.2 Variable measurement

We use two proxies for product market competition. We measure industry-level competition by the Herfindahl-Hirschman index (*HHI*), which is defined as the sum of the squared market shares of the firms competing in each industry for each country-year combination.[5] As all of the firms in the same industry receive the same *HHI* value, this metric captures cross-industry differences in competition and represents the market power common to all firms in a specific industry. A greater *HHI* value indicates less competition and stronger market power.

Previous research documents that firm-specific market power improves firm profitability and reduces the idiosyncratic fluctuation beyond the effect of industry concentration (Shepherd, 1972; Cheng, 2005; Hou and Robinson, 2006; Gaspar and Massa, 2006). Therefore, the price-cost margin (*PCM*), also referred to as the Lerner Index (Lerner, 1934), is commonly employed as a firm-specific competition measure. *PCM* is measured by net sales divided by operating costs, where operating costs are the sum of the cost of goods sold, selling, general, and administrative expenses, and depreciation, depletion, and amortization. Because different industries may have structurally different profit margins due to industry-wide factors rather than firm-specific characteristics, we construct the industry-adjusted price-cost margin to capture the pricing power specific to each firm. Following Gaspar and Massa (2006),

[4] Datta et al. (2011) define utility firms as having the three-digit SIC codes of 481 (telephone communications), 491 (electric services), and 494 (water supply). We further classify firms with three-digit SIC codes of 492 (gas production and distribution) and 493 (combination electric and gas, and other utilities) into the utility industry. Our results do not change when we include utility firms in the sample.

[5] In this paper, we classify industry membership using the two-digit SIC code, following Gaspar and Massa (2006) and Peress (2010). The results do not change qualitatively when we classify industry membership by the three-digit SIC code.

we measure the excess price-cost margin (*EPCM*) as the firm's price-cost margin less the industry median price-cost margin. By construction, this measure captures the intra-industry pricing power. A higher *EPCM* value indicates stronger pricing power and less competition.

We use two country-level measures, the effectiveness of competition law index (*COMPLAW*) and the level of entry cost index (*ENTCOST*), to assess the country-wide competition environments. The effectiveness of competition law index is obtained from Dyck and Zingales (2004) and captures the extent to which a country's competition law prevents unfair competition and encourages fair competition. A higher score indicates that a country's competition laws are more conducive to fair competition. The level of entry cost index was constructed by Djankov et al. (2002).[6] The entry cost includes all of the identifiable official expenses for obtaining the legal status needed to operate a firm as a share of per capita GDP in 1999, and represents the economic cost that a new business incurs in entering an industry. Higher entry costs restrict new entries and enhance the market power of incumbents.

We use the intensity of analyst following and analysts' forecast properties to quantify analyst forecasting activity. Analyst following (*AF*) is measured by the number of analysts who issued at least one earnings forecast for a firm in a given year. Following previous studies, forecast accuracy (*ACCU*) is defined as the absolute value of the deviation of the median forecast from the actual EPS, deflated by the stock price at the end of the previous fiscal year. We multiply forecast accuracy by -100 to make it easier to interpret the results. By definition, a higher value of *ACCU* represents more accurate forecasts. Forecast dispersion (*DISP*) is defined as the standard deviation of individual forecasts scaled by the stock price at the end of the previous fiscal year. We

[6] Djankov et al. (2002) also present the time that a new business takes to obtain the legal status to operate as a firm in business days. The results are qualitatively similar when we use entry time as an alternative measure of entry costs.

also multiply forecast dispersion by 100 for expositional purposes. O'Brien (1988) finds that the forecast date is relevant for determining forecast accuracy. Accordingly, as we are interested in assessing the overall effect of market competition, we compute the simple average of both *ACCU* and *DISP* across the 12 months during the firm's fiscal year.[7]

3.3 Empirical models

To explore the relation between competition and analyst forecasting activity, we develop the following multivariate regression model:

$$\begin{aligned} ANALYST_{it} = {} & \beta_0 + \beta_1 COMPETITION_{it} + \beta_2 INDSIZE_{it} + \beta_3 AF_{it} + \beta_4 SIZE_{it} \\ & + \beta_5 XLIST_{it} + \beta_6 LEV_{it} + \beta_7 SURPRISE_{it} + \beta_8 STDROE_{it} \\ & + \beta_9 CORR_{it} + \sum_j \beta_{10\,j} Year_j + \sum_k \beta_{11k} Country_k + \varepsilon_{it} \end{aligned} \quad (1)$$

where, for firm *i* in country *k* in year *t*, the dependent variable, *ANALYST*, represents one of the three measures of analyst forecasting activity, namely, analyst following (*AF*), forecast accuracy (*ACCU*), and forecast dispersion (*DISP*). *COMPETITION* refers to either the Herfindahl-Hirschman index (*HHI*) or the excess price-cost margin (*EPCM*). In addition, we include a broad set of determinants of analyst forecasting activity identified in the literature. We first control for industry size (*INDSIZE*), as measured by the natural log of the market value of equity in U.S. dollars for each two-digit SIC industry. Firms in a large industry may attract more attention from financial analysts because analysts tend to follow several industry members simultaneously when the industry has greater potential for investment banking services. Moreover, industry concentration is negatively associated with industry size because, if an economy of scale exists, then a larger industry can accommodate a greater number

[7] This approach is consistent with that of Lang and Lundholm (1996) and Hope (2003a, b). As O'Brien and Bhushan (1990) document that analyst activity levels off from the 11th month of the fiscal year, we alternatively measure analyst activity using the data from the 12th month of the fiscal year and obtain qualitatively similar results.

of competitors (Karuna, 2007).

In the regressions of forecast properties, we control for analyst following (*AF*) as a proxy for analysts' incentives to predict future earnings in response to competition among analysts (Lys and Soo, 1995). We include firm size (*SIZE*) as a proxy for multiple factors such as a firm's overall information availability, investors' attention, and trading volume, all of which conceivably affect analysts' incentives to cover a firm and the properties of their forecasts (e.g., Bhushan, 1989; Brennan and Hughes, 1991; Lang and Lundholm, 1996; Hope, 2003b). We also control for a firm's cross-listing status (*XLIST*), as firms that are cross-listed on the U.S. exchanges are followed by more analysts, presumably due to the greater disclosure requirements and regulatory scrutiny in the U.S. capital market (Lang et al., 2003).[8] We also add leverage ratio (*LEV*), earnings surprise (*SURPRISE*), standard deviation of return on equity (*STDROE*), and the correlation between stock returns and earnings (*CORR*) to the regression model (1), because forecast attributes are significantly related to financial leverage, the magnitude of earnings surprise, earnings variability, and the return-earnings correlation (O'Brien and Bhushan, 1990; Lang and Lundholm, 1996; Hope, 2003a, 2004; Lang et al., 2003, 2004).[9] Moreover, we use country-fixed effects to address the concern that the product market power variables may be related to unobservable country characteristics that explain analysts' forecast properties (Hope, 2003a, b). As an alternative way to control for country-level institution factors, we replace country-fixed effects with a set of country-wide institutions: legal origin (*LEGAL*), shareholder rights (*RIGHTS*), and law enforcement (*ENFORCE*). *LEGAL* is an indicator variable that equals one if the country's legal origin is common law, and

[8] The data on cross-listed firms are obtained from the JP Morgan Chase and Thomson Financial database (http://www.adr.com).

