

## **Internet Appendix to “Product Market Competition, Insider Trading and Stock Market Efficiency” \***

In this appendix, we verify that our results are robust to a number of changes. We first confirm that they are insensitive to the definition of industries (we obtain identical results using three- instead of two-digit SIC codes to identify industries), the length of the event window (our findings are unchanged when we use a three-day window from -1 to +1 day), and the definition of abnormal returns (again, we obtain identical results using raw returns and abnormal returns with respect to the CAPM model).

Second, the regressions in the paper cluster standard errors by firm and year (Tables II to IV). We confirm that the Fama-McBeth (1973) procedure with standard errors corrected for temporal dependence (using the Newey-West (1987) adjustment with one lag) leads to the same conclusions. The results featured in Tables IA.I to IA.III are similar to those obtained with firm and year clusters, in terms of coefficients and significance.

Third, the results also obtain using a nonparametric analysis that controls for firm size. Every year, we sort firms into size deciles and divide further each size decile into market power quintiles. We compute, within each of the 50 groups, the equally weighed average of the share turnover, insider activity, and abnormal return around earnings announcements. The results are displayed in Tables IA.IV to IA.VI. In most size deciles, share turnover and insider trading increase from the bottom to the top market power deciles, while the abnormal return surrounding earnings announcements decreases. These findings confirm the results of the regressions. This pattern is only reversed among the largest firms (top decile) for the share turnover and insider turnover. This reversal is

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consistent with the finding that in the turnover regressions, the coefficient on an interacted regressor, *Mkt Power* x *Size*, is negative.

Finally, we also assess the informativeness of stock prices using a different approach. The paper uses the abnormal stock price reaction to earnings news as a proxy for the informativeness of stock prices. While this technique has a long tradition in finance and accounting<sup>i</sup>, one may not be entirely convinced that it captures the information content of prices. To reinforce the evidence, we employ a different approach, also frequently used in accounting (e.g. ,Collins et al. (1994), Durnev et al. (2003)).

The idea to estimate how much information about future earnings is capitalized into stock prices by regressing current stock returns on future earnings. This method relies on two hypotheses. First, it assumes that revisions in expected dividends are correlated with revisions in expected earnings. Therefore, current stock returns can be expressed as a function of the current unexpected earnings and changes in expected future earnings. The second assumption is that current unexpected earnings can be proxied using the current change in earnings, and that changes in expected future earnings can be proxied using changes in realized future earnings. It follows that

$$r_t^m = a + b_0 \Delta E_t^m + \sum_s b_s \Delta E_{t+s}^m + \sum_s c_s r_{t+s}^m + u_t^m, \quad (\text{IA.1})$$

where  $r_t^m$  denotes the return on firm  $m$ 's stock in year  $t$ ,  $\Delta E_t^m$  the change in its earnings in year  $t$ , and  $\Delta E_{t+s}^m$  the change in its earnings  $s$  periods ahead. In this equation, we follow this literature by including future stock returns,  $r_{t+s}^m$ , as control variables, and using three future years of earnings changes and future returns (i.e., setting  $s=3$ ).<sup>ii</sup>

There are two measures of stock price informativeness, both based on the significance of future earnings in equation (IA.1). The first measure is the sum of the coefficients on future earnings, denoted *FERC* (for “Future Earnings Response Coefficient”) and defined as

$$FERC \equiv \sum_{s=1}^3 b_s .$$

The second measure is the incremental power of future earnings in explaining current returns, denoted *FINC* (for “Future earnings INCremental explanatory power”). To compute it, we run the same regression as equation IA.1 (again on an annual frequency) excluding the forward looking terms and compute its R<sup>2</sup>. Then we subtract it from the R<sup>2</sup> of equation IA.1. Thus, *FINC* is defined as

$$FINC \equiv R^2_{a + b_0 \Delta E_t^m + \sum_{s=1}^3 b_s \Delta E_{t+s}^m + \sum_{s=1}^3 c_s r_{t+s}^m + u_t^m} - R^2_{a + b_0 \Delta E_t^m + u_t^m} .$$

Hence, *FERC* and *FINC* capture how much information about future earnings is contained in current returns: the higher their values, the greater the information content of stock returns.

