# ETF Ownership and Corporate Investment

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## Abstract

We examine whether ownership by exchange traded funds (ETFs) affects the relation between real investment and Tobin's *Q*. Recent studies show that the stock prices of companies included in ETF baskets are more noisy; due to this effect, the managers of firms highly-owned by ETFs should rely less stock prices for information, which, in turn, should weaken the investment-*Q* relation for such firms. The results reliably confirm the hypothesis. To address endogeneity, we estimate an instrumental variable model based on S&P500 index additions, and find that the results continue to hold. The sensitivity of dividends to prices is higher for firms that are heavily ETF-owned, which suggests that managers pay money out to shareholders foregoing growth opportunities. Operating performance is less sensitive to stock prices for higher ETF-owned firms, which suggests that the effect of ETF ownership on the sensitivity of corporate policies to stock prices is to make the link between stock price and future performance more tenuous.

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# ETF Ownership and Corporate Investment


## Abstract

We examine whether ownership by exchange traded funds (ETFs) affects the relation between real investment and Tobin's *Q*. Recent studies show that the stock prices of companies included in ETF baskets are more noisy; due to this effect, the managers of firms highly-owned by ETFs should rely less stock prices for information, which, in turn, should weaken the investment-*Q* relation for such firms. The results reliably confirm the hypothesis. To address endogeneity, we estimate an instrumental variable model based on S&P500 index additions, and find that the results continue to hold. The sensitivity of dividends to prices is higher for firms that are heavily ETF-owned, which suggests that managers pay money out to shareholders foregoing growth opportunities. Operating performance is less sensitive to stock prices for higher ETF-owned firms, which suggests that the effect of ETF ownership on the sensitivity of corporate policies to stock prices is to make the link between stock price and future performance more tenuous.

## 1. Introduction

The availability of exchange traded funds (ETFs) has vastly increased during the recent years. To illustrate, as shown in Figure 1, the average ETF ownership in a firm in our sample has increased ten-fold from 2000 to 2014, from 1% to 10%. This increase in the availability of ETFs entails direct benefits, as it allows investors to participate in stock markets and hold diversified portfolios cheaply. However, recent work has highlighted that ETFs also entail some indirect costs, in that they contribute to a decrease in the pricing efficiency of the underlying securities (Ben-David, Franzoni and Moussawi (2017); Israeli, Lee and Sridharan (2017)).[1] We test whether ETF ownership affects the relation between corporate investment and Tobin's *Q*, by influencing managements' ability to learn about future growth opportunities from market prices. To our knowledge, the link between ETF ownership and real investment has not been previously investigated in the literature.

[Insert Figure 1 here]

The premise of our study is that investment policies are positively related to prices, consistent with Tobin's *Q* theory of investments (e.g., Chen, Goldstein and Jiang (2007)). The economic rationale behind this relationship is simple: Since prices aggregate information from outside investors, they incorporate information about the company that is not yet known to managers. Thus, managers extract value-relevant information from prices, which leads to the positive relationship between corporate investments and stock prices.

Ben-David, Franzoni and Moussawi (2017) draw attention to the fact that ETFs, due to their high liquidity, attract high-frequency traders. Moreover, since ETFs and the underlying assets are bound by no arbitrage conditions, volatility in ETFs caused by high-frequency trading

[1] Gorton and Pennacchi (1993) and Subrahmanyam (1991) show how markets in baskets of securities (like ETFs) can direct information acquisition activities away from firm-specific determinants of cashlow towards systematic factors influencing stock valuations.

can propagate to the underlying assets, as arbitragers trade to exploit violations of the law of one price. In line with this logic, Ben-David, Franzoni and Moussawi (2017) show that the *non-fundamental* volatility of stocks increases with ETF ownership. A similar conclusion is reached by Israeli, Lee, and Sridharan (2017), who show that the stock prices of firms highly owned by ETFs are less informative and contain less firm-specific information.[2]

We conjecture that these effects have implications for corporate investments. Specifically, we hypothesize that since ETF ownership makes stock prices more volatile and less informative, it adversely affects the ability of managers to learn about the prospects of their firms from stock prices. Therefore, for firms highly owned by ETFs, the sensitivity of investments to stock prices is lower.

We test this hypothesis using three different corporate investment measures: capital expenditure, capital expenditure plus R&D and change in assets. In our models we use *Q* as a measure of normalized price following the analysis in Chen, Goldstein and Jiang (2007), where higher *Q* values indicate better growth opportunities. The variable of interest for our hypothesis is the interaction between ETF ownership and *Q*, which we expect to be negative, so that for high ETF owned firms, real investment is less sensitive to stock prices.

The results strongly confirm our hypothesis. Using data on a sample of U.S. firms from 2000 to 2014, and models that include several firm level controls as well as firm and time fixed effects, we find that the coefficient on the interaction between *ETF* and *Q* is negative and statistically significant, for all three investment policy measures. The magnitude of the effect is considerable, as the sensitivity of investments to stock price falls by a factor of *six*, as we move from the 25$^{th}$ percentile of ETF ownership to the 75$^{th}$ percentile.

[2] Consistent with the analysis by Israeli, Lee, and Sridharan (2017), we find that the stock prices of firms that are heavily owned by ETFs contain less firm specific information. This analysis is shown in Table I.1 in the internet Appendix.

We conduct several robustness tests. We estimate our models using two different measures for ETF ownership, one proposed by Glosten, Nallareddy and Zou (2016), and the other as a simple count of the different ETFs that invest in a specific company. The coefficient on the interaction between *ETF* and *Q* is negative and significant in these specifications. Moreover, our results are robust in specifications with additional firm-level control variables, including analyst coverage.

In our baseline tests we rely on a sample of firms that are held by ETFs. However, for robustness, we also estimate our models in an expanded sample that includes firms not held by ETFs, and find that our results continue to hold. Finally, we estimate our model separately for each year of our sample, and find that the coefficient on the interaction between *ETF* and *Q* is negative and significant in 80% of those regressions. This suggests that our findings are not driven by a few 'outlier' years.

To allay concerns of endogeneity we also test our hypothesis using an instrumental variable (IV) model, using S&P500 inclusions as the relevant instrument. Since many ETFs track the S&P500 index, the demand for shares by ETFs in newly listed companies increases. Several other authors have used S&P500 inclusions as an instrument for institutional ownership in various settings (e.g., Aghion, Van Reenen and Zingales (2013); Agarwal, Vashishtha, and Venkatachalam (2017)). Importantly, because inclusion in the index is not based on considerations of future performance (e.g., Aghion, Van Reenen and Zingales (2013)), the increase in ETF ownership is plausibly exogenous, thus satisfying the exclusion restriction. The results show that the instrument is positive and significant in the first stage regression, passing tests for weak instrument and under-identification. In the second stage, the interaction between the fitted value of ETF from the first stage model and *Q* continues to be negative and significant for all three of the investment policy measures. This result strengthens the view that the relationships we document are causal.

Our final robustness check addresses the possibility that ETF ownership in our models is capturing the effect of an omitted variable. To conduct the test we calculate for each firm in our sample its average ETF ownership during 2000-2014, assign this average value back to the same firm for the period 1984-1999, and estimate the interaction between ETF ownership and *Q*. Since ETFs were much less widespread in the earlier (1984-1999) period, and therefore less likely to influence the ability of managers to learn from stock prices, we expect that the coefficient on the *ETF*Q* interaction to be insignificant in this earlier sample, so long as ETF ownership is not capturing the effect of an omitted variable. In line with our predictions we find that in the interaction is indeed statistically insignificant for all three corporate investment measures, which suggests that the reduction in the investment to stock price sensitivity in our baseline models indeed reflects the impact of ETF ownership.

For our next set of tests we examine whether the effects we document are stronger in cases where managers are more reliant on stock prices for information about their firms. To test this hypothesis we estimate our baseline model in various subsamples sorted on variables that relate to this propensity.

Our first sorting variables relate to the costs of information production faced by investors that are related to the general opacity that surrounds a firm. Previous research has shown that investors price more efficiently information for larger, older, and less volatile firms (e.g., Zhang (2006)), which suggests that investors face lower information production costs for such companies. Thus, managers may rely more on prices for information for these firms.

For our second set of sorting variables we consider corporate governance (measured with board independence), since better governed firms attract institutional investors (e.g., Black (1992, 1998); Chung and Zhang (2011); Miletkov, Poulsen, and Wintoki (2014); Tosun (2018)). Because institutional investors are more sophisticated (e.g., Malmendier and Shanthikumar (2007)), their trades should bring more new information into stock prices, making them a more useful signal to managers. We also consider industry competition, as this attribute is related to the pressures faced by managers to gather information. Managers of firms operating in competitive industries, in their attempts to gain an edge, will be forced to consider all possible information sources, including stock prices. Finally, we consider CEO tenure, since managers with longer tenure should have more general experience in observing how the market prices information for their companies. Thus, they should be in a better position to extract information from stock prices.

The results from the sub-sample analysis across all these different sorting variables are remarkably consistent, as we find that the negative relationship between *Q* and *ETF* is more pronounced among larger, older and less volatile firms, with better governance systems, operating in high competition industries, and managed by CEOs with longer tenure. Collectively these results suggest that the adverse effect of ETF ownership on the ability of managers to learn from prices is concentrated in cases where managers are more likely to rely on prices for information.

According to the *Q* theory of investments the relationship between dividend payments and prices should be negative, as firms with growth opportunities should invest and not pay out money to shareholders. However, our previous findings suggest that ETF ownership may temper this relationship. Specifically, since managers of firms highly owned by ETFs are less able to learn from stock prices about their growth opportunities, they may be more prone to making dividend payments instead. To test this hypothesis we examine the relationship between a firm's dividend policy and the interaction between *ETF* and *Q*. We find that the coefficient on the interaction is positive, consistent with our conjecture.

Our results show that ETF ownership adversely impacts the relationship between prices and corporate policies (investments and dividend payouts). Therefore, ETF ownership may be detrimental to firm performance. For our last test we estimate the relationship between operating performance (sales growth and return on assets) and the interaction between *ETF* and *Q*. The results indeed show that the coefficient on the interaction is *negative*, which suggests that the distortions in the relationship between corporate policies and prices associated with ETF ownership are costly.