[9] Alternatively, we also use the standard deviation of the monthly returns over the previous three years instead of the standard deviation of annual earnings over the past three years (*STDROE*). The tenor of our empirical results remains the same, although the sample size drops significantly.

zero otherwise. *RIGHTS* is the shareholder rights index constructed by summing (1) vote by mail, (2) obstacles to the actual exercise of the right to vote, (3) minority representation on the board of directors, (4) an oppressed minority mechanism, (5) pre-emptive rights, and (6) the right to call a special shareholder meeting (Djankov et al., 2008). *ENFORCE* is the average of three legal enforcement measures in La Porta et al. (1998): (1) a measure of the efficiency of the judicial system that assesses the efficiency and integrity of the legal environment, (2) a rule-of-law index that assesses the law and order tradition of a country, and (3) a corruption variable that assesses the degree of government corruption (Leuz et al. 2003). It ranges from zero to ten, with higher scores indicating stricter enforcement. Finally, we include year dummies to account for time-fixed effects.

4. Empirical Results

4.1 Descriptive statistics and correlations

Table 1 shows the descriptive statistics and correlation coefficients of our research variables. Panel A of Table 1 presents the sample distribution across countries, and the country-level mean values of our key variables. There are wide cross-country variations in analyst following and forecast properties. As expected, there is also considerable variation in the intensity of the product market competition across countries. Japanese firms display the lowest degree of industry concentration (0.092), while New Zealand firms have the highest (0.686). With respect to the price-cost margin, Japanese firms command the weakest pricing power (1.070), whereas firms in Spain have the strongest pricing power (1.359).[10] Consistent with the common belief that the U.S. has more effective competition laws and lower entry barriers, our sample countries have less

[10] We report the country-level mean values of *PCM* rather than those of *EPCM* in Panel A of Table 1 because the mean of *EPCM* in each country is close to zero due to the industry adjustment.

competitive market environments compared to the U.S.[11] Panel A also reports the country-level competition indices in the two rightmost columns. Germany has the most effective competition laws among the sample countries, whereas Indonesia has the least effective competition laws. The entry cost is highest in Greece and lowest in New Zealand. Panel B of Table 1 reports the descriptive statistics for the full sample. The mean values of *HHI* and *PCM* are 0.248 and 1.141, respectively, which indicates the presence of strong market power among the sample firms. The mean and median of *EPCM* are much lower than the corresponding statistics of *PCM*, as a result of the industry median adjustment.[12] All of the industry- and firm-level control variables show considerable variations across the sample firms.

Panel C of Table 1 displays the correlation coefficients among the research variables. A few interesting correlations emerge. The industry-level competition measure (*HHI*) exhibits a weak positive correlation with the firm-level competition measure (*EPCM*), which implies that the two metrics capture different dimensions of product market competition and validates the use of both measures in our analysis. Analyst following is positively correlated with both competition proxies (*HHI* and *EPCM*). Forecast accuracy is negatively correlated with *HHI* but positively correlated with *EPCM*. Similarly, forecast dispersion is significantly positively correlated with *HHI* while negatively correlated with *EPCM*. As univariate correlation analysis does not take into account the effects of the other correlated variables, we consider the evidence to be suggestive and rely on the multivariate analyses to draw statistical

[11] Several countries in our sample exhibit very high *HHI* values because many industries in those countries are monopolistic or duopolistic. We retain such highly concentrated industries in the main analyses for the completeness of our sample, but perform a sensitivity analysis using a subsample with at least three firms in each industry. We find that our main results remain unchanged.

[12] The mean of *EPCM* is greater than its median because the unadjusted *PCM* is positively skewed. The median of *EPCM* (= 0.005) does not converge to zero completely because we construct *EPCM* using the full set of firms covered by the *Worldscope* database. The positive median value indicates that our sample firms with analyst forecast coverage are slightly more profitable than those without analyst coverage in the *Worldscope* universe.

inferences.

All three measures of analyst forecasting activity show generally significant correlations with most of the control variables in the predicted directions. Finally, the negative correlations between the competition variables and industry size suggest that it is important to control for industry size in explaining the cross-sectional differences in analyst forecasting activity.

4.2 The effect of product market competition on analyst forecasting activity

In this section, we conduct multivariate analyses to examine the effect of product market competition on the analyst forecast variables. The sample size varies slightly depending on whether the dependent variable is analyst coverage, forecast accuracy, or forecast dispersion. In all of the model specifications, we estimate the *t*-values using standard errors adjusted for heteroskedasticity and country and year clustering (Petersen, 2009).[13]

Table 2 lists the results of the regression of analyst following on product market competition. Columns (1) and (3) present the regression results based on the specifications with country fixed effects, while columns (2) and (4) report those of the specifications with the three country-level legal institution variables: legal origin (*LEGAL*), shareholder rights (*RIGHTS*), and law enforcement (*ENFORCE*).[14] Starting with the industry-level market competition proxy, columns (1) and (2) show that analyst following is positively and significantly associated with the Herfindahl-Hirschman index. The result indicates that analysts have greater incentives to follow firms operating in more concentrated industries, probably because analysts

[13] In our regression analyses, the *t*-statistics based on standard errors adjusted for country and year clustering are more conservative than those adjusted for firm and year clustering.

[14] The samples in columns (2) and (4) of Table 2 are slightly smaller than those in columns (1) and (3), respectively, because China and Poland have a missing value for *ENFORCE* and are excluded from the analyses. When we drop *ENFORCE* from the regression and re-do the analyses using the full set of sample countries, the results remain qualitatively similar.

incur lower costs in following firms that face less competition. For the firm-specific competition measure in columns (3) and (4), the coefficient on the excess price-cost margin is positive and significant, which suggests that analysts are more likely to cover the leading companies within an industry. The results for the control variables are generally consistent with those in the literature. Larger firms, cross-listed firms, and firms with a higher return-earnings correlation are covered by more analysts, whereas those with higher leverage and greater earnings surprise are less followed. Among the country-level institutional variables, analyst following is significantly higher in countries with common law legal origin than in those with other legal origins.

Table 3 presents the results of the regression of forecast accuracy on competition. Analysts' forecast accuracy is positively and significantly associated with both of the competition metrics (*HHI* and *EPCM*), thus supporting the view that the greater earnings predictability and lower information complexity stemming from less competition enable analysts to better forecast firms' future performance. Most of the control variables have significant coefficients with the predicted signs. Specifically, forecast accuracy is positively associated with analyst following and the return-earnings correlation, and negatively associated with financial leverage, earnings surprise, and earnings volatility. Moreover, forecast accuracy is positively related to industry size and negatively related to firm size, which implies that although analysts have strong incentives to spend additional time and resources on improving the accuracy of the earnings forecasts for firms in larger industries, the complex operations of larger firms make it more difficult to forecast their future earnings. As for the country-level legal institutions, forecast accuracy is significantly higher in common law countries. We also find that forecast accuracy is positively associated with effective law enforcement (*ENFORCE*), which is consistent with the previous evidence from Hope (2003b, 2004).

Table 4 reports the regression results on the relation between forecast dispersion and competition. Analysts' forecast dispersion is negatively and significantly associated with both *HHI* and *EPCM*. The results are consistent with the view that strong market power reduces information uncertainty, which, in turn, reduces the divergence in analyst expectations of a firm's future performance. The coefficients on most of the control variables match those of previous studies. Forecast dispersion is negatively associated with analyst following and the return-earnings correlation, and positively associated with firm size, earnings surprise, and earnings volatility. Moreover, forecast dispersion is significantly lower in countries with more effective law enforcement, consistent with the result from Preiato et al. (2015).