To assess the impact of firms’ market power on their *FERC* and *FINC*, we group firms into market power groups and measure *FERC* and *FINC* within each group. To allow for time variation in coefficients, we rebalance groups every year. To mitigate the important influence of size, we first sort firms (every year) into size deciles, which we divide further into two market power groups. In this way, we obtain 20 groups of firms in every year. We denote by  $FERC_t^{i,j}$  and  $FINC_t^{i,j}$  the response coefficient and incremental explanatory power of future earnings in size group  $i$  ( $i=1$  to 10) and market power group  $j$  ( $j=1$  to 2). If market power speeds up the incorporation of information about future earnings into current returns, then *FERC* and *FINC* should increase from the low ( $j=1$ ) to the high ( $j=2$ ) market power group. Defining *Mkt power dummy*, a dummy variable that equals zero (one) in the low (high) market power group, the coefficients on *Mkt power dummy* should be significantly positive in the following regressions:

$$FERC_t^{i,j} = \text{const} + \beta * \text{Mkt\_power\_dummy} + \gamma * i + \sum \delta * \text{Control}_t^{i,j} + \text{error}_t ,$$

$$FINC_t^{i,j} = \text{const} + \beta * \text{Mkt\_power\_dummy} + \gamma * i + \sum \delta * \text{Control}_t^{i,j} + \text{error}_t .$$

In these regressions, we control for size by including as a regressor the index  $i$ , which measures the firm's size group,<sup>iii</sup> and for other factors by including as regressors the average value of a control variable within size decile  $i$  and market power group  $j$  in year  $t$ , denoted  $Control_t^{i,j}$ . We use the same controls as in the paper: return on assets, leverage, and the market-to-book ratio. Because we do not have Amihud's illiquidity measure over the full sample period (1969 to 2002), we use instead share turnover. We use annual data from Compustat covering the 1969 to 2002 period. The sample ends in 2002 because we need earnings and returns data up to 2005. In each of these 34 years, I form 10 x 2 groups, resulting in 680 observations.

The estimation results are presented in Table IA.VII. In all specifications, the coefficient on *Mkt power dummy* is statistically significant and positive. Including future earnings as an explanatory variable in equation (IA.1)'s leads to a higher loading on future earnings and raises its R<sup>2</sup> more among high market power firms than among low market power firms. The effect is also economically significant. For example, a coefficient on *Mkt power dummy* of 1 (0.04) in the *FERC (FINC)* regressions implies that *FERC (FINC)* is larger by 1 (0.04) among high market power firms relative to low market power firms. This amounts to a relative increase of 107% (30%) given that the average *FERC (FINC)* is 0.93 (0.13). These results confirm those obtained from measuring abnormal stock returns around earnings announcements (Table III).

Overall, we conclude that there is convincing evidence that product market power enhances trading, including that by insiders, and the informativeness of stock prices, in line with the model.

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**Table IA.I**

**Market Power and Turnover:  
Fama-Macbeth Regressions with Newey-West Standard Errors**

This table presents results of annual Fama-MacBeth regressions of turnover on market power. Standard errors are adjusted for serial correlation using the Newey-West procedure with one lag. The absolute value of *t*-statistics are displayed below the coefficient estimates. The symbols \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively, for the two-tailed hypothesis test that the coefficient equals zero. See the tables in the paper for variable definitions.