Several other studies have addressed the impact of ETFs on the underlying asset markets, focusing their analysis on the asset pricing dimension. Aside from Ben-David, Franzoni and Moussawi (2017) and Israeli, Lee and Sridharan (2017), who show that ETF ownership increases the non-fundamental volatility of stocks and their pricing inefficiency, respectively, Agarwal et al. (2017) show that ETF ownership increases commonality in liquidity. On a theoretical level, Bhattacharya and O'Hara (2016) show that ETFs contribute towards market instability. Our results suggest that ETF ownership is associated with a negative externality at the corporate level, impeding the ability of managers to learn about the growth opportunities of their firms from stock prices when choosing their investment policies.

On the relation between *Q* and real investment, Hennessy (2004) and Hennessy, Levy and Whited (2007) discuss how the relationship between investments and *Q* can be distorted by a debt overhang or financing frictions, respectively. Almeida and Campello (2007) highlight that tangible assets are more pledgeable, and thus can be used as collateral to enable more borrowing. In support of this notion, these authors show that the sensitivity of investments to *Q* increases with the firm's asset tangibility. Andrei, Mann, and Moyen (2018) show that the relation between investment and *Q* has strengthened in recent years, a finding they attribute to increasingly greater dispersion in *Q* over time. Chen, Goldstein, and Jiang (2007) hypothesize that managers will rely more on stock prices for information if prices contain more private information, which is likely to be unknown to managers. Consistent with this notion, Chen, Goldstein, and Jiang (2007) show that that the sensitivity of investments to *Q* increases with proxies for the amount of private information embedded in stock prices. Our work adds to this literature, documenting that ETF ownership reduces the sensitivity of corporate investments to *Q*.

Finally, our paper makes a contribution to the literature on limits to arbitrage and market efficiency. According to the traditional view, the actions of sophisticated agents act as a stabilizing force against mispricing. However, several studies show that, in some cases, the effect of arbitrage can go the other way. For example, Vayanos and Wooley (2013) and Buffa, Vayanos and Wooley, (2014) discuss how the interplay between managers and investors in a delegated capital management setting can, in some cases, strengthen return predictability. Another line of research highlights that information asymmetries across different investment managers about their respective trading strategies can make prices diverge from fundamental values (e.g., Stein (2009); Lou and Polk (2013); Mendel and Shleifer (2012)). These papers focus their analysis on the asset pricing dimension. Our study provides a new perspective on this issue, by demonstrating how the presence of ETF institutions affects real investment.

The next section in our paper discusses the methods and data we use in our analysis. The third section presents the results, and the fourth section concludes.

## 2. Methodology and Data

*2.1 Baseline Model*

To test our hypothesis we use the model below, estimated using ordinary least square regressions:

$$Policy_{i,t} = \alpha + \gamma_i + \delta_t + \beta_1 q_{i,t-1} + \beta_2 ETF_{t-1} + \beta_3 Q_{i,t-1} \times ETF_{t-1} + \rho' \boldsymbol{Control_{i,t-1}} + \epsilon_{\boldsymbol{i,t}} \quad \textbf{(1)}$$

The dependent variable in the model is the investment policy of firm *i* in quarter *t*. Following the analysis of Chen, Goldstein, and Jiang (2007), we use three different measures in our baseline analysis: Capital Expenditure (*CAPX*), Capital Expenditure plus expenses for research and development (*CAPXR&D*), and the Change in Total assets between quarters *t* and *t*-1 (*ChangeAssets*). These variables are scaled by total assets.

To measure the price sensitivity of investments, we use *Q* as our normalized price measure, calculated as the market value of equity plus book value of assets minus the book value of equity scaled by book value of total assets. Increases in *Q* suggest that the firm has growth opportunities, and therefore warrants further investments.

*ETF* in (1) measures ownership of company *i* by exchange traded funds, and for our baseline tests it is based on the method in Ben-David, Franzoni and Moussawi (2017). Specifically, we construct this variable using only ETFs that are listed in US exchanges and whose baskets contain US stocks. Moreover, we focus on ETFs that hold securities included in the ETF basket they track, omitting ETFs that also use derivatives for index tracking purposes.[3] We conduct robustness tests using two alternative measures, the ETF ownership measure proposed by Glosten, Nallareddy and Zou (2016), as well as the number of ETFs that own shares in firm *i*.

The key variable of interest for our hypothesis is the coefficient on the interaction between *Q* and *ETF*, $\beta_3$. According to previous evidence, higher ETF ownership makes stock prices noisier (e.g., Ben-David, Franzoni and Moussawi (2017)). Thus, managers of firms with high ETF ownership should be less reliant on prices when choosing their investment policies, therefore, the coefficient on the interaction term $\beta_3$ is expected to be negative and significant.

Our models also control for various firm-level attributes that may influence investment decisions. Since *Policy* and *Q* are scaled by total assets, we control for the inverse of total assets (*InverseAssets*) to exclude the possibility of spurious correlation (Chen, Goldstein, and Jiang (2007)). To control for the possibility that our results are driven by the tendency of overvalued firms to invest more (i.e., Loughran and Ritter (1995) and Baker and Wurgler (2002)), our models include the market adjusted return of the company in the following three quarters (*FutureReturn*). To account for the well-documented effect of cash flows on investments (i.e., Fazzari, Hubbard and Petersen (1988)) we include cash flow in the analysis (*CashFlow*), both on its own and as an interaction with *ETF*. To control for any investment constraints, our model includes leverage (*Leverage*), cash holdings (*Cash*), *Retained Earnings*, and the tangibility of assets (property, plant, and equipment, or *Tangibility*). To control for constraints to debt financing, we use the variable proposed by Baker, Stein and Wurgler (2003), calculated as a

[3] Our ETF sample is restricted to the following Lipper Objectives Codes: Broad Based US Equity: CA, EI, G, GI, MC, MR, SG, SP, and sector funds that invest in US companies with codes BM, CG, CS, FS, H, ID, NR, RE, TK, TL, S and UT. For more details on ETF measurement see the internet appendix of Ben-David, Franzoni and Moussawi (2017).

weighted sum of Leverage, cash flow, cash dividends and cash balances, weighted by total assets (*KZ4*). To control for aspects of the information environment we include the volatility of sales revenues in the past seven quarters (*AdjSalesVolatility*). To ensure that our ETF variables are not capturing institutional ownership, we control for non-ETF institutional ownership in our models (*InstOwn*).[4] All the independent variables in our models are lagged by one quarter, except *FutureReturn*, *CashFlow* and *KZ4,* which enter contemporaneously with investment policies, as in Chen, Goldstein, and Jiang (2007). The variables are defined in detail in Table A.1 in the Appendix.

Finally, to control for any unobserved, time-invariant firm-specific factors that may influence firm *i*'s investment decisions, all our models include firm fixed effects, indicated with $\gamma_i$ in the model in (1). Moreover, time fixed effects ($\delta_t$ in (1)) control for any systematic variation in investments in any given quarter across all firms that is related to the macro-economy. The standard errors of all our models are clustered at the firm level.

### *2.2 Sample Construction*

Since we are interested in the relationship between investment policies and *Q* for different ETF ownership firms, for our baseline tests we use only firms that have some ETF ownership (i.e., *ETF* > 0). This sample covers roughly 53% of the total U.S. equity market.[5] Using breakpoint data from Kenneth French's website we find that, on average, firms in our sample belong in the 4th decile in terms of market value, and the 7th decile in terms of book-to-market ratio. This suggests that our sample is tilted slightly toward smaller and value-stocks.

[4] Institutional ownership is constructed with data from Thomson Reuters, Factset and CRSP databases, and measures the percentage of total shares outstanding held by institutional investors other than ETFs.

[5] For robustness, we also conduct tests using a sample that includes firms not owned by ETFs.

As is common in the literature (e.g., Chen, Goldstein, and Jiang (2007)), to avoid the influence of outliers, all variables are winsorized at the 1st and 99th percentile. For each of our tests we include all firms with available data, and the number of observations in each test is indicated in the corresponding table. Our data come from the Center for Research in Security Prices (CRSP), Compustat, Bloomberg and OptionMetrics, and cover the period from the first quarter of 2000 to the fourth quarter of 2014. We end our sample at end of 2014 to avoid errors in Thomson-Reuters mutual fund ownership data (Ben-David, Franzoni and Moussawi (2017)).

### *2.3 Instrumental Variable Model*

In section 3.3 of the paper we test the hypothesis using an instrumental variable (IV) model, similar to Aghion, Van Reenen and Zingales (2013) and Agarwal, Vashishtha and Venkatachalam (2017). For this test we use the inclusion of a firm in the S&P500 index as an instrument. The intuition is that many ETFs track this index, so when a company is included in the index, the demand for shares by ETFs increases. Since inclusion in the S&P500 index is not driven by considerations of future performance,[6] the exclusion restriction is likely to be satisfied. We define two different instrumental variables: the dummy *Listed* (equal to 1 for all periods that a firm is listed in the S&P 500, and zero otherwise) and the dummy *Added* (equal to 1 only in the quarter after the firm is listed, and zero otherwise). In the first stage, we predict *ETFownership* with either *Listed* or *Added*, as shown below:

$$ETFownership_{i,t-1} = \alpha + \gamma_i + \delta_t + \beta Instrument_{i,t-1} + \rho' \boldsymbol{Control}_{i,t-1} + \varepsilon_{i,t} \quad \textbf{(2)}$$

[6] Standard and Poor's explicitly states that the decision to include a company in the S&P 500 Index is not an opinion on that company's investment potential (Aghion, Van Reenen and Zingales (2013), p. 282).