Taken together, the results in Tables 2 through 4 support the view that the greater earnings predictability and lower information uncertainty associated with strong market power reduce analysts' information acquisition and processing costs and make it less difficult to forecast future earnings. It is notable that our competition variables (*HHI* and *EPCM*) have an incremental effect on analyst forecasting activity, even after controlling for historical earnings volatility (*STDROE*). This result is consistent with the argument that a firm's ability to avoid competition and exercise market power not only reduces its cash flow fluctuations but also directly decreases the information uncertainty about its future performance. As such, the competition measures contain a wide range of information that exceeds that conveyed by the historical earnings volatility.

4.3 The effect of country-level competition environments

The industrial organization literature views product market competition as a dynamic process that is endogenously determined by free entry and exit in the industry (e.g., Raith, 2003). This implies that the above documented link between competition

and analyst forecasts could be attributable to omitted market or firm fundamentals. To address this concern, we investigate the variation in the relation between competition and analyst forecasting activity across different country-level institutions. If product market power indeed influences the production of analysts' information, then the effect should be more salient in countries where firms' competitive advantage is less threatened. We partition the full sample into two subsamples by the cross-country median value of the competition law index (*COMPLAW*) and the entry cost index (*ENTCOST*) and then re-estimate the regression model (1) for each subsample.[15]

Panel A of Table 5 presents the subsample regressions on the relation between analyst following and product market competition. The positive coefficients on both *HHI* and *EPCM* are consistently larger in countries with weak competition law than in those with strong competition law and the difference in coefficients across the subsamples is significant for both measures in columns (1) to (4).[16] Similarly, the coefficients on *HHI* and *EPCM* are systematically larger in countries with high entry costs than in those with low entry costs and the difference in coefficients is consistently significant in columns (5) to (8). The results indicate that the effect of product market power on analyst following is greater in countries with less effective competition laws and with higher entry costs.

Panel B of Table 5 presents the results of the subsample regressions of forecast accuracy on competition. In columns (1) to (4), the positive coefficients on *HHI* and *EPCM* are consistently greater in countries with weak competition laws than in strong

[15] The subsample analysis implicitly assumes that all of the control variables in equation (1), and not only the market power variables (*HHI* and *EPCM*), have different regression coefficients across the subsamples. We test the hypothesis that the coefficients of all of the control variables except the year and country dummies are jointly equal across the subsamples, and find that the null hypothesis is rejected consistently at the 1 percent level for all of the specifications in Table 5.

[16] We use the Wald test to examine the differences in the regression coefficients between the high and low *COMPLAW* (or *ENTCOST*) countries. The standard errors for the differences between the two subsamples are calculated via a seemingly unrelated regression system that jointly estimates the two country subsamples. See Fresard (2010) and Campello (2003) for examples.

competition law countries. In columns (5) to (8), the coefficients on the market power variables are also larger in countries with high entry costs than in low entry cost countries. The difference in the regression coefficients across the subsamples is significant across all of the specifications. The positive association between product market power and forecast accuracy is more pronounced in countries with less competitive environments.

Panel C of Table 5 reports the subsample regression results for forecast dispersion. The coefficients on the market power variables are more negative in countries with weak competition laws and in those with high entry costs. The cross-subsample difference in coefficients is also significant for all of the specifications. The overall results suggest that the effect of industry-wide and firm-specific market power on the production of analyst forecasts is greater in environments in which the competitive position of incumbents is less likely to be challenged. This finding lends further credence to the link between competition and analyst forecasts.

We further examine whether the different levels of market competition and the different sample sizes across the subsamples affect our subsample results. First, we find that the two competition variables have significantly different mean values across the subsamples. The (untabulated) means of *HHI* and *PCM* are significantly greater in countries with weak competition laws (or high entry costs) than in those with strong competition laws (or low entry costs), which is consistent with the view that firms possess greater market power in less competitive environments. However, this difference in competition intensity does not explain our findings. The greater mean value of *HHI* reduces the absolute value of its regression coefficient if all other things are equal. Specifically, the mechanically negative relation between the level of a regressor and its regression coefficient makes it more difficult to detect evidence suggesting that the association between product market power and analyst forecast

variables is more significant in countries with weak competition environments. In addition, we employ industry-adjusted *PCM* (i.e., *EPCM*) in the regression analyses. Therefore, the cross-country variation in *PCM* does not affect the relation between *EPCM* and analyst forecast variables.

Second, we observe in Table 5 that the sample size for countries with weak competition laws (or high entry costs) is substantially smaller than that of countries with strong competition laws (or low entry costs) because we split the full sample by the country-level median. It is well recognized that the significant effects of explanatory variables are more difficult to detect in smaller samples, all else being equal (Cohen 1988). However, we find that the coefficients on the market power variables are more significant in the smaller subsamples with lower test power (i.e., countries with weak competition laws and those with high entry costs). As a result, our subsample results are not attributable to the difference in the level of product market power or the difference in sample size across the subsamples.

4.4 Sensitivity analyses

We perform a series of sensitivity analyses to validate our findings. Table 6 summarizes the coefficients of the competition variables and we omit those of the control variables for brevity.

First, we adopt two alternative measures of competition, namely, the four-firm concentration ratio (*CR4*) and market share (*MS*), and repeat our main regressions. The four-firm concentration ratio (*CR4*) is measured as the sum of the market shares of the four largest firms in terms of net sales for each industry-country-year combination. Market share (*MS*) is measured as net sales divided by the sum of the net sales of all individual firms in each industry-country combination. The results presented in Panel A of Table 6 are consistent with the main results in Tables 2 to 5. Second, we perform

industry-level analyses to verify whether our results hold at the industry level. We use *HHI* and industry-average *PCM* to measure industry-level variations in product market competition. We transform each firm-level variable into an industry-level equally-weighted average for each industry-country-year combination. This test also alleviates the concern that our results are unduly influenced by industries with a large number of firm-year observations. The results reported in Panel B of Table 6 confirm our main findings. Third, as shown in Panel A of Table 1, our sample size varies substantially across countries, with firms from Japan and the U.K. representing 47 percent of the full sample. We re-estimate our main regression models after excluding firms from Japan and the U.K. Again, the regression results in Panel C remain consistent with those from our main analysis. Fourth, we apply weighted least squares (WLS) procedures with an equal weight placed on each country sample and present the regression results in Panel D. Specifically, the square root of the number of firm-year observations in each country serves as the weighting variable. This alternative estimation also controls for the effect of the uneven sample size across countries. Our results are robust to this alternative estimation method.

We further explore several different empirical issues to examine the sensitivity of our findings. Our untabulated results remain intact in all of the following tests. First, we split the sample period into two sub-periods, 1990-1999 and 2000-2008, and repeat the regression analyses for each sub-period. Second, we estimate the average of the annual regression coefficients and the associated standard errors using the Fama and MacBeth (1973) procedure. Third, we perform our analyst following analysis by adding to our sample all of the firms that are covered by *Worldscope*, but not by *IBES*, assuming zero analyst coverage for those firms. Finally, we re-estimate the regression of analyst coverage using the negative binomial model in which the dependent variable, analyst following (*AF*), ranges among nonnegative integers (Rock et al., 2001). In sum, our

findings are robust to the adoption of alternative competition measures, the choice of different sample selection procedures, and the application of alternative estimation methods.

4.5 The effect of industry-level deregulation on analyst forecasting activity

To gain additional insights into the relation between competition and analyst forecasts, we exploit the deregulation of the utility industry in Europe as a quasi-experimental setting. The electricity and gas industries in Europe underwent two stages of substantial liberalization and deregulation in 1996 and 2003 (Jamasb and Pollitt, 2005, Table 2; Asche et al., 2006). As the deregulation of the industry lowered the barriers to entry, European utility firms faced a significantly higher level of competition within and across countries. We focus on the utility industry in Europe because the deregulation process is clearly identifiable and a relatively large number of utility firms underwent the same process.