	Turnover							
Mkt power	0.9248 4.26***	0.5303 5.15***	0.3613 4.19***	0.3488 3.63***	0.5567 5.64***	2.5014 6.54***	1.4955 3.90***	1.7771 4.36***
Mkt power * Size						-0.3319 7.40***	-0.188 3.76***	-0.2023 3.95***
Size		0.1289 3.24***	0.0998 2.39**	0.1001 2.41**	0.1265 3.01***	0.1741 3.95***	0.1259 2.71***	0.1549 3.26***
Illiquidity			-0.0184 3.27***	-0.0181 3.23***	-0.0172 3.11***		-0.018 3.29***	-0.0168 3.11***
Return on assets			0.3605 1.89*	0.393 2.02**	-0.058 0.23		0.3168 1.72*	-0.1128 0.47
Market-to-book				5.6956 1.85*	5.2156 1.94*			5.1997 1.93*
Leverage					-0.8553 7.15***			-0.8617 7.17***
Constant	-0.2349 3.00***	-0.9293 3.75***	-0.7174 2.81***	-0.7337 2.93***	-0.7321 2.89***	-1.1849 4.30***	-0.8664 3.04***	-0.8921 3.09***
Observations	25798	25791	25732	25462	25389	25791	25732	25389

**Table IA.II**  
**Market Power and Insider Trading:**  
**Fama-Macbeth Regressions with Newey-West Standard Errors**

This table presents results of annual Fama-MacBeth regressions of insider trading on market power. In the left panel, insider trading activity is measured as the log of the ratio of a firm's annual total insider trading dollar volume to the firm's market capitalization, and it is denoted Insider turnover. In the right panel, it is measured as the log of the ratio of the firm's annual number of insider trades to its number of active insiders, denoted Number of insider trades. Standard errors are adjusted for serial correlation using the Newey-West procedure with one lag. The absolute value of *t*-statistics are displayed below the coefficient estimates. The symbols \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively, for the two-tailed hypothesis test that the coefficient equals zero. See the tables in the paper for variable definitions.

Panel A: Insider turnover

Mkt power	0.0036	0.0055	0.003	0.0027	0.0025	0.0183	0.0124	0.0122
	2.82***	4.86***	3.14***	2.54**	2.03**	4.79***	3.09***	3.30***
Mkt power * Size						-0.0021	-0.0015	-0.0016
						4.36***	2.71***	3.23***
Size		-0.0006	-0.0006	-0.0006	-0.0006	-0.0003	-0.0004	-0.0004
		5.45***	5.71***	5.69***	4.23***	2.57**	2.93***	2.38**
Illiquidity			0	0	0		0	0
			1.33	1.29	1.34		1.15	1.19
Return on assets			0.0109	0.0119	0.0121		0.0105	0.0117
			6.04***	6.43***	6.63***		6.07***	6.78***
Market-to-book				0.0234	0.025			0.0248
				1.32	1.36			1.35
Leverage					0.0005			0.0004
					0.35			0.3
Constant	0.0062	0.0094	0.0093	0.0092	0.0092	0.0077	0.008	0.008
	19.44***	15.57***	15.17***	15.19***	15.06***	11.85***	9.34***	9.71***
Observations	26040	26031	25970	25676	25597	26031	25970	25597

Panel B: Number of insider trades

Mkt Power	0.2149	0.215	0.1591	0.1485	0.1687	0.5368	0.3615	0.3808
	7.10***	6.76***	6.85***	7.14***	7.47***	5.08***	6.64***	7.02***
Mkt Power * Size						-0.0526	-0.0329	-0.0344
						4.47***	4.70***	5.03***
Size		-0.0003	-0.0018	-0.0017	0.0008	0.0071	0.0029	0.0058
		0.32	1.48	1.33	0.66	4.68***	2.15**	4.59***
Illiquidity			-0.0022	-0.0022	-0.0021		-0.0021	-0.002
			1.6	1.55	1.49		1.59	1.47
Return on assets			0.2327	0.2686	0.2235		0.2252	0.2135
			2.11**	2.81***	2.16**		2.07**	2.09**
Market-to-book				1.3271	1.2818			1.2814
				2.22**	2.30**			2.29**
Leverage					-0.0838			-0.0855
					4.01***			4.08***
Constant	0.2176	0.2193	0.2281	0.2236	0.2243	0.1762	0.2006	0.1957
	9.86***	9.07***	9.93***	10.17***	10.29***	9.41***	10.05***	9.46***
Observations	23091	23080	23037	22743	22674	23080	23037	22674