In the second stage, we estimate our baseline model replacing *ETF* with the fitted value from the model in (2):

$$Policy_{i,t} = \alpha + \gamma_i + \delta_t + \beta_1 Q_{i,t-1} + \beta_2 \widehat{ETF}_{t-1} + \beta_3 Q_{i,t-1} \times \widehat{ETF}_{t-1} + \rho' \boldsymbol{Control_{i,t-1}} + \epsilon_{\boldsymbol{i,t}} \quad \textbf{(3)}$$

## 3. Results

### *3.1 Descriptive Statistics*

In Table 1 we present descriptive statistics for the main variables we use in our analysis. Mean *CAPX* (*CAPXR&D*) is 2.6% (3.8%) of total assets, whereas the change in total assets (*ChangeAssets)* is 2.3%. ETFs own on average 2.4% of the equity of the firms in our sample. The average number of ETF funds invested in each firm is roughly 14. The average *Q* of our firms is 1.7, close to what is usually reported in the literature (e.g., Chen, Goldstein, and Jiang (2007)). The market capitalization of each firm in our sample is $2.8B on average, with an average cash flow of 2.1% relative to total assets, and an average future quarterly return of 5.8%. Table A.2 in the Appendix presents pairwise correlation coefficients for all the variables used in our analysis.

[Insert Table 1 here]

### *3.2 ETF Ownership and Investment to Stock Price Sensitivity*

In this section we test out baseline hypothesis using the model in (1). The results are shown in Table 2. For each of our dependent variables we use three separate models, adding control variables sequentially. The number of observations in each of these models differs, depending on the availability of the control variables.

[Insert Table 2 here]

The first noteworthy finding is that the coefficient of *Q* is positive and significant for all corporate investment measures, consistent with prior studies (e.g., Hennesy (2004); Chen, Goldstein, and Jiang (2007)). This finding accords with the notion that managers extract information from prices when choosing their investment policies.

Consistent with our hypothesis, for the *CAPX* variable, the interaction between *ETF* and *Q* is *negative*, equal to -0.0222 and significant at the 1% level. This shows that that for high *ETF*-owned firms *CAPX* is less sensitive to price. This finding is robust to adding additional control variables, as is shown in columns (2) and (3) of Table 2.

A similar finding emerges for the two remaining investment variables. In terms of *CAPXR&D*, the results in Column (6) show that the coefficient on the interaction is -0.0249, whereas for *ChangeAssets* the coefficient is -0.0604, both significant at conventional confidence levels.

In terms of control variables, as seen from Column (3) in Table 2, we find that *CAPX* increases with *Cash Flow, InstOwn, KZ4, Mrktvalue, Retained and Tangibility* and reduces with *FutureReturn, Leverage, Cash,* and *SalesGrowth*. Similar relationships are shown for the models with *CAPXR&D* and *ChangeAssets* as dependent variables.

The economic significance of the interaction effect is substantial. Focusing, for example, on Column (3) of Table 3, we observe that the investment-to-stock price sensitivity drops by a factor of six as ETF ownership increases from the 25th percentile to the 75th, from 0.5% to 3.5%.[7]

The significance of our results we also be seen from Figure 1, which plots the coefficient on *Q* estimated in two sub-samples sorted on ETF ownership, cutting at the median.[8] From the

[7] Given that the 25th and 75th percentile values for *ETFownership* are 0.5% and 3.5%, respectively, our regression estimates imply that the investment-to-price sensitivity of a firm decreases from -0.015% (= -2.94%*0.5%) to -0.10% (= -2.94%*3.5%) as ETF ownership increases from the first to the fourth quartile.

[8] These models include a full set of control variables, but exclude *ETF* and *ETF*q*.

three panels in Figure 2 we observe a visible downward shift in the coefficient on *Q* as we move from the low to the high ETF ownership group, consistent with our hypothesis. The reduction is noteworthy, equaling roughly 9% for *CAPX*, 13% for *CAPXR&D* and 35% for *ChangeAssets.*

[Insert Figure 2 here]

Overall, the results in this section show that the investments of firms highly owned by ETFs investments are less sensitive to prices, suggesting the managers of these firms rely less on stock prices for information.

### *3.3 Robustness Checks*

In this section we conduct additional tests to check the robustness of our baseline results.

#### *3.3.1 Different ETF Measures and Additional Tests*

In Table 3 we test the model in (1) using two different measures of ETF ownership, *ETFownership(gnz)* (based on the analysis of Glosten, Nallareddy, and Zou (2016)), and the natural logarithm of the number of ETFs invested in each firm, *Ln(ETFnumber)*. We test the hypothesis using all three of our investment policy measures with each additional ETF proxy, six models in total. We find that for all models the coefficient on the interaction between *ETF* and *Q* is negative and statistically significant, consistent with our baseline results in Table 2.

[Insert Table 3 here]

For our next robustness test we estimate the model in (1) using an expanded sample that also includes firms with no ETF ownership. The results are shown in Table A.3 in the Appendix. We find that the interaction between *ETF* and *Q* is negative and significant in all models, with the effect being somewhat stronger statistically in this expanded sample.

We also test our baseline model in each year of our sample separately (2000-2014). The results are shown in Figure 3, which plots the coefficient on the interaction between *ETF* and *Q* in these models. We observe that the relationship is negative and significant in 12 out of 15 years, suggesting a high level of intertemporal stability. The three years that the interaction is insignificant are in the beginning of the sample, where ETF ownership is generally lower (see Figure 1). [9]

[Insert Figure 3 here]

### *3.3.2 Instrumental Variable Model*

We continue with a test of the hypothesis using the instrumental variable (IV) model described in section 2.3. The results are shown in Table 4.

[Insert Table 4 here]

From the first two columns, we see that the estimated coefficient of the instrument in the first stage regression is positive and highly significant, which shows that ETF ownership increases after a firm is listed in the S&P500. In the bottom of Table 4 we provide statistics from the Cragg and Donald (1993) *F*-test for weak-instruments, and Anderson's Chi-square test for under-identification. The null hypotheses under these tests is rejected for both *Listed* and *Added*, showing that the instruments are not weak.[10]

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[9] Our models have missing data for Q1 and Q4 in 2011 and Q1-Q3 in 2013. This is because the variable "asset" from Thomson Reuters that is needed to calculate ETF ownership is missing entirely for these periods. For robustness, we calculate ETF ownership using a substitute variable "Total_Aum" from Factset, and re-estimate all our models. We find that the results are qualitatively and quantitatively very similar to those reported in the paper. This analysis is shown in Table I.2 of the internet Appendix.

[10] Specifically, the Cragg-Donald *F*-statistics for *Listed* and *Added* are 49.83 and 17.2, respectively, and exceed the Stock-Yogo critical value of 16.38 for one instrument with significance level of 5%. For the Anderson test, the Chi-square values are 45.9 and 4.42, respectively, and they reject the null hypothesis of under-identification at the 1% significance level.

The results from columns (3)-(8) in Table 4 show that the coefficient on the interaction between the fitted value of *ETF* and *Q* continues to be negative and significant in the second stage model for all three investment policies, using either *Listed* or *Added* as an instrument. Similarly to Ben-David, Franzoni and Moussawi (2017) we find that the coefficient on the interaction between the fitted *ETF* ($\widehat{ETF}$) and *Q* is larger in the IV model compared to the OLS model, especially when the dependent variable is *CAPXR&D* or *Change Assets*. This result may arise because in the IV model variation in ETF ownership comes solely from S&P500 inclusion, a treatment that is associated with a large increase in demand for shares by ETFs, which is, arguably, more impactful than ETF ownership for the average stock (as captured by the OLS model).

*3.3.3 Controlling for Analyst Coverage*

Israeli, Lee, and Sridharan (2017) find that ETF ownership results in a reduction in analyst coverage, which can reduce the informativeness of stock prices. Indeed, Lang, Lins, and Miller (2003) argue that an increase in analyst coverage in the company reduces the information gathering costs faced by investors for this company, and thus can lead to a wider investor base. Therefore, through this channel, variations in analyst coverage may influence the degree to which managers rely on stock prices for information. To exclude the possibility that our results are picking up an analyst coverage effect, for our final robustness test, we repeat our tests by including analyst coverage and its interaction with *Q* as additional controls in our models.

We use the IBES files to measure analyst coverage, defined as the number of analysts who issue one-quarter ahead earnings forecasts for firm *i* in quarter *t*. We use two different specifications for coverage, (*i*) the natural logarithm of (1+ the number of analysts), and (*ii*) the residual from a regression of this variable on the natural logarithm of the market value of firm *i* at the end of quarter *t*-1. This orthogonalization is motivated by the observation of Hong, Lim and Stein (2000), that analyst coverage and firm value are strongly positively correlated. We use their procedure to obtain an expression for analyst coverage that is “net” of firm value.

The results are shown in Table 5. Across all models we observe that the interaction between *ETF* and *Q* is negative and significant, consistent with the results in our baseline estimation. In terms of magnitude we observe that the coefficient on the interaction is larger in this specification, compared with columns (2), (5), and (8) in Table 2. This finding confirms that our baseline results are not driven by analyst coverage.

[Insert Table 5 here]

We find that the coefficient on *Analyst Coverage* is positive and significant for two policies. However, in contrast, the coefficient on *Residual Analyst Coverage* is negative and significant. Moreover, we find that the coefficient between *Residual Analyst Coverage* and *Q* is positive and significant for two of the investment measures (*CAPXR&D* and *ChangeAssets*), which suggests that managers rely more on prices for information when analyst coverage is high, consistent with the conclusion reached by Lang, Lins and Miller (2003).

### *3.3.4 A Placebo Test*

It is possible that the ETF ownership variable in our models is capturing the effect of an omitted variable on the sensitivity of investments to *Q*. To address this concern we examine whether the ETF effect on this sensitivity is present in earlier periods, where ETFs where much less widespread, and therefore less likely to influence the ability of managers to learn from stock prices.

To conduct this 'placebo' test we calculate for each firm *i* in our sample its average ETF ownership during our sample period (2000-2014). We then assign this average *ETF* value to firm *i* for the period 1984-1999, a period where ETFs were much less wide-spread.[11] If ETF ownership is just proxy for an omitted firm-level characteristic, then the coefficient on the *ETF*Q* interaction should continue to be negative and significant in this earlier sample. However, if the coefficient on the interaction is insignificant, then it is more likely that the reduction in the sensitivity of investments to *Q* in the 2000-2014 period is indeed driven by ETFs.