To test the effect of enhanced competition, we select utility firms with the three-digit SIC codes of 491 (electric services), 492 (gas production and distribution), and 493 (combination electric and gas, and other utility) over the 1990 to 2008 period in 13 European countries that experienced deregulation.[17] We then estimate the regressions of the analyst forecast variables on two deregulation indicators: *DEREG1* and *DEREG2*. *DEREG1* is defined as one for the sample years from 1996 to 2002, and zero otherwise. *DEREG2* is defined as one for the sample years from 2003 to 2008, and zero otherwise. *DEREG1* and *DEREG2* reflect the two phases of structural change in the electricity and gas industries in the 13 European countries. We include all of the

[17] The sample countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Norway, Spain, Sweden, Switzerland, and the U.K. Two non-E.U. countries, Norway and Switzerland, are included because they entered free trade agreements with European Union (E.U.) countries before 1990 (the starting year of our sample period). Among the European countries in Panel A of Table 1, Ireland, Netherlands, and Portugal are excluded because there are no valid observations on their electricity and gas industries in our data sources. Poland is excluded because it joined the European Union in 2004 (after the two deregulation events).

control variables in equation (1) in the regressions except the year dummies and *XLIST* because the two deregulation indicators are linearly dependent on the year dummies and none of the utility firms are cross-listed. We also control for a general trend in the analyst forecast variables by adding a time-trend variable *TREND* to the regressions, in which *TREND* is defined as the sample year minus 1989 (i.e., *TREND* = 1,…,19 corresponding to the sample years 1990 to 2008).

Table 7 presents the regression results regarding the effect of deregulation on analyst forecasting activity. As shown in column (1), the number of analysts following the European utility firms decreases significantly after the second stage of deregulation in 2003. In column (2), the forecast accuracy for the future earnings of utility firms declines significantly following both stages of deregulation. In column (3), the forecast dispersion increases significantly after the second stage of deregulation. The overall results suggest that the severe competition resulting from deregulation increases the cost of generating precise analyst forecasts by reducing the earnings predictability and increasing the information uncertainty of the electricity and gas industries in Europe.[18] This evidence lends some support for the causal link between product market competition and analyst forecasting activity.

5. Conclusion

This study provides evidence linking product market competition to the production of analysts' information in an international setting. Using industry- and firm-level measures of competition, we find that firms in more concentrated industries and with greater firm-specific pricing power receive significantly greater analyst coverage and have more accurate and less dispersed earnings forecasts. These findings are consistent with the notion that a less competitive industry environment and a

[18] The results in Table 7 should be interpreted with caution because our sample for the deregulation tests is much smaller than the full sample.

dominant position within an industry increase firms' earnings predictability and reduce their information uncertainty, which, in turn, improves the efficiency of analyst forecasting activity. Furthermore, the effect of competition on analyst following and forecast properties is more pronounced in countries with laxer competition laws and higher entry costs. This implies that institutional regulations that promote competition can effectively curb firms' market power, which in turn limits the effect of market power on the production of analysts' information. Our additional analysis reveals that the deregulation of the European electricity and gas industries led to lower analyst following and less accurate and more dispersed earnings forecasts in the post-deregulation period. Overall, the results of this study confirm that the intensity of the competition in product markets has important implications for the information efficiency in financial markets.

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Table 1 Summary statistics and correlations

Panel A presents the number of observations and the mean values of the research variables for each sample country. Panel B reports the descriptive statistics of the research variables. Panel C shows the correlation matrix of the research variables. The correlation coefficients in bold are significant at the 1 percent level. *AF* is the number of analysts issuing at least one earnings forecast for a firm in a given year. *ACCU* is the 12-month average of the absolute value of forecast errors measured as actual earnings per share minus the median forecast, deflated by the stock price at the beginning of the year. We multiply this variable by -100 so that higher values represent more accurate forecasts. *DISP* is the 12-month average of the standard deviation of analyst forecasts, deflated by the stock price at the beginning of the year. We multiply this variable by 100 to facilitate exposition. *HHI* is the sum of the squared market shares of individual firms competing in each industry-country-year combination. Industry membership is classified by the two-digit SIC code. *PCM* is net sales divided by operating costs. *EPCM* is a firm's *PCM* minus its industry median *PCM*. *INDSIZE* is the natural log of the sum of market value of equity in U.S. dollars for all two-digit SIC firms in each industry-country-year combination at the beginning of the year. *SIZE* is the natural log of a firm's total assets in U.S. dollars at the beginning of the year. *XLIST* is an indicator variable that equals one if the firm has an ADR (level II and III) or a GDR, and zero otherwise. *LEV* is the ratio of total liabilities to total assets at the beginning of the year. *SURPRISE* is the absolute value of the difference between current earnings per share and earnings per share from the previous year, deflated by the stock price at the beginning of the year. *STDROE* is the standard deviation of the return on equity over the past three years. *CORR* is the correlation between annual stock returns and earnings over the past three years. *COMPLAW* is the effectiveness of competition law index, obtained from Dyck and Zingales (2004). *ENTCOST* is the level of entry cost index, constructed by Djankov et al. (2002).

Panel A: Country-level statistics

		Analyst forecast variables			Product market competition variables		Country-level competition variables	
Country	N	*AF*	*ACCU*(%)	*DISP*(%)	*HHI*	*PCM*	*COMPLAW*	*ENTCOST*
Argentina	118	8.220	-16.305	3.200	0.592	1.156	4.85	0.102
Australia	2,502	9.127	-2.809	0.995	0.360	1.228	5.52	0.023
Austria	395	6.056	-4.335	1.383	0.501	1.166	5.29	0.273
Belgium	570	8.935	-3.914	1.304	0.572	1.122	na	0.100
Brazil	402	10.423	-10.207	3.391	0.400	1.165	4.90	0.201
Chile	205	4.590	-3.388	1.404	0.557	1.173	5.40	0.131
China	1,603	6.386	-3.980	1.540	0.138	1.228	na	0.142
Denmark	663	6.674	-4.401	1.472	0.437	1.099	5.16	0.100
Finland	720	9.710	-4.569	1.657	0.513	1.263	5.26	0.012
France	2,882	11.964	-3.840	1.248	0.317	1.158	5.83	0.143
Germany	2,177	11.607	-4.840	1.508	0.301	1.130	5.91	0.157
Greece	665	6.080	-4.092	1.370	0.377	1.118	na	0.586
Hong Kong	1,289	10.696	-5.110	1.730	0.312	1.244	5.85	0.033
India	441	10.129	-2.928	0.944	0.154	1.250	na	0.578
Indonesia	185	8.546	-12.780	3.673	0.359	1.255	4.42	0.538
Ireland	372	5.995	-3.811	0.782	0.645	1.139	na	0.116
Israel	111	3.225	-3.859	1.330	0.409	1.115	5.11	0.213
Italy	1,000	9.770	-5.586	1.767	0.447	1.111	5.14	0.200
Japan	17,334	5.903	-3.487	0.858	0.092	1.070	5.64	0.116
Korea	714	13.833	-15.514	4.418	0.255	1.096	4.90	0.163
Malaysia	1,635	8.798	-4.471	1.777	0.279	1.249	4.84	0.265
Mexico	341	12.261	-7.515	2.585	0.437	1.269	4.93	0.566
Netherlands	971	14.558	-3.990	1.399	0.473	1.158	5.53	0.184
New Zealand	423	6.714	-3.079	1.041	0.686	1.290	5.40	0.005
Norway	629	8.690	-6.766	2.462	0.388	1.245	4.96	0.047