**Table IA.III**  
**Market Power and Stock Price Informativeness:**  
**Fama-Macbeth Regressions with Newey-West Standard Errors**

This table presents results of annual Fama-MacBeth regressions of the absolute abnormal return surrounding an earnings announcement on market power. Standard errors are adjusted for serial correlation using the Newey-West procedure with one lag. The absolute value of *t*-statistics are displayed below the coefficient estimates. The symbols \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively, for the two-tailed hypothesis test that the coefficient equals zero. See the tables in the paper for variable definitions.

	Stock price informativeness									
Mkt power	-0.0995	-0.048	-0.0207	-0.0197	-0.0196	-0.0369	-0.189	-0.0753	-0.0753	-0.1076
	16.03***	6.68***	3.79***	3.51***	2.75***	4.47***	11.03***	8.41***	8.89***	9.18***
Mkt power * Size							0.0242	0.0094	0.0096	0.0119
							6.77***	3.71***	3.90***	11.61***
Size		-0.0172	-0.0154	-0.0157	-0.0158	-0.0194	-0.0206	-0.0167	-0.0171	-0.0211
		10.33***	10.05***	10.53***	10.66***	28.55***	10.03***	9.28***	9.69***	27.81***
Illiquidity			0.001	0.001	0.001	0.0014		0.001	0.0009	0.0014
			4.77***	4.75***	4.62***	5.21***		4.77***	4.59***	5.17***
Return on assets			-0.0885	-0.0948	-0.0948	-0.0857		-0.0869	-0.0921	-0.0823
			6.11***	7.58***	6.51***	7.68***		6.03***	6.28***	7.26***
Market-to-book				0.2484	0.2358	-0.0051			0.2341	-0.0062
				1.66*	1.67*	0.22			1.67*	0.27
Leverage					0.0018	0.0292			0.0021	0.0296
					0.25	5.90***			0.3	5.84***
Turnover						0.0267				0.0268
						12.40***				12.58***
Constant	0.1595	0.2486	0.2349	0.2357	0.236	0.2558	0.2669	0.2423	0.2434	0.2652
	21.37***	24.51***	30.03***	31.24***	30.63***	44.69***	21.27***	25.43***	26.83***	50.49***
Observations	23432	23417	23415	23113	23040	22718	23417	23415	23040	22718

**Table IA.IV**  
**Market Power and Turnover: Double-sort Table**

This table presents the average turnover for firms sorted every year into size deciles and market power quintiles. See the tables in the paper for variable definitions.

Size	Market Power					High - Low	t-stat for High - Low
	Low	2	3	4	High		
Small	-0.587	-0.594	-0.482	-0.454	-0.451	0.135	1.75
2	-0.633	-0.603	-0.366	-0.208	-0.322	0.311	4.873
3	-0.532	-0.519	-0.204	-0.091	-0.078	0.454	6.473
4	-0.335	-0.417	-0.312	0.015	-0.044	0.291	3.993
5	-0.282	-0.16	-0.217	0.133	0.134	0.416	5.827
6	-0.205	-0.066	0.007	0.126	0.211	0.416	6.748
7	-0.002	-0.042	-0.089	0.023	0.198	0.199	3.11
8	0.119	0.043	0.094	0.06	0.283	0.164	2.756
9	0.217	0.09	0.141	0.161	0.171	-0.046	-0.678
Big	0.267	0.188	0.15	-0.049	-0.064	-0.331	-5.951

**Table IA.V**  
**Market Power and Insider Trading: Double-sort Table**

This table presents the average insider turnover and the number of insider trades for firms sorted every year into size deciles and market power quintiles. See the tables in the paper for the variable definitions.