To conduct the test we estimate the baseline version of our model, shown in columns 2, 4 and 6 in Table 2. However, because in this sample there is no variation in *ETF* on the firm level (since each firm receives its future average *ETF* value), we can no longer use the model in Equation (1) with firm fixed effects. Instead, we use a pooled OLS model, where the standard errors are two-way clustered at the firm and time level, as in Petersen (2009). [12]

The results are shown in Table 6. Consistent with our baseline analysis the coefficient on *Q* remains positive and significant in this earlier sample in all cases (columns 1-3). In line with our predictions, we find that the coefficients on *ETF* and *ETF*Q* are both statistically insignificant across all three corporate investment measures. This finding provides further support to the claim that our baseline results for the 2000-2014 period reflect an ETF-related distortion on the sensitivity of corporate investments to *Q*.

[Insert Table 6 here]

[11] We start in 1984 because coverage of some of key variables like *CAPX* in Compustat prior to that year is very sparse.

[12] For robustness, we use the two-way clustered standard errors model for the 2000-2014 sample, and find that the coefficient on *ETF*Q* is negative and significant for all three corporate policy measures. This analysis is shown in Table I.3 of the internet Appendix.

Overall the results in this section suggest that our main findings are robust to different specifications for ETF ownership, models that additionally control for analyst coverage, and to different sample specifications. Further, our results continue to hold using an instrumental variable model, and are absent in earlier periods where ETFs where less widespread. These findings strengthen the view that the relationships we document are causal.

*3.4 Subsample Tests*

In this section we estimate the model in (1) in various subsamples, to determine whether the relationship between ETF and investment-to-stock price sensitivity is stronger for particular types of companies. Specifically, we conjecture that the effects we document will be stronger in cases where managers are more reliant on stock prices for information about their firms. For brevity, for the analysis in this section, we only consider *CAPX*.

The stock price should be a more useful signal for managers if it incorporates more information, which in turn depends on the costs faced by investors when producing that information (e.g., Grossman and Stiglitz (1980)). Previous research has shown that investors price information about larger, older, and less volatile firms more efficiently (e.g., Zhang (2006)), which suggests that investors face lower information production costs for such companies. Motivated by this observation, we sort our sample in two groups based on firm size, firm age, or sales volatility (cutting at the median), and estimate the model in (1) separately for each group.

The results are shown in Table 7. The first noteworthy finding across all three Panels is that the coefficient on *Q* is bigger for larger and older firms, and firms with lower sales volatility.

This finding supports our idea that managers are more reliant on stock prices for information for such firms. From the first panel we observe that the ETF effect we document is concentrated among the largest firms in the sample. The coefficient for these firms on the interaction between *ETF* and *Q* is -0.0260 and highly significant at the 1% level. Similar results are seen in the second and third Panel of Table 7, where the interaction is only significant for older firms and firms with lower sales volatility.

[Insert Table 7 here]

We consider three additional sorting variables that may influence the extent to which managers rely on prices for information. The first variable relates to the observation that firms with better corporate governance systems attract more investments from institutional investors (Chung and Zhang (2011)). Since such investors are more sophisticated (e.g., Malmendier and Shanthikumar (2007)), their trades will bring more information into prices, making these prices a more useful signal to managers. Based on previous literature (e.g. Mak and Li (2001); Fernandez and Arrondo (2005); Miletkov, Poulsen, and Wintoki (2014)) we measure corporate governance using board independence.

We also consider the degree to which the industry in which a firm operates is competitive. The idea here is that managers operating in more competitive industries will have more volatile cash flows, leading to greater information acquisition by outsiders, and thus more informative stock prices (Irving and Pontiff (2008); Admati and Pfleiderer (1988)). To perform the test we use the Herfindahl-Hirschman Index (HHI) of industry concentration, and construct sub-samples of firms operating in concentrated (HHI > 0.25) vs competitive industries (HHI < 0.15).[13]

[13] For more details on this index see: https://www.justice.gov/atr/herfindahl-hirschman-index.

Our final sorting variable is CEO tenure. Gorton, Huang, and Qiang (2016) argue that firms with entrenched CEOs create greater incentives to produce outside information. The reason is that entrenchment implies a delayed internal reaction to information, increasing the incentive to collect outside information. This implies that stock prices in firms with greater CEO tenure will be more sensitive to outside information. To conduct this test we use data from ExecuComp to measure CEO tenure in the firm.

For board independence and CEO tenure we sort our sample in two groups cutting at the median, whereas for industry competition we form the two groups using the HHI breakpoints mentioned above. We estimate the model in (1) separately for each group.

The results are shown in Table 8. We find that the coefficient on *Q* is larger for firms with higher board independence, and firms operating in more competitive industries, which suggests that managers are more reliant on stock prices for information in these cases.[14] From the first Panel we observe that the coefficient on the interaction between *Q* and *ETF* is negative and significant only for firms with high board independence, with a coefficient equal to -0.0445 highly significant at the 1% level. A similar finding obtains in the second and third Panel of Table 8, where the *ETF***Q* interaction is negative and significant only for firms operating in highly competitive industries, and for firms managed by more experienced CEOs.

[Insert Table 8 here]

Overall the results from Tables 7 and 8 provide support to the claim that the adverse effect of ETF ownership on the sensitivity of investment to price is more significant in cases where managers are likely to rely more on stock prices for information.

[14] The coefficient on *Q* estimated from subsamples of firms with low and high manager tenure is similar.

*3.5 Payout Policy*

Since managers in high ETF-owned firms learn less from prices, they may be more likely to pay out dividends. We test this conjecture, examining the relationship between dividend policy and the interaction between *Q* and *ETF*. We use two different specifications for dividend policy, the natural logarithm of total dividend payouts *Ln(Dividend*) or the *Dividend Ratio*. ETF ownership is measured following Ben-David, Franzoni and Moussawi (2017).

The results are shown in the first Panel of Table 9. The first finding is that the baseline relationship between *Q* and dividends is insignificant *Ln(Dividend*) and positive and significant for *Dividend Ratio*.

[Insert Table 9 here]

The coefficient on the interaction between *ETF* and *Q* is positive and significant across both models in Table 9, showing that, for high ETF owned firms, the sensitivity of dividend payouts to stock price is higher. The effect is economically substantial. Particularly, the findings for *Ln(Dividend)* for example indicate that the average investment-to-dividend sensitivity in a firm increases from 0.48% (= 0.959*0.5%) to 3.36% (= 0.959*3.5%) if *ETFownership* in those firms increases from a 25$^{th}$ percentile value to a 75$^{th}$ percentile value.

For robustness, we also estimate the model using the IV model outlined in section 2.3 replacing corporate policy with dividend payment as the dependent variable. The results from this model, which are shown in Table A.4 in the Appendix, are consistent with those in Table 9, showing that the coefficient on the interaction between the fitted value of *ETF* and *Q* is positive and statistically significant.

Overall the results in this section show that the managers of firms highly owned by ETFs are more prone to pay-out money out to shareholders, foregoing growth opportunities.

*3.6 Operating Performance*

In an efficient and frictionless market managers optimally choose their investments according to the growth opportunities of their firms. Thus, *Q* should be positively related to future operating performance. Our results thus far, however, suggest that for high ETF owned firms investment policies are less sensitive to *Q*. This finding indicates that, for these firms, corporate policies are sub-optimal, which may be detrimental to future operating performance.

In this section we examine this hypothesis, analyzing the relationship between *Sales Growth* and *Return on Assets* and the interaction between *Q* and *ETF*. Our conjecture is that, because the presence of ETFs pushes corporate policies away from the "first best", the sensitivity of operating performance to *Q* should be lower for high ETF owned firms. For brevity, we only consider ETF ownership as measured by Ben-David, Franzoni and Moussawi (2017).

The results are shown in the second Panel of Table 9. While the baseline relation between operating performance and *Q* is insignificant, we find that the coefficient on the interaction between *ETF* and *Q* is negative and significant, for both measures of operating performance. The economic effect is considerable. Specifically, the results for *Sales Growth* and *Return on Assets* imply that the average investment-to-performance sensitivity in a firm decreases from -0.04% (= 8.72%*0.5%) to -0.31% (= 8.72%*3.5%) and from -0.01% (= 1.98%*0.5%) to -0.07% (= 1.98%*3.5%), respectively, as *ETFownership* increases from the 1st to the 4th quartile.[15]

The economic effect can also be seen from Figure 4, where we plot the coefficient on *Q* estimated in two ETF ownership groups, cutting at the median. When the dependent variable is *Sales Growth* the coefficient decreases by 119% as we move from the low to the high ETF

[15] For robustness, we also estimate the IV model outlined in section 2.3, replacing corporate policy with operating performance. Our results continue to hold in this specification. This analysis is shown in Table I.4 of the internet Appendix.

ownership group (-0.0043 to -0.0094). The corresponding decrease in the coefficient of *Q* when the dependent variable is *Return on Assets* is 40% (0.006 to 0.0036).

**4. Conclusion**

It has been shown that ETF ownership increases the non-fundamental volatility of the stocks included in the ETF baskets (e.g., Ben-David, Franzoni and Moussawi (2017)). In this paper we examine, for the first time, whether ETF ownership also influences outcomes at the corporate level. Specifically, our hypothesis is that since the stock prices of firms highly owned by ETFs are less informative, managers will rely less on them when making real investment decisions. Thus, for these firms the sensitivity of corporate investment to stock prices (Tobin's *Q*) will be lower.

Our results confirm this hypothesis, as we show that for high ETF-owned firms corporate investments are less sensitive to prices. Moreover, we find that this effect is concentrated in cases where managers are more likely to be reliant on stock prices for information. Our results continue to hold in various robustness tests, including an instrumental variable model based on S&P500 additions. In additional analyses we find that dividends are more sensitive to prices when ETF ownership is high, which suggests that the diminished ability of managers to learn from prices makes them more likely to pay out dividends. Finally, we find that for high ETF owned firms operating performance is less sensitive to prices, which suggests that the effect of ETF-ownership on the investment-*Q* relation impacts real firm outcomes.

It has long been argued that investors would be better off if they pursued passive investment strategies that are cheap to implement (e.g., Malkiel (1973)). The expansion in the availability of ETFs goes a long way toward achieving this objective. However, recent work, including our own analysis in this paper, suggests that ETFs entail some indirect costs to financial markets, which can affect not just market participants, but corporate management as well. We hasten to add that we are not taking a position on the aggregate impact of ETFs. The role of these securities as liquid instruments for facilitating diversification cannot be denied. Further, these securities, representing cheap ways of trading broad indices, may well facilitate the incorporation of macroeconomic information. A detailed exploration of these alternative roles for ETFs is left for future research.