Philippines	153	6.843	-15.279	4.599	0.416	1.203	4.61	0.190
Poland	157	5.968	-5.891	1.933	0.446	1.104	5.06	0.255
Portugal	193	6.580	-5.369	2.006	0.582	1.139	4.81	0.184
Singapore	1,005	8.447	-4.742	1.576	0.334	1.184	5.21	0.119
South Africa	920	5.307	-4.011	1.534	0.347	1.226	4.89	0.084
Spain	738	13.862	-4.673	1.800	0.494	1.359	5.07	0.173
Sweden	1,113	8.361	-4.744	1.753	0.425	1.091	5.08	0.026
Switzerland	891	9.962	-3.727	1.101	0.430	1.148	5.22	0.172
Taiwan	1,241	6.193	-4.373	1.784	0.159	1.127	5.56	0.066
Thailand	473	8.833	-6.649	2.358	0.335	1.154	4.77	0.064
Turkey	168	8.762	-6.693	3.000	0.397	1.158	5.14	0.193
United Kingdom	7,827	6.874	-3.339	0.923	0.201	1.151	5.74	0.014
Total	53,226							

Table 1 (Continued)

Panel B: Descriptive statistics

	N	Mean	Std. Dev.	Q1	Median	Q3
Analyst Forecast Variables						
AF	53,226	7.880	7.865	2	5	11
ACCU	49,256	-4.181	9.056	-3.860	-1.450	-0.552
DISP	41,900	1.292	2.153	0.336	0.675	1.398
Product Market Power Variables						
HHI	53,226	0.248	0.240	0.069	0.165	0.338
PCM	52,763	1.141	0.237	1.036	1.080	1.169
EPCM	52,763	0.062	0.231	-0.036	0.005	0.089
Control Variables						
INDSIZE	53,226	23.343	2.074	21.958	23.514	24.919
SIZE	53,226	20.038	1.672	18.876	19.953	21.126
XLIST	53,226	0.002	0.049	0	0	0
LEV	53,226	0.530	0.195	0.396	0.540	0.672
SURPRISE	53,226	0.067	0.155	0.008	0.022	0.058
STDROE	53,226	8.984	15.212	1.774	3.965	9.262
CORR	53,226	0.435	0.642	0.056	0.737	0.949

Table 1 (Continued)

Panel C: Pearson (above)/Spearman (below) correlations

	AF	*ACCU*	*DISP*	*HHI*	*EPCM*	*INDSIZE*	*SIZE*	*XLIST*	*LEV*	*SURPRISE*	*STDROE*	*CORR*
AF		**0.127**	**-0.092**	**0.163**	**0.142**	**0.062**	**0.551**	**0.055**	**0.032**	**-0.089**	**-0.059**	**0.025**
ACCU	**0.232**		**-0.562**	-0.009	**0.108**	**0.101**	**0.043**	**0.013**	**-0.117**	**-0.284**	**-0.197**	**0.049**
DISP	**-0.064**	**-0.632**		**0.032**	**-0.088**	**-0.153**	**-0.043**	-0.008	**0.085**	**0.331**	**0.232**	**-0.049**
HHI	**0.158**	**-0.077**	**0.204**		**0.102**	**-0.571**	**-0.019**	0.008	0.008	**0.042**	**0.040**	**0.026**
EPCM	**0.231**	**0.180**	**-0.112**	**0.155**		**-0.084**	**-0.017**	-0.004	**-0.171**	**-0.090**	**-0.082**	**0.086**
INDSIZE	**0.023**	**0.147**	**-0.259**	**-0.623**	**-0.136**		**0.287**	**0.014**	**0.030**	**-0.122**	**-0.066**	**-0.042**
SIZE	**0.533**	**0.127**	**-0.072**	**-0.096**	**-0.080**	**0.268**		**0.048**	**0.304**	**-0.067**	**-0.138**	**-0.039**
XLIST	**0.050**	**0.015**	-0.011	0.006	0.003	**0.011**	**0.047**		**-0.018**	-0.002	-0.010	-0.004
LEV	0.005	**-0.107**	**0.086**	-0.003	**-0.262**	**0.030**	**0.293**	**-0.020**		**0.133**	**0.225**	**-0.077**
SURPRISE	**-0.133**	**-0.353**	**0.415**	**0.106**	**-0.150**	**-0.161**	**-0.112**	**-0.012**	**0.129**		**0.505**	**-0.078**
STDROE	**-0.041**	**-0.279**	**0.344**	**0.165**	**-0.085**	**-0.150**	**-0.175**	-0.006	**0.219**	**0.617**		**-0.076**
CORR	**0.038**	**0.045**	**-0.040**	**0.032**	**0.137**	**-0.048**	**-0.049**	-0.002	**-0.086**	**-0.086**	**-0.087**	

Table 2 Multivariate regressions of analyst following on product market competition

This table presents the results of the regressions of analyst following on product market competition variables. *LEGAL* is an indicator variable that equals one if the country's legal origin is common law, and zero otherwise. *RIGHTS* is the shareholder rights index obtained from Djankov et al. (2008). *ENFORCE* is the law enforcement index that Leuz et al. (2003) construct using legal enforcement data reported in La Porta et al. (1998). See Table 1 for the definitions of other variables. All reported *t*-values in parentheses are based on standard errors adjusted for heteroskedasticity and country and year clustering. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, in the two-tailed test.

	Pred.	Dependent Variable = Analyst Following (*AF*)			
	Sign	(1)	(2)	(3)	(4)
HHI	+	1.444***	5.032***		
		(2.82)	(3.76)		
EPCM	+			1.706***	3.672***
				(3.24)	(3.83)
INDSIZE	+	0.518***	0.034	0.446***	-0.302*
		(8.12)	(0.37)	(8.38)	(-1.97)
SIZE	+	3.269***	2.991***	3.292***	3.095***
		(13.81)	(13.57)	(13.45)	(13.39)
XLIST	+	3.354**	3.623**	3.402***	3.907***
		(2.72)	(2.64)	(2.83)	(2.89)
LEV	–	-6.742***	-5.517***	-6.578***	-5.227***
		(-7.19)	(-4.53)	(-7.45)	(-4.73)
SURPRISE	–	-4.549***	-4.131***	-4.427***	-3.971***
		(-6.39)	(-4.83)	(-6.08)	(-4.31)
STDROE	?	0.027***	0.040***	0.028***	0.045***
		(6.52)	(6.40)	(6.65)	(6.22)
CORR	+	0.351***	0.367***	0.323***	0.309***
		(6.07)	(5.88)	(5.32)	(4.38)
LEGAL			3.553*		3.758*
			(1.75)		(1.70)
RIGHTS			-0.963		-1.258
			(-0.91)		(-1.12)
ENFORCE			-0.111		-0.022
			(-0.34)		(-0.06)
Intercept		-65.116***	-47.667***	-63.803***	-40.696***
		(-11.14)	(-7.06)	(-10.84)	(-4.84)
Year Dummy		Included	Included	Included	Included
Country Dummy		Included		Included	
Adj. R^2		0.522	0.389	0.523	0.385
Obs.		53,226	51,466	52,763	51,004

Table 3 Multivariate regressions of forecast accuracy on product market competition

This table presents the results of the regressions of analysts' forecast accuracy on the product market competition variables. See Tables 1 and 2 for the variable definitions. All reported *t*-values in parentheses are based on standard errors adjusted for heteroskedasticity and country and year clustering. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, in the two-tailed test.