Panel A: Insider turnover

Size	Market Power					High - Low	t-stat for High - Low
	Low	2	3	4	High		
Small	0.006	0.008	0.008	0.008	0.006	0	-0.119
2	0.006	0.007	0.008	0.009	0.01	0.003	1.984
3	0.005	0.006	0.006	0.008	0.008	0.003	2.402
4	0.006	0.007	0.01	0.009	0.012	0.005	2.238
5	0.005	0.007	0.009	0.011	0.008	0.004	3.272
6	0.008	0.007	0.007	0.009	0.011	0.003	1.43
7	0.006	0.005	0.007	0.006	0.008	0.002	1.654
8	0.005	0.006	0.007	0.006	0.007	0.002	1.389
9	0.008	0.006	0.005	0.006	0.005	-0.003	-1.922
Big	0.005	0.003	0.004	0.003	0.005	0	-0.116

Panel B: Number of insider trades

Size	Market Power					High - Low	t-stat for High - Low
	Low	2	3	4	High		
Small	0.177	0.176	0.226	0.24	0.279	0.102	4.23
2	0.179	0.21	0.223	0.322	0.271	0.092	4.428
3	0.204	0.225	0.281	0.307	0.33	0.126	5.254
4	0.222	0.232	0.248	0.311	0.304	0.082	3.636
5	0.229	0.258	0.25	0.299	0.328	0.099	4.242
6	0.192	0.253	0.267	0.302	0.315	0.123	6.084
7	0.197	0.269	0.254	0.269	0.279	0.081	3.543
8	0.231	0.248	0.232	0.261	0.295	0.064	2.828
9	0.205	0.238	0.205	0.249	0.299	0.094	3.367
Big	0.206	0.197	0.217	0.23	0.23	0.024	1.192

**Table IA.VI**  
**Market Power and Stock Price Informativeness: Double-sort Table**

This table presents the average absolute abnormal return surrounding an earnings announcement for firms sorted every year into size deciles and market power quintiles. See the tables in the paper for the variable definitions.

Size	Market Power					High - Low	t-stat for High - Low
	Low	2	3	4	High		
Small	0.223	0.218	0.21	0.203	0.178	-0.045	-6.668
2	0.193	0.19	0.177	0.177	0.166	-0.026	-5.137
3	0.19	0.162	0.166	0.16	0.157	-0.032	-6.295
4	0.168	0.155	0.144	0.152	0.152	-0.016	-3.246
5	0.156	0.143	0.137	0.142	0.144	-0.012	-2.698
6	0.15	0.138	0.126	0.133	0.137	-0.013	-3.193
7	0.142	0.128	0.123	0.124	0.127	-0.015	-3.465
8	0.139	0.123	0.119	0.115	0.119	-0.02	-4.965
9	0.134	0.118	0.107	0.107	0.115	-0.02	-4.694
Big	0.115	0.102	0.096	0.089	0.097	-0.018	-4.568

**Table IA.VII**  
**Market Power and Stock Price Informativeness:**  
**Measuring Stock Price Informativeness by the Future Earnings**  
**Response Coefficient, *FERC*, and the Incremental Power of Future**  
**Earnings in Explaining Current Returns, *FINC***

This table presents results of regressions of *FERC* and *FINC* on market power and other firm characteristics over the 1969-2002 period. Every year, firms are sorted first into size deciles and then into two market power groups. The following regression is run in each year and within each size and market power group:

$$r_t^m = a + b_0 \Delta E_t^m + \sum_{s=1}^3 b_s \Delta E_{t+s}^m + \sum_{s=1}^3 c_s r_{t+s}^m + u_t^m, \quad (\text{IA.1})$$

where  $r_t^m$  denotes the return on firm  $m$ 's stock in year  $t$ ,  $\Delta E_t^m$  the change in its earnings in year  $t$ , and  $\Delta E_{t+s}^m$  the change in its earnings  $s$  periods ahead. *FERC* and *FINC* are estimated in each year and within each size-market power group. *FERC* is defined as  $FERC \equiv \sum_{s=1}^3 b_s$ , and represents the future earnings response coefficient. *FINC* is defined as