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**Figure 1: Trends in ETF Ownership**

In this figure we plot yearly averages of our baseline ETF ownership measure, as well as the number of ETFs invested in a company.

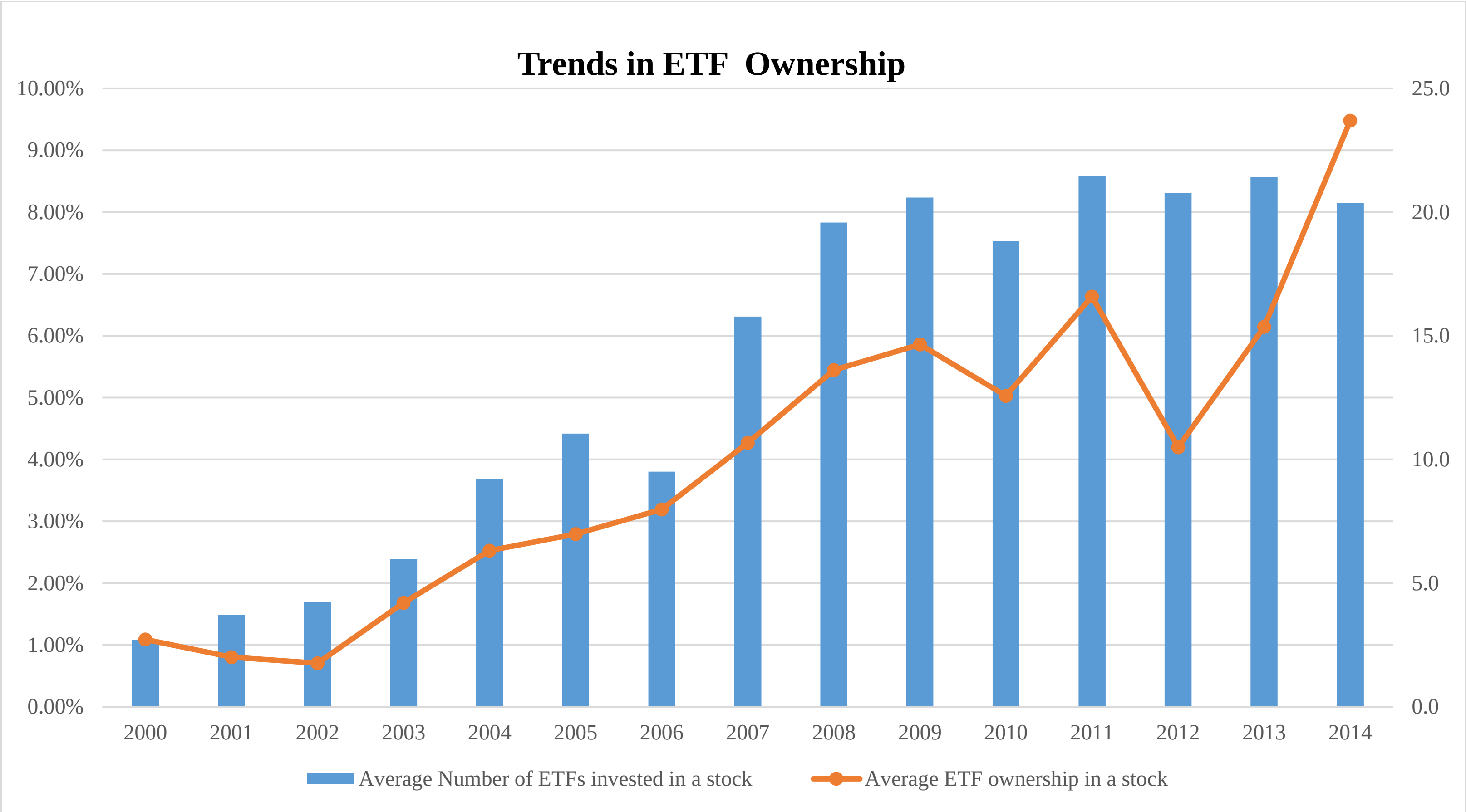


**Figure 2: Coefficient on *Q* in High and Low ETF Groups**

In this figure we plot the coefficient estimate on *Q* for sub-samples sorted on ETF ownership. To obtain this estimate we sort our sample into two groups based on ETF ownership, cutting at the median. We then run our baseline model in (1) with a full set of control variables separately for each group, excluding *ETF* and its interaction with *Q* from the estimation. The figures plot the coefficient on *Q* in each group for the different corporate investment measures.

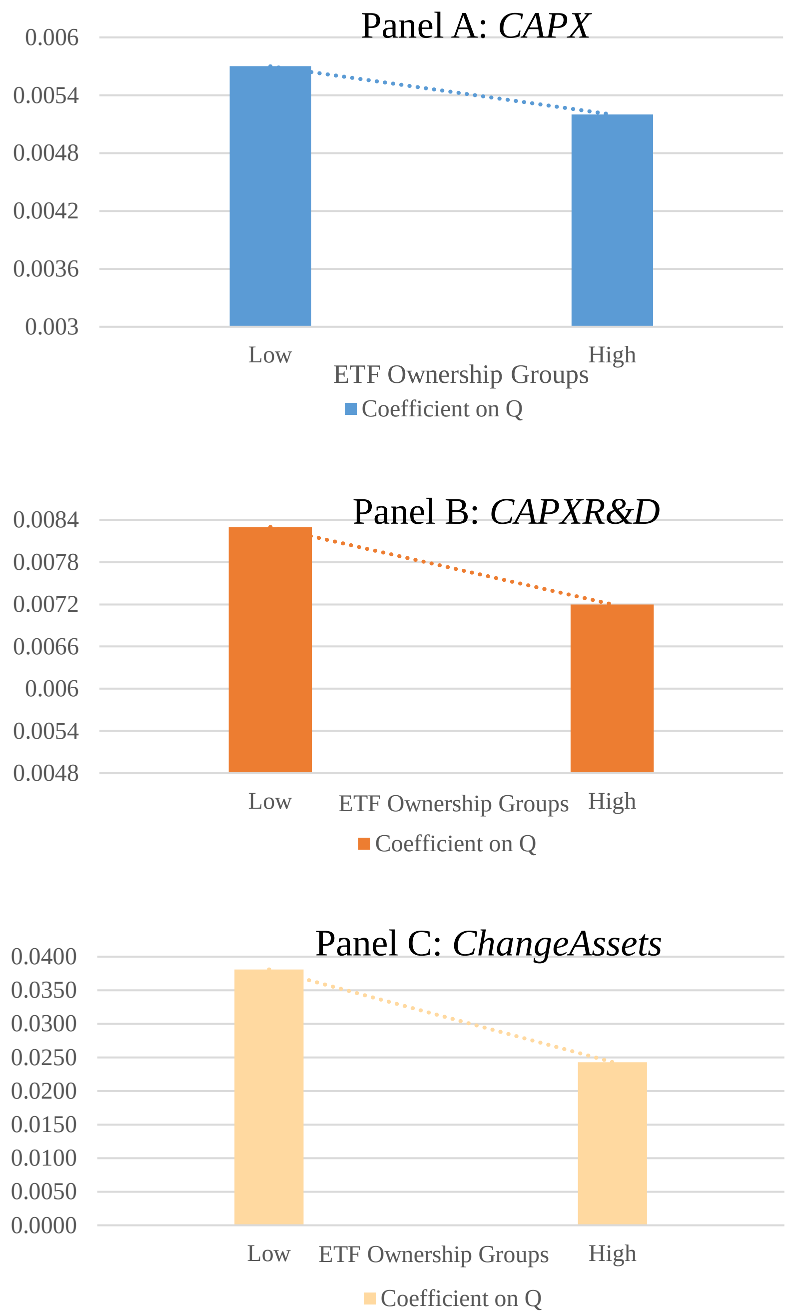


**Figure 3: Coefficient on *ETF*Q* by year**

In this figure we plot the coefficient estimate on the interaction *ETF *Q* estimated using our baseline model without any fixed effects on an annual basis. The * under each column indicates statistical significance at the 10% confidence level, or better.