	Pred.	Dependent Variable = Forecast Accuracy (*ACCU*)			
	Sign	(1)	(2)	(3)	(4)
HHI	+	1.771***	1.104**		
		(4.22)	(2.12)		
EPCM	+			2.556***	2.359***
				(7.89)	(7.48)
INDSIZE	+	0.174***	0.366***	0.075*	0.299***
		(3.90)	(4.90)	(1.89)	(5.57)
AF	+	0.195***	0.133***	0.189***	0.126***
		(6.90)	(7.89)	(6.58)	(7.21)
SIZE	–	-0.348***	-0.149	-0.312***	-0.124
		(-3.23)	(-1.63)	(-3.02)	(-1.36)
XLIST	+	1.141	0.969	1.253	1.075*
		(1.26)	(1.68)	(1.30)	(1.70)
LEV	–	-2.599***	-2.768***	-2.343***	-2.553***
		(-7.82)	(-4.98)	(-7.84)	(-4.60)
SURPRISE	–	-11.781***	-13.027***	-11.473***	-12.718***
		(-8.81)	(-7.73)	(-8.37)	(-7.40)
STDROE	–	-0.042***	-0.043***	-0.040***	-0.042***
		(-3.98)	(-3.90)	(-3.70)	(-3.67)
CORR	+	0.224***	0.246***	0.180**	0.204***
		(3.00)	(3.98)	(2.41)	(3.16)
LEGAL			1.017*		0.992*
			(1.86)		(1.81)
RIGHTS			-0.154		-0.224
			(-0.54)		(-0.79)
ENFORCE			0.877***		0.905***
			(3.74)		(3.88)
Intercept		-1.701	-17.933***	-0.016	-16.823***
		(-0.92)	(-6.05)	(-0.01)	(-5.99)
Year Dummy		Included	Included	Included	Included
Country Dummy		Included		Included	
Adj. R^2		0.163	0.144	0.165	0.146
Obs.		49,256	47,781	48,835	47,361

Table 4 Multivariate regressions of forecast dispersion on product market competition

This table presents the results of the regressions of analysts' forecast dispersion on the product market competition variables. See Tables 1 and 2 for the variable definitions. All reported *t*-values in parentheses are based on standard errors adjusted for heteroskedasticity and country and year clustering. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, in the two-tailed test.

	Pred.	Dependent Variable = Forecast Dispersion (*DISP*)			
	Sign	(1)	(2)	(3)	(4)
HHI	–	-0.693***	-0.378*		
		(-5.15)	(-1.72)		
EPCM	–			-0.605***	-0.462***
				(-6.35)	(-4.04)
INDSIZE	–	-0.029	-0.125***	0.007	-0.099***
		(-1.36)	(-4.07)	(0.36)	(-4.66)
AF	–	-0.043***	-0.020***	-0.043***	-0.020***
		(-8.72)	(-4.21)	(-7.98)	(-3.80)
SIZE	+	0.112***	0.029	0.097***	0.021
		(4.33)	(0.88)	(3.89)	(0.68)
XLIST	–	-0.136	-0.140	-0.138	-0.165
		(-0.75)	(-0.90)	(-0.73)	(-1.02)
LEV	+	0.262*	0.273	0.189	0.217
		(1.94)	(1.27)	(1.52)	(1.03)
SURPRISE	+	3.433***	3.711***	3.407***	3.682***
		(7.73)	(7.69)	(7.52)	(7.50)
STDROE	+	0.014***	0.016***	0.014***	0.016***
		(4.33)	(4.20)	(4.20)	(4.13)
CORR	–	-0.067**	-0.078***	-0.055**	-0.068***
		(-2.66)	(-3.57)	(-2.28)	(-3.18)
LEGAL			-0.281		-0.278
			(-1.31)		(-1.29)
RIGHTS			0.031		0.051
			(0.33)		(0.53)
ENFORCE			-0.284***		-0.292***
			(-4.91)		(-5.10)
Intercept		-0.210	6.380***	-0.800*	5.901***
		(-0.51)	(7.48)	(-1.77)	(7.41)
Year Dummy		Included	Included	Included	Included
Country Dummy		Included		Included	
Adj. R^2		0.225	0.190	0.227	0.191
Obs.		41,900	40,615	41,573	40,289

Table 5 Subsample regressions of analyst forecasts on product market competition

This table presents the regression results using sub-samples partitioned by country-level competition variables. We partition the full sample into two subsamples by the country-level median of the effectiveness of competition law index (*COMPLAW*) in columns (1) to (4) and the level of entry costs index (*ENTCOST*) in columns (5) to (8). Panels A, B, and C report the results from the regressions of analyst following, forecast accuracy, and forecast dispersion on competition variables (*HHI* and *EPCM*), respectively. The *p*-values for the difference in the coefficients on *HHI* and *EPCM* between the two sub-samples are shown in the third last row of each panel. See Table 1 for the variable definitions. All *t*-values in parentheses are based on standard errors adjusted for heteroskedasticity and country and year clustering. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, in the two-tailed test.

Panel A: Analyst following (*AF*)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Pred. Sign	Strong competition law	Weak competition law	Strong competition law	Weak competition law	Low entry costs	High entry costs	Low entry costs	High entry costs
HHI	+	0.091	4.293***			1.149**	1.997*		
		(0.19)	(6.69)			(2.55)	(1.82)		
EPCM	+			1.420*	2.327***			1.506**	2.398***
				(1.92)	(3.41)			(2.60)	(3.16)
INDSIZE	+	0.427***	1.005***	0.420***	0.696***	0.425***	0.749***	0.371***	0.620***
		(14.19)	(6.29)	(10.29)	(4.57)	(9.50)	(4.60)	(8.57)	(4.77)
SIZE	+	3.281***	3.143***	3.276***	3.335***	3.047***	4.179***	3.060***	4.247***
		(11.06)	(10.14)	(11.00)	(11.13)	(15.31)	(10.62)	(14.85)	(11.54)
XLIST	+	4.561***	-3.287***	4.570***	-2.362***	3.379**	4.936	3.365**	5.663
		(4.08)	(-4.73)	(4.17)	(-3.49)	(2.81)	(0.62)	(2.83)	(0.76)
LEV	–	-6.556***	-6.637**	-6.400***	-6.734**	-6.208***	-9.198***	-6.033***	-9.162***
		(-6.03)	(-2.62)	(-6.21)	(-2.51)	(-5.86)	(-3.71)	(-6.09)	(-3.65)
SURPRIS	–	-5.100***	-3.644**	-4.942***	-3.834*	-4.632***	-4.482**	-4.510***	-4.377**
		(-10.64)	(-2.16)	(-10.53)	(-2.08)	(-11.73)	(-2.85)	(-11.17)	(-2.70)
STDROE	?	0.028***	0.019	0.029***	0.026*	0.024***	0.042***	0.024***	0.046***
		(7.99)	(1.44)	(8.81)	(1.84)	(10.17)	(3.34)	(11.07)	(3.93)
CORR	+	0.313***	0.484**	0.281***	0.496**	0.304***	0.483**	0.273***	0.473**
		(5.75)	(2.32)	(5.18)	(2.27)	(5.71)	(2.63)	(5.29)	(2.44)
Intercept		-62.817***	-75.855***	-62.780***	-71.536***	-58.609***	-88.860***	-57.559***	-89.882***
		(-9.43)	(-9.96)	(-9.06)	(-9.25)	(-12.33)	(-15.42)	(-11.85)	(-14.02)
Year		Included	Included	Included	Included	Included	Included	Included	Included
Country Dummy		Included	Included	Included	Included	Included	Included	Included	Included
p-value of diff.		0.00		0.00		0.01		0.01	
Adj. R^2		0.556	0.433	0.558	0.426	0.530	0.503	0.532	0.504
Obs.		40,525	9,050	40,217	8,928	41,889	11,337	41,526	11,237