$$FINC \equiv R^2_{a + b_0 \Delta E_t^m + \sum_{s=1}^3 b_s \Delta E_{t+s}^m + \sum_{s=1}^3 c_s r_{t+s}^m + u_t^m} - R^2_{a + b_0 \Delta E_t^m + u_t^m}$$

and captures the incremental power of future earnings in explaining current returns. Higher *FINC* and *FERC* correspond to stock prices that contain more information about future earnings. The right-hand-side variable in the regressions displayed in the table below is *FERC* in Panel A and *FINC* in Panel B. The main regressor is *Mkt power dummy*, a dummy variable that equals zero (one) in the low (high) market power group. The control variables are the size group and the average value of the return on assets, leverage, market-to-book, and share turnover, in each year and within each size-market power group. Standard errors are clustered by year. The absolute value of  $t$ -statistics are displayed below the coefficient estimates. The symbols \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively, for the two-tailed hypothesis test that the coefficient equals zero. See the tables in the paper for the variable definitions.

Panel A: <i>FINC</i>						
Mkt power dummy	0.0129	0.0129	0.0398	0.0381	0.0422	0.0422
	1.73*	1.73*	2.40**	2.25**	2.53**	2.53**
Size group		0.0024	0.0026	0.0027	0.0037	0.0037
		1.71*	1.82*	1.93*	1.88*	1.88*
Return on assets			-0.5102	-0.5026	-0.5721	-0.5721
			1.62	1.58	1.87*	1.87*
Market-to-book				0.0014	0.0016	0.0016
				1.34	1.48	1.48
Leverage					-0.0387	-0.0387
					0.27	0.27
Turnover					-0.0064	-0.0064
					0.82	0.82
Constant	0.1271	0.1141	0.1242	0.1209	0.1184	0.1184
	24.35***	13.72***	11.46***	10.44***	4.58***	4.58***
Observations	680	680	680	680	680	680
R <sup>2</sup>	0.0058	0.0121	0.0233	0.0259	0.0275	0.0275

Panel B: <i>FERC</i>						
Mkt power dummy	1.1277	1.1277	1.04	1.0112	0.8299	0.8299
	4.71***	4.70***	3.05***	3.02***	2.18**	2.18**
Size group		0.001	0.0003	0.0024	0.1653	0.1653
		0.02	0.01	0.05	2.20**	2.20**
Return on assets			1.6645	1.7952	2.9714	2.9714
			0.23	0.25	0.36	0.36
Market-to-book				0.0243	0.0126	0.0126
				0.69	0.38	0.38
Leverage					-12.7295	-12.7295
					2.05**	2.05**
Turnover					0.307	0.307
					1.31	1.31
Constant	0.366	0.3603	0.3273	0.27	2.1537	2.1537
	2.07**	0.89	0.65	0.55	1.86*	1.86*
Observations	680	680	680	680	680	680
R <sup>2</sup>	0.032	0.032	0.0321	0.0326	0.0447	0.0447

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<sup>i</sup> Many analytical and empirical studies show that price reactions to earnings announcements depend on the content of the public announcement relative to the quality of the pre-announcement information. Theoretical studies include Kim and Verrecchia (1991a, 1991b, 1994), Harris and Raviv (1993), and Kandel and Pearson (1995). Empirical studies include Atiase and Bamber (1994), Bamber and Cheon (1995), Abarbanell, Lanen and Verrecchia (1995), Utama and Cready (1997), Kim, Krinsky and Lee (1997), and Barron and Stuerke (1998).

<sup>ii</sup> Collins et al. (1994) argue that using the actual future earnings introduces an error-in variables problem in equation (IA.1) because the theoretically correct regressor is the unobservable change in expected future earnings. Future returns are included as control variables to correct for this bias. However, our findings are unchanged when we drop future returns from equation (IA.1).

<sup>iii</sup> The results are unchanged if we control for size using the average size within each size decile rather than the size decile index  $i$ .