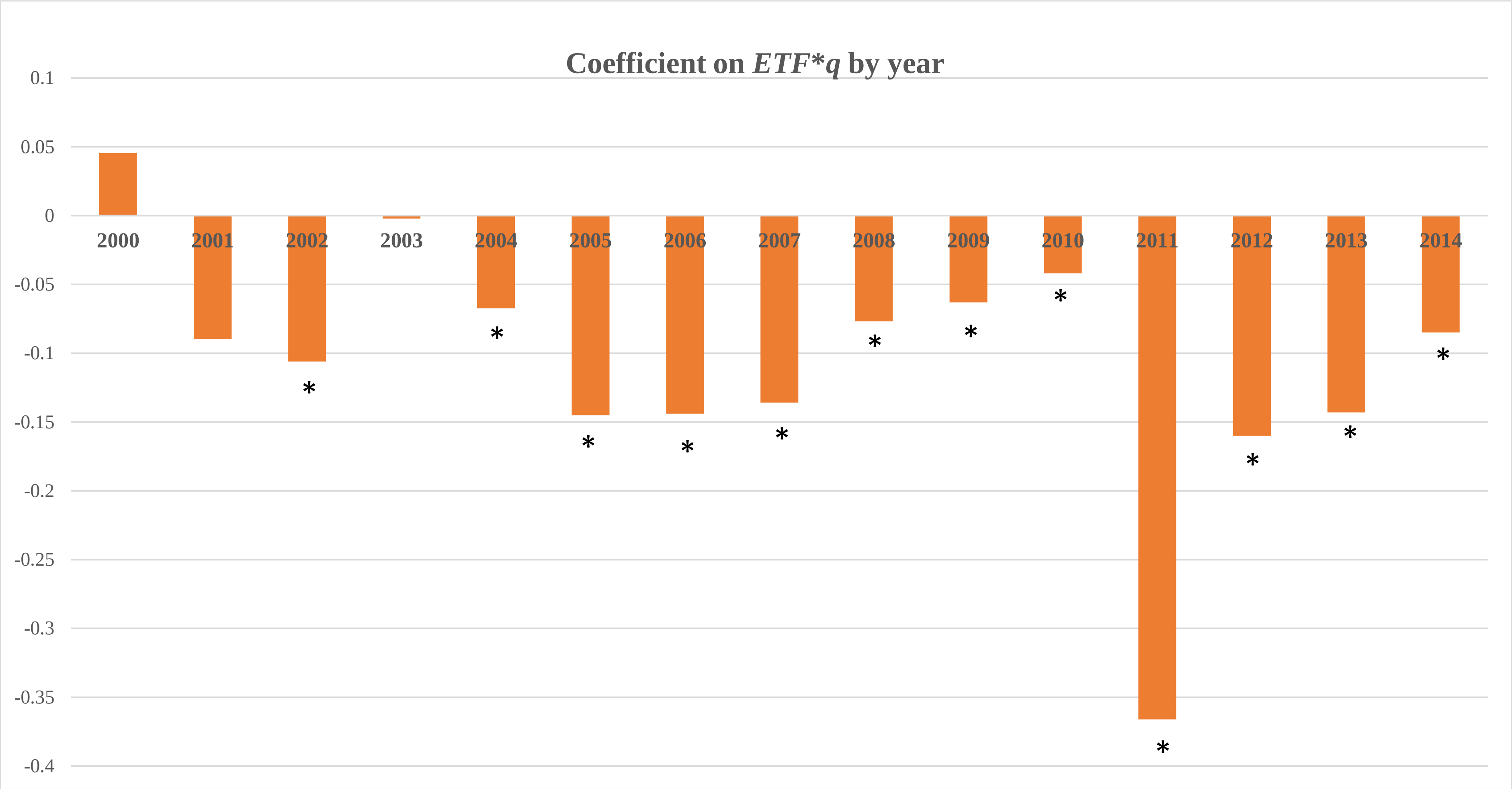
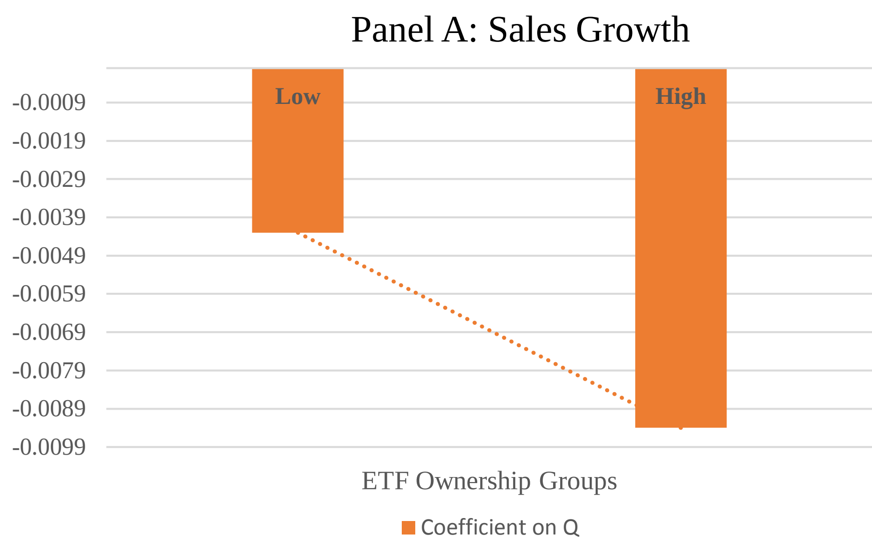


**Figure 4: Coefficient on *Q* in High and Low ETF Groups**

In this figure we plot the coefficient estimate on *Q* for sub-samples sorted on ETF ownership. To obtain this estimate we sort our sample in two groups based on ETF ownership, cutting at the median. We then estimate the model with a full set of control variables separately for each group, excluding *ETF* and its interaction with *Q* from the estimation. The dependent variable in the models is operating performance.



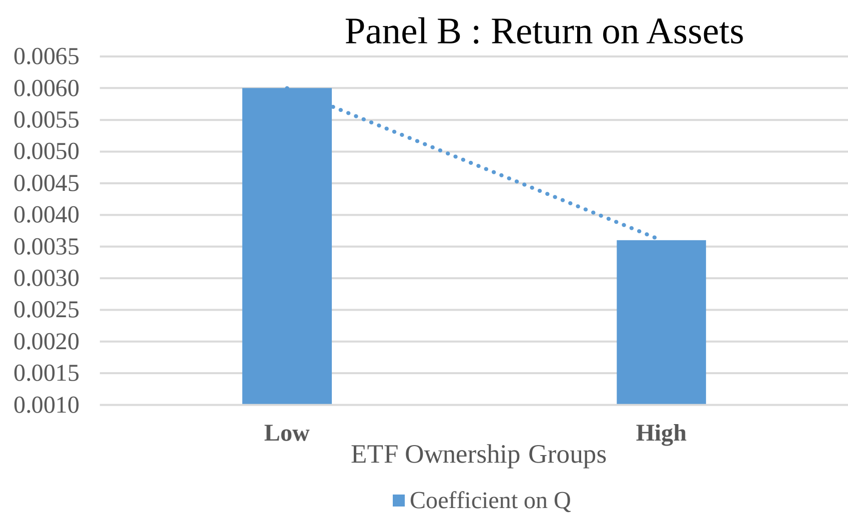



**Table 1: Descriptive Statistics**

This table presents descriptive statistics for the main variables used in the analyses. The sample used for all the analysis in the main body of the paper contains firm-quarter observations for firms that are held by ETFs. *CAPX* is capital expenditure, *CAPEXR&D* is capital expenditure plus R&D and *ChangeAssets* is the change between total assets in quarters *t* and *t*-1. These variables are scaled by total assets. *ETFownership* (*ETFownership(gnz))* is the percentage ownership of all ETFs in a company following the procedure in Ben-David, Franzoni and Moussawi (2017) (Glosten, Nallareddy, Zou (2016)). *ETFnumber* is the number of ETFs holding that stock at the end of that quarter. *Firm Size* is the market capitalization in $ million. *Q* is the market value of equity plus book value of total assets minus book value of equity, scaled by book value of total assets. *Cashflow* is net income before extraordinary item plus depreciation and amortization expenses plus R&D expenses, scaled by total assets. *FutureReturn* is the value-weighted market return adjusted firm return for next three quarters. *Leverage* is debt in current liabilities plus long-term debt, scaled by total assets in quarter. *AdjSalesVolatility* is volatility in in sales revenues of past seven quarters, scaled by the mean of sales revenues in past seven quarters. *InstOwn* is the percentage of shares owned by institutional investors other than ETFs. The sample period is from 2000 Q1-2014 Q4. For detailed definitions for these variables see Table A.1 in the Appendix.

**Panel A: The Firms Invested by at least One ETF**

| **Variables** | **Mean** | **Standard Dev** | **Min** | **Median** | **Max** |
|---|---|---|---|---|---|
| CAPX | 0.026 | 0.033 | 0.000 | 0.013 | 0.141 |
| CAPXR&D | 0.038 | 0.042 | 0.000 | 0.024 | 0.173 |
| ChangeAssets | 0.023 | 0.126 | -0.274 | 0.009 | 0.784 |
| ETFownership | 0.024 | 0.022 | 0.001 | 0.017 | 0.071 |
| ETFnumber | 13.579 | 13.641 | 1.000 | 9.000 | 56.000 |
| Firm Size (in $ mil) | 2,759.972 | 8,029.000 | 2.180 | 381.122 | 58,800.000 |
| *Q* | 1.705 | 0.829 | 0.943 | 1.363 | 3.487 |
| Cashflow | 0.021 | 0.035 | -0.082 | 0.021 | 0.097 |
| FutureReturn | 0.058 | 0.413 | -0.692 | 0.025 | 1.224 |
| Leverage | 0.197 | 0.195 | 0.000 | 0.154 | 0.825 |
| AdjSalesVolatility | 0.201 | 0.253 | 0.015 | 0.128 | 2.463 |
| InstOwn | 0.556 | 0.309 | 0.012 | 0.583 | 1.000 |
| Cash | 0.188 | 0.225 | 0.000 | 0.088 | 0.924 |
| Retained | -0.251 | 1.359 | -8.524 | 0.073 | 0.933 |
| Tangibility | 0.221 | 0.232 | 0.000 | 0.133 | 0.885 |
| Firm Age | 19 | 15 | 1 | 14 | 64 |
| SalesGrowth | 0.030 | 0.148 | -0.235 | 0.022 | 0.336 |
| Return on Assets | 0.004 | 0.134 | -4.123 | 0.014 | 2.172 |
| Ln(dividend) | 1.092 | 1.645 | 0.000 | 0.000 | 5.094 |
| Dividend Ratio | 0.008 | 0.172 | 0.000 | 0.000 | 0.635 |