Table 5 (Continued)

Panel B: Forecast accuracy (*ACCU*)

	Pred. Sign	(1) Strong competition law	(2) Weak competition law	(3) Strong competition law	(4) Weak competition law	(5) Low entry costs	(6) High entry costs	(7) Low entry costs	(8) High entry costs
HHI	+	1.225**	2.435**			1.137**	2.537***		
		(2.48)	(2.88)			(2.54)	(4.24)		
EPCM	+			2.328***	3.336***			2.383***	3.751***
				(7.79)	(3.68)			(8.85)	(3.15)
INDSIZE	+	0.094***	0.355*	0.031	0.136	0.098**	0.341**	0.034	0.149
		(2.99)	(2.00)	(0.75)	(0.95)	(2.64)	(2.79)	(0.75)	(1.58)
AF	+	0.161***	0.303***	0.155***	0.301***	0.182***	0.229***	0.176***	0.222***
		(9.47)	(5.09)	(10.14)	(4.79)	(11.64)	(3.72)	(12.28)	(3.60)
SIZE	−	-0.198***	-0.751**	-0.168***	-0.704**	-0.263***	-0.685**	-0.248***	-0.581*
		(-4.07)	(-2.49)	(-3.90)	(-2.44)	(-4.83)	(-2.34)	(-5.28)	(-2.03)
XLIST	+	0.295	4.495	0.284	5.315*	0.792	3.331	0.860	4.331
		(0.83)	(1.72)	(0.75)	(1.92)	(0.88)	(1.19)	(0.93)	(1.27)
LEV	−	-2.700***	-4.168***	-2.510***	-3.992***	-2.516***	-3.327***	-2.203***	-3.329***
		(-4.86)	(-4.01)	(-4.82)	(-3.85)	(-5.23)	(-3.08)	(-4.60)	(-3.23)
SURPRISE	−	-10.299***	-13.885***	-9.799***	-14.012***	-10.692***	-13.066***	-10.221***	-13.010***
		(-11.10)	(-4.66)	(-10.53)	(-4.58)	(-11.10)	(-4.57)	(-10.73)	(-4.37)
STDROE	−	-0.038***	-0.072***	-0.038**	-0.064***	-0.038***	-0.063***	-0.038***	-0.056***
		(-3.13)	(-4.00)	(-2.92)	(-3.73)	(-3.16)	(-3.85)	(-2.95)	(-3.45)
CORR	+	0.194***	0.257	0.142*	0.240	0.161**	0.560**	0.114	0.531**
		(3.23)	(0.81)	(2.04)	(0.78)	(2.54)	(2.19)	(1.45)	(2.37)
Intercept		-2.881**	-2.583	-1.978	1.868	-1.650	-3.317	-0.578	-0.422
		(-2.41)	(-0.55)	(-1.47)	(0.39)	(-1.20)	(-0.78)	(-0.35)	(-0.09)
Year Dummy		Included	Included	Included	Included	Included	Included	Included	Included
Country Dummy		Included	Included	Included	Included	Included	Included	Included	Included
p-value of diff. test		0.03		0.01		0.00		0.00	
Adj. R^2		0.116	0.257	0.117	0.261	0.124	0.237	0.126	0.240
Obs.		37,855	8,197	37,571	8,091	38,984	10,272	38,654	10,181

Table 5 (Continued)

Panel C: Forecast dispersion (*DISP*)

	Pred. Sign	(1) Strong competition law	(2) Weak competition law	(3) Strong competition law	(4) Weak competition law	(5) Low entry costs	(6) High entry costs	(7) Low entry costs	(8) High entry costs
HHI	−	-0.359***	-1.321***			-0.471***	-1.017***		
		(-3.04)	(-5.02)			(-3.29)	(-5.07)		
EPCM	−			-0.547***	-0.824***			-0.496***	-1.096***
				(-4.87)	(-4.40)			(-5.49)	(-4.25)
INDSIZE	−	0.003	-0.060	0.022	0.047	-0.005	-0.086**	0.018	-0.017
		(0.21)	(-1.03)	(1.62)	(0.73)	(-0.22)	(-2.22)	(0.81)	(-0.54)
AF	−	-0.036***	-0.067***	-0.035***	-0.071***	-0.040***	-0.054***	-0.039***	-0.054***
		(-13.91)	(-7.35)	(-14.53)	(-7.05)	(-11.46)	(-5.99)	(-10.55)	(-5.74)
SIZE	+	0.070***	0.226***	0.060***	0.189***	0.086***	0.224***	0.075***	0.192***
		(5.80)	(4.14)	(4.45)	(3.70)	(4.91)	(4.90)	(4.34)	(4.52)
XLIST	−	-0.074	-0.004	-0.068	-0.234	-0.037	-0.634	-0.015	-0.999
		(-0.61)	(-0.01)	(-0.56)	(-0.29)	(-0.21)	(-1.47)	(-0.09)	(-1.45)
LEV	+	0.347*	0.455*	0.297*	0.358	0.284	0.232	0.217	0.161
		(1.96)	(1.24)	(1.85)	(0.99)	(1.64)	(0.86)	(1.30)	(0.62)
SURPRISE	+	3.039***	3.559***	3.001***	3.565***	3.432***	3.217***	3.432***	3.143***
		(10.60)	(3.49)	(9.86)	(3.53)	(12.46)	(3.46)	(11.95)	(3.35)
STDROE	+	0.012***	0.024***	0.012***	0.023***	0.010***	0.027***	0.010***	0.026***
		(3.66)	(3.95)	(3.47)	(4.00)	(4.23)	(5.34)	(3.96)	(5.04)
CORR	−	-0.056***	-0.082	-0.044**	-0.069	-0.074**	-0.058	-0.060**	-0.055
		(-3.26)	(-0.83)	(-2.90)	(-0.68)	(-2.78)	(-0.79)	(-2.58)	(-0.73)
Intercept		-0.275	1.424	-0.512	-0.376	-0.318	1.659**	-0.677	0.679
		(-0.77)	(1.42)	(-1.63)	(-0.34)	(-0.73)	(2.47)	(-1.59)	(0.96)
Year Dummy		Included	Included	Included	Included	Included	Included	Included	Included
Country Dummy		Included	Included	Included	Included	Included	Included	Included	Included
p-value of diff. test		0.00		0.03		0.00		0.00	
Adj. R^2		0.175	0.258	0.178	0.256	0.194	0.256	0.196	0.258
Obs.		31,839	7,208	31,623	7,121	32,846	9,054	32,583	8,990

Table 6 Sensitivity analyses

This table presents the results of four sensitivity analyses: regressions using alternative measures of product market competition (Panel A), industry-level regressions using *HHI* and industry-average *PCM* (Panel B), regressions for a restricted sample excluding firms from Japan and the U.K. (Panel C), and weighted least squares regressions (Panel D). The four-firm concentration ratio (*CR4*) is measured by the sum of the market shares of the four largest firms in terms of net sales for each industry-country-year combination. Market share (*MS*) is measured as net sales divided by the sum of the net sales of all individual firms in each industry-country combination. Industry membership is classified by the two-digit SIC code. See Table 1 for the definitions of other variables. We also estimate the regressions using sub-samples partitioned by the country-level median of the effectiveness of competition law (*COMPLAW*) or the level of entry cost (*ENTCOST*). Each panel reports the *p*-values for the difference in coefficients on competition variables (*HHI*, *PCM*, *EPCM*, *CR4* and *MS*) across sub-samples. All reported *t*-values in parentheses are based on standard errors adjusted for heteroskedasticity and country and year clustering. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, in the two-tailed test.