**Table 2: Relation between ETF Ownership and Investment Sensitivity**

This table presents results from OLS panel regressions, with *CAPX*, *CAPXR&D* and *ChangeAssets* as dependent variables. A constant is included in the regression, but is not reported in this table. The definitions for all the variables are in Table A.1 of the Appendix. All variables, except *Cashflow*, *FutureReturn*, and *KZ4* are lagged by one quarter. The estimates for *Q*, *FutureReturn*, *KZ4*, *AdjSalesVolatility*, *InstOwn*, *Cash*, *Retained*, and *SalesGrowth* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **CAPX** | | | **CAPXR&D** | | | **ChangeAssets** | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **ETFownership*Q** | **-0.0222*** ** | **-0.0223*** ** | **-0.0294*** ** | **-0.0358*** ** | **-0.0175* ** | **-0.0247** ** | **-0.0568** ** | **-0.0592* ** | **-0.0753* ** |
| | **(0.0069)** | **(0.0081)** | **(0.00945)** | **(0.0092)** | **(0.0106)** | **(0.0120)** | **(0.0269)** | **(0.0338)** | **(0.0402)** |
| ETFownership | 0.0543*** | 0.0506*** | 0.0334* | 0.0561*** | 0.0233 | 0.0180 | -0.0210 | -0.0351 | -0.0800 |
| | (0.0143) | (0.0159) | (0.0192) | (0.0180) | (0.0196) | (0.0228) | (0.0511) | (0.0546) | (0.0673) |
| *Q* | 0.6940*** | 0.6530*** | 0.6780*** | 1.0200*** | 0.8350*** | 0.7950*** | 5.4500*** | 3.5700*** | 3.390*** |
| | (0.0300) | (0.0334) | (0.0352) | (0.0389) | (0.0421) | (0.0441) | (0.1260) | (0.1410) | (0.1600) |
| InverseAssets | | -0.0118 | 0.0803 | | 0.7090*** | 0.331*** | | 3.8830*** | 3.369*** |
| | | (0.0380) | (0.0523) | | (0.0682) | (0.0739) | | (0.2270) | (0.277) |
| Cashflow | | 0.0260*** | 0.0205*** | | 0.0454*** | 0.0495*** | | 0.9470*** | 0.926*** |
| | | (0.0058) | (0.00577) | | (0.0081) | (0.00818) | | (0.0330) | (0.0374) |
| ETFown*Cashflow | | -0.0662 | -0.0136 | | 0.3930* | 0.463* | | 3.1130*** | 3.502*** |
| | | (0.1680) | (0.179) | | (0.2350) | (0.257) | | (0.9070) | (1.012) |
| FutureReturn | | -0.1300*** | -0.1150*** | | -0.0844*** | -0.1030*** | | -1.1800*** | -1.3100*** |
| | | (0.0210) | (0.0226) | | (0.0268) | (0.000283) | | (0.1030) | (0.1120) |
| KZ4 | | | 0.0606** | | | 0.111*** | | | -1.0200*** |
| | | | (0.0243) | | | (0.0285) | | | (0.234) |
| AdjSalesVolatility | | | 0.0862 | | | 0.0832 | | | -0.14700 |
| | | | (0.0964) | | | (0.1460) | | | (0.450) |
| InstOwn | | | 0.6960*** | | | 0.7420*** | | | 2.2600*** |
| | | | (0.1230) | | | (0.1510) | | | (0.4840) |
| Leverage | | | -0.0167*** | | | -0.0230*** | | | -0.0358*** |
| | | | (0.00177) | | | (0.00223) | | | (0.00951) |
| Cash | | | -0.3690*** | | | -0.1470 | | | -4.2100*** |
| | | | (0.1360) | | | (0.1970) | | | (0.7790) |
| Retained | | | 0.1290*** | | | -0.3940*** | | | -0.7310*** |
| | | | (0.0324) | | | (0.0543) | | | (0.2000) |
| Tangibility | | | 0.0598*** | | | 0.0727*** | | | 0.109*** |
| | | | (0.00339) | | | (0.00382) | | | (0.0104) |
| SalesGrowth | | | -0.1140*** | | | -0.2180*** | | | -2.7600*** |
| | | | (0.0436) | | | (0.0522) | | | (0.365) |
| Time & Firm FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Adj. $R^2$ | 0.281 | 0.298 | 0.359 | 0.254 | 0.281 | 0.342 | 0.055 | 0.111 | 0.137 |
| Observations | 149,804 | 129,376 | 95,225 | 149,804 | 129,376 | 95,225 | 154,548 | 132,839 | 95,468 |

**Table 3: Other Measures for ETF Ownership**

This table presents results from OLS panel regressions, with *CAPX*, *CAPXR&D* and *ChangeAssets* as dependent variables. The definitions for all the variables are in Table A.1 of the Appendix. All variables, except *Cashflow* and *FutureReturn* are lagged by one quarter. *ETFownership(gnz)* is ETF ownership according to Glosten et al. (2016). *Ln(ETFnumber)* is natural logarithm of the number of ETFs holding that stock at the end of that quarter. The estimates for *Ln(ETFnumber)*Q, Ln(ETFnumber), Q, FutureReturn,* and *Ln(ETFnumber)*Cashflow* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **CAPX** | | **CAPXR&D** | | **ChangeAssets** | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **ETFownership(gnz)*Q** | **-0.0338*** ** | | **-0.0356*** ** | | **-0.0650*** | |
| | **(0.0080)** | | **(0.0110)** | | **(0.0343)** | |
| ETFownership(gnz) | 0.0602*** | | 0.0348* | | -0.0424 | |
| | (0.0169) | | (0.0211) | | (0.0577) | |
| **Ln(ETFnumber)*Q** | | **-0.0676*** ** | | **-0.0842*** ** | | **-0.2620*** ** |
| | | **(0.0196)** | | **(0.0254)** | | **(0.0892)** |
| Ln(ETFnumber) | | 0.2380*** | | 0.2000*** | | 0.0481 |
| | | (0.0421) | | (0.0525) | | (0.1520) |
| *Q* | 0.6820*** | 0.7420*** | 0.8790*** | 0.9700*** | 3.5900*** | 4.0200*** |
| | (0.0337) | (0.0521) | (0.0428) | (0.0665) | (0.1430) | (0.2340) |
| InverseAssets | -0.0211 | 0.0023 | 0.6940*** | 0.7100*** | 3.8700*** | 3.7990*** |
| | (0.0381) | (0.0383) | (0.0676) | (0.0682) | (0.2270) | (0.2310) |
| FutureReturn | -0.1290*** | -0.1210*** | -0.0829*** | -0.0745*** | -1.1900*** | -1.1800*** |
| | (0.0210) | (0.0209) | (0.0268) | (0.0267) | (0.1030) | (0.1030) |
| Cashflow | 0.0197*** | 0.0202** | 0.0338*** | 0.0222* | 0.9490*** | 0.8940*** |
| | (0.0059) | (0.0088) | (0.0083) | (0.0124) | (0.0333) | (0.0488) |
| ETFown(gnz)*Cashflow | 0.2220 | | 0.9220*** | | 3.0530*** | |
| | (0.1700) | | (0.2470) | | (0.9540) | |
| Ln(ETFnumber)*Cashflow | | 0.2220 | | 1.6300*** | | 6.2500*** |
| | | (0.3740) | | (0.5280) | | (2.1300) |
| Constant | 0.0159*** | 0.0146*** | 0.0193*** | 0.0177*** | -0.0661*** | -0.0724*** |
| | (0.0012) | (0.0014) | (0.0015) | (0.0017) | (0.0074) | (0.0079) |
| Time & Firm FE | YES | YES | YES | YES | YES | YES |
| Adj. $R^2$ | 0.299 | 0.299 | 0.282 | 0.282 | 0.111 | 0.111 |
| Observations | 129,376 | 129,376 | 129,376 | 129,376 | 132,839 | 132,839 |

**Table 4: Instrumental Variable Regression Model**

This table reports results from instrumental variable regression analysis with *CAPX*, *CAPXR&D* and *ChangeAssets* as dependent variables in the second-stage model. The definitions for all the variables are in Table A.1 of the Appendix. In the second stage model all variables, except *Cashflow* and *FutureReturn* are lagged by one quarter. Columns (1) and (2) show the coefficient estimates on the instrument (*Listed* or *Added*) from the first-stage regression, where the dependent variable is ETF ownership. *Listed* is a dummy variable that is equal to one for a firm in all quarters where the firm is listed in S&P500 index, and zero otherwise. *Added* is a dummy variable that is equal to one for a firm in that quarter where the firm is added in S&P500 index, and zero otherwise. The estimates for *Listed, Added, Q,* and *FutureReturn* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. For weak and under-identification tests, Cragg- Donald Wald and Anderson Canonical Correlation Likelihood Ratio statistics are shown, respectively. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **First Stage** | | **IV: Listed** | | | **IV: Added** | | |
|---|---|---|---|---|---|---|---|---|
| | **ETFownership** | **ETFownership** | **CAPX** | **CAPXR&D** | **ChangeAssests** | **CAPX** | **CAPXR&D** | **ChangeAssests** |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Listed | 0.3051*** | | | | | | | |
| | (0.0424) | | | | | | | |
| Added | | 0.2604*** | | | | | | |
| | | (0.0944) | | | | | | |
| **ETFown(fitted)****Q* | | | **-0.0281***** | **-0.0516***** | **-0.195***** | **-0.0284***** | **-0.0530***** | **-0.205***** |
| | | | **(0.0067)** | **(0.0089)** | **(0.0511)** | **(0.0067)** | **(0.0089)** | **(0.0511)** |
| ETFown(fitted) | | | -0.240 | -0.524*** | -5.771*** | -0.227 | -0.478 | -2.300 |
| | | | (0.167) | (0.201) | (0.941) | (0.530) | (0.663) | (2.938) |
| *Q* | 11.6400*** | 13.0000*** | 0.6990*** | 0.9790*** | 4.5600*** | 0.7030*** | 9.8500*** | 4.2200*** |
| | (1.8100) | (1.8400) | (0.0282) | (0.0355) | (0.1850) | (0.0723) | (0.0910) | (0.413) |
| InverseAssets | -0.4140*** | -0.4337*** | -0.134* | 0.446*** | 1.356*** | -0.135 | 0.451 | 2.719** |
| | (0.0123) | (0.0118) | (0.0711) | (0.0866) | (0.415) | (0.231) | (0.289) | (1.283) |
| FutureReturn | 2.3800 | 2.2200 | -0.1250*** | -0.6890*** | -1.0300*** | -0.1250*** | -0.0695*** | -1.1100*** |
| | (1.6800) | (1.6900) | (0.0169) | (0.0210) | (0.1010) | (0.0203) | (0.0251) | (0.1190) |
| Cashflow | 0.0340*** | 0.0357*** | 0.0315*** | 0.0465*** | 1.0630*** | 0.0314 | 0.0458* | 0.950*** |
| | (0.0035) | (0.0036) | (0.00714) | (0.00902) | (0.0487) | (0.0194) | (0.0243) | (0.111) |
| ETFown(fitted)*Cashflow | | | 0.1390 | 1.334*** | 7.423*** | 0.144 | 1.335*** | 7.415*** |
| | | | (0.1520) | (0.208) | (1.276) | (0.151) | (0.208) | (1.275) |
| Constant | -0.0003 | 0.0013* | 0.0216** | 0.0393*** | 0.2100*** | 0.0209 | 0.0369 | 0.0311 |
| | (0.0007) | (0.0007) | (0.00888) | (0.0106) | (0.0502) | (0.0274) | (0.0343) | (0.152) |
| Time & Firm FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Weak Instrument Test | 49.830 | 17.200 | | | | | | |
| Under-Identification Test | 45.900 | 4.420 | | | | | | |
| Adj. $R^2$ | 0.434 | 0.433 | 0.701 | 0.727 | 0.204 | 0.701 | 0.728 | 0.209 |
| Observations | 132,862 | 132,862 | 120,555 | 129,376 | 132,839 | 129,376 | 129,376 | 123,831 |