Dependent Variable	Market Power Variable	(1) Full sample	(2) Strong competition law	(3) Weak competition law	(4) Diff. test *p*-value	(5) Low entry costs	(6) High entry costs	(7) Diff. test *p*-value
Panel A: Using alterative measures of product market competition								
AF	*CR4*	1.707***	0.701*	6.695***	0.00	1.256**	2.707*	0.00
		(2.95)	(1.82)	(8.15)		(2.75)	(1.91)	
	MS	4.519***	4.020***	7.903***	0.00	3.830***	5.294***	0.00
		(7.08)	(5.44)	(6.79)		(5.43)	(3.44)	
ACCU	*CR4*	1.553**	0.780	4.723***	0.00	0.724	4.360***	0.00
		(2.25)	(1.36)	(3.52)		(1.39)	(4.60)	
	MS	1.720***	1.078***	3.010***	0.00	1.489***	2.479***	0.05
		(5.41)	(3.14)	(3.16)		(4.33)	(3.42)	
DISP	*CR4*	-0.625**	-0.254	-2.651***	0.00	-0.344*	-1.630***	0.00
		(-2.44)	(-1.58)	(-5.40)		(-1.74)	(-4.44)	
	MS	-0.528***	-0.183**	-1.264***	0.00	-0.353***	-0.979***	0.00
		(-4.56)	(-2.28)	(-5.65)		(-3.13)	(-4.03)	
Panel B: Industry-level regressions								
AF	*HHI*	2.428***	0.686	5.143***	0.00	2.050***	3.194***	0.00
		(4.41)	(1.14)	(9.18)		(3.74)	(3.31)	
	PCM	0.776**	0.692	2.719***	0.00	0.274	2.901***	0.00
		(2.19)	(1.33)	(2.92)		(0.51)	(3.14)	
ACCU	*HHI*	2.035***	1.485***	2.750**	0.08	1.457***	2.718***	0.04
		(4.84)	(4.06)	(2.51)		(3.43)	(3.58)	
	PCM	2.588***	1.952***	3.637**	0.01	2.585***	3.054**	0.45
		(5.25)	(7.48)	(2.65)		(5.76)	(2.55)	
DISP	*HHI*	-0.789***	-0.443***	-1.282***	0.00	-0.592***	-1.026***	0.00
		(-7.22)	(-5.43)	(-5.64)		(-5.68)	(-4.93)	
	PCM	-0.524***	-0.415***	-0.788**	0.07	-0.278**	-1.025***	0.00
		(-4.27)	(-3.57)	(-2.58)		(-2.55)	(-4.35)	

Table 6 (Continued)

Dependent Variable	Market Power Variable	(1) Full sample	(2) Strong competition law	(3) Weak competition law	(4) Diff. test *p*-value	(5) Low entry costs	(6) High entry costs	(7) Diff. test *p*-value
Panel C: Excluding firms in Japan and the UK								
AF	*HHI*	1.623***	0.207	4.293***	0.00	1.302**	1.997*	0.06
		(2.78)	(0.38)	(6.69)		(2.23)	(1.82)	
	EPCM	1.375***	0.684	2.327***	0.00	1.114*	2.398***	0.00
		(3.08)	(1.26)	(3.41)		(2.07)	(3.16)	
ACCU	*HHI*	1.977***	1.441***	2.435***	0.08	1.360***	2.537***	0.02
		(5.27)	(3.34)	(2.88)		(3.16)	(4.24)	
	EPCM	2.796***	2.276***	3.336***	0.02	2.257***	3.750***	0.00
		(6.39)	(4.63)	(3.68)		(6.04)	(3.15)	
DISP	*HHI*	-0.810***	-0.453***	-1.321***	0.00	-0.614***	-1.017***	0.00
		(-6.05)	(-3.61)	(-5.02)		(-3.66)	(-5.07)	
	EPCM	-0.660***	-0.533**	-0.823***	0.03	-0.412***	-1.096***	0.00
		(-4.91)	(-2.77)	(-4.40)		(-3.09)	(-4.25)	
Panel D: Weighted least squares (WLS)								
AF	*HHI*	1.868***	0.276	3.880***	0.00	1.489***	2.351***	0.05
		(15.85)	(1.50)	(21.85)		(9.87)	(13.01)	
	EPCM	1.885***	0.893***	3.145***	0.00	0.926***	3.472***	0.00
		(17.69)	(5.46)	(19.12)		(7.61)	(18.65)	
ACCU	*HHI*	2.758***	1.109***	4.253***	0.00	2.409***	3.209***	0.38
		(13.20)	(4.69)	(11.29)		(9.06)	(9.96)	
	EPCM	3.705***	2.259***	5.465***	0.00	3.378***	4.753***	0.10
		(19.66)	(10.88)	(15.69)		(16.06)	(14.01)	
DISP	*HHI*	-1.027***	-0.337***	-1.583***	0.00	-0.722***	-1.325***	0.00
		(-18.85)	(-6.03)	(-15.62)		(-12.08)	(-14.59)	
	EPCM	-0.794***	-0.537***	-1.258***	0.00	-0.483***	-1.362***	0.00
		(-15.85)	(-11.04)	(-12.88)		(-10.29)	(-13.76)	

Table 7 Effect of deregulation on analyst forecasting activity

This table presents the results of the regressions of the analyst forecast variables on the deregulation indicator variables. The sample includes utility firms in the electricity and gas industries over the period of 1990 to 2008 from 13 European countries that experienced two phases of deregulation in 1996 and 2003. *DEREG1* is defined as one for the sample years from 1996 to 2002 and zero otherwise. *DEREG2* is defined as one for the sample years from 2003 to 2008 and zero otherwise. *TREND* is a time-trend variable, defined as the sample year minus 1989. See Table 1 for the definitions of the other variables. All reported *t*-values in parentheses are based on standard errors adjusted for heteroskedasticity and country and year clustering. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, in the two-tailed test.

	Dependent Variable		
	(1) Analyst Following (*AF*)	(2) Forecast Accuracy (*ACCU*)	(3) Forecast Dispersion (*DISP*)
DEREG1	0.244	-2.148**	0.304
	(0.23)	(-2.51)	(0.81)
DEREG2	-3.806**	-2.604**	2.394**
	(-2.81)	(-2.30)	(2.33)
TREND	0.390	0.194*	-0.391
	(1.44)	(1.80)	(-1.14)
INDSIZE	-0.063	-0.060	1.246
	(-0.07)	(-0.23)	(0.87)
AF		0.024	-0.014
		(1.66)	(-0.37)
SIZE	5.375***	-0.031	0.390
	(11.35)	(-0.34)	(0.88)
LEV	-10.676**	0.640	1.788
	(-2.59)	(0.92)	(0.49)
SURPRISE	2.761	-3.797***	2.483*
	(0.87)	(-3.21)	(1.76)
STDROE	-0.089	-0.014	0.012
	(-1.15)	(1.56)	(0.49)
CORR	-0.131	0.005	1.010
	(-0.21)	(0.03)	(0.83)
Intercept	-98.010***	0.232	-36.673
	(-5.37)	(0.03)	(-0.86)
Country Dummy	Included	Included	Included
Adj. R^2	0.635	0.161	0.138
Obs.	567	567	502