**Table 5: Controls for Analyst Coverage**

This table presents results from OLS panel regressions, with *CAPX*, *CAPXR&D* and *ChangeAssets* as dependent variables. The definitions for all the variables are in Table A.1 of the Appendix. All variables, except *Cashflow* and *FutureReturn* are lagged by one quarter. In these models we also add *Analyst Coverage*, defined as Log(1+N), where *N* is the amount of analysts issuing one-quarter ahead earnings forecasts in quarter *t*-1. We also use in the models *Residual Analyst Coverage*, measured using the residual from a regression of Log(1+N) on log(market value), following the procedure in Hong, Lim and Stein (2000). The estimates for *Q*, *FutureReturn*, and all the analyst-related variables are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **CAPX** | | **CAPXR&D** | | **ChangeAssets** | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **ETFownership*$Q$** | **-0.0329*** ** | **-0.0312*** ** | **-0.0295*** ** | **-0.0310*** ** | **-0.0522*** | **-0.0833** ** |
| | **(0.00830)** | **(0.00817)** | **(0.0109)** | **(0.0107)** | **(0.0314)** | **(0.0322)** |
| ETFownership | 0.0604*** | 0.0659*** | 0.0308 | 0.0413** | -0.0514 | 0.00689 |
| | (0.0161) | (0.0161) | (0.0199) | (0.0199) | (0.0547) | (0.0548) |
| ***Q*** | 0.614*** | 0.6640*** | 0.7800*** | 0.8480*** | 3.6400*** | 3.4900*** |
| | (0.0460) | (0.0342) | (0.0598) | (0.0431) | (0.210) | (0.1450) |
| InverseAssets | 0.0267 | -0.0115 | 0.777*** | 0.741*** | 3.793*** | 3.846*** |
| | (0.0395) | (0.0395) | (0.0719) | (0.0718) | (0.237) | (0.234) |
| Cashflow | 0.0268*** | 0.0264*** | 0.0484*** | 0.0476*** | 0.954*** | 0.950*** |
| | (0.00609) | (0.00609) | (0.00864) | (0.00864) | (0.0343) | (0.0343) |
| ETFown*Cashflow | 0.0367 | 0.0243 | 0.515** | 0.518** | 2.743*** | 2.807*** |
| | (0.171) | (0.172) | (0.242) | (0.241) | (0.936) | (0.931) |
| FutureReturn | -0.1250*** | -0.1350*** | -0.0836*** | -0.0935*** | -1.1800*** | -1.1700*** |
| | (0.0214) | (0.0214) | (0.0273) | (0.0273) | (0.1030) | (0.103) |
| Analyst Coverage | 0.1220*** | | 0.1200** | | 0.1330 | |
| | (0.0436) | | (0.0533) | | (0.1610) | |
| Analyst Coverage*Q | 0.0252 | | 0.0356 | | -0.0976 | |
| | (0.0210) | | (0.0273) | | (0.0948) | |
| Residual Analyst Coverage | | -0.0703 | | -0.1760*** | | -0.9410*** |
| | | (0.0508) | | (0.0608) | | (0.1860) |
| Residual Analyst Coverage*Q | | 0.0422 | | 0.1330*** | | 0.4820*** |
| | | (0.0257) | | (0.0324) | | (0.1150) |
| Constant | 0.0141*** | 0.0158*** | 0.0177*** | 0.0193*** | -0.0700*** | -0.0684*** |
| | (0.0013) | (0.0012) | (0.0017) | (0.0015) | (0.0076) | (0.0072) |
| Time & Firm FE | YES | YES | YES | YES | YES | YES |
| Adj. $R^2$ | 0.304 | 0.303 | 0.287 | 0.287 | 0.112 | 0.113 |
| Observations | 121,847 | 121,847 | 121,847 | 121,847 | 125,108 | 125,108 |

**Table 6: A Placebo Test**

This table presents results from OLS panel regressions with *CAPX*, *CAPXR&D* and *ChangeAssets* as dependent variables. A constant is included in the regression, but is not reported in this table. The sample period is from 1984 Q1-1999 Q4. *Mean(ETFownership)* is the average value of *ETFownership* for each firm between 2000 Q1-2014 Q4. The definitions for the rest of the variables are in Table A.1 of the Appendix. All variables, except *Cashflow* and *FutureReturn,* are lagged by one quarter. The estimates for *Q* and *FutureReturn* are multiplied by 100. Standard errors are 2-way clustered by firm and time (quarters). ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **CAPX** | **CAPXR&D** | **ChangeAssets** |
|---|---|---|---|
| | (1) | (2) | (3) |
| **Mean(ETFownership)*$Q$** | **0.0264** | **0.0300** | **0.1250** |
| | **(0.0216)** | **(0.0388)** | **(0.1100)** |
| Mean(ETFownership) | -0.0061 | -0.1240 | -0.3190 |
| | (0.0663) | (0.0964) | (0.2110) |
| $Q$ | 0.1810*** | 0.6390*** | 1.5900*** |
| | (0.0511) | (0.0981) | (0.3140) |
| InverseAssets | -0.0160** | 0.0007 | 0.0541** |
| | (0.0070) | (0.0098) | (0.0229) |
| Cashflow | 0.0284 | 0.0444 | 0.1970*** |
| | (0.0181) | (0.0280) | (0.0668) |
| Mean(ETFown)*Cashflow | 2.1430*** | 3.5530*** | 4.0980* |
| | (0.6780) | (1.0370) | (2.2780) |
| FutureReturn | -0.1720 | 0.3020** | -0.4570*** |
| | (0.1080) | (0.1480) | (0.1230) |
| Adj. $R^2$ | 0.013 | 0.059 | 0.056 |
| Number of Firm Clusters | 4,205 | 4,205 | 4,205 |
| Number of Time Clusters | 64 | 64 | 64 |
| Observations | 113,222 | 113,222 | 113,222 |

**Table 7: Sorts on Firm Size, Firm Age and Sales Volatility**

This table presents results from OLS panel regressions, with *CAPX* as the dependent variable. The definitions for all the variables are in Table A.1 of the Appendix. All variables, except *Cashflow* and *FutureReturn* are lagged by one quarter. To conduct the analysis we divide our sample in two groups cutting at the median, based on Firm Size, Firm Age, and Sales Volatility. The estimates for *Q and Future Return* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **Firm Size** | | **Firm Age** | | **Sales Volatility** | |
|---|---|---|---|---|---|---|
| | 1: Small | 2: Large | 1: Young | 2: Old | 1: Low | 2: High |
| **ETFownership*Q** | **-0.0214** | **-0.0260*** ** | **0.0127** | **-0.0356*** ** | **-0.0280*** ** | **-0.0157** |
| | **(0.0139)** | **(0.00964)** | **(0.0119)** | **(0.0115)** | **(0.0104)** | **(0.0111)** |
| ETFownership | 0.0491* | 0.0601*** | -0.0220 | 0.0854*** | 0.0494*** | 0.0369 |
| | (0.0254) | (0.0195) | (0.0261) | (0.0210) | (0.0188) | (0.0246) |
| *Q* | 0.4790*** | 0.7800*** | 0.4990*** | 0.7500*** | 0.6640*** | 0.6120*** |
| | (0.0455) | (0.0506) | (0.0412) | (0.0540) | (0.0530) | (0.0411) |
| InverseAssets | -0.0086 | 0.183* | 0.0280 | 0.0316 | 0.0584 | -0.0241 |
| | (0.0415) | (0.0999) | (0.0527) | (0.0580) | (0.103) | (0.0397) |
| CashFlow | 0.0157** | 0.0415*** | 0.0088 | 0.0469*** | 0.0245*** | 0.0240*** |
| | (0.0067) | (0.0104) | (0.0074) | (0.0085) | (0.0093) | (0.0065) |
| ETFown*Cashflow | 0.0295 | -0.3010 | -0.0081 | -0.3370 | 0.1320 | -0.0048 |
| | (0.2170) | (0.2470) | (0.2360) | (0.2270) | (0.2360) | (0.1960) |
| FutureReturn | -0.1530*** | -0.9380*** | -0.1380*** | -0.148*** | -0.1080*** | -0.1140*** |
| | (0.0276) | (0.0312) | (0.0311) | (0.0283) | (0.0295) | (0.000281) |
| Constant | 0.0171*** | 0.0144*** | 0.0194*** | 0.0139*** | 0.0129*** | 0.0194*** |
| | (0.00357) | (0.00140) | (0.00236) | (0.00139) | (0.00130) | (0.00203) |
| Time & Firm FE | YES | YES | YES | YES | YES | YES |
| Adj. R2 | 62,833 | 62,543 | 56,434 | 58,401 | 64,127 | 63,841 |
| Observations | 0.249 | 0.354 | 0.281 | 0.333 | 0.324 | 0.298 |

**Table 8: Sorts on Corporate Governance, Industry Competition and CEO Tenure**

This table presents results from OLS panel regressions, with *CAPX* as the dependent variable. The definitions for all the variables are in Table A.1 of the Appendix. All variables, except *Cashflow* and *FutureReturn* are lagged by one quarter. To conduct the analysis we divide our sample in two groups cutting at the median, based on Board Independance and CEO Tenure. In the middle Panel we calculate the Herfindahl-Hirschman Index (HHI) of industry concentration, and construct sub-samples of firms operating in low competition industries (HHI > 0.25) and high competition industries (HHI < 0.15). The estimates for *Q and Future Return* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **Board Independence** | | **Industry Competition** | | **CEO Tenure** | |
|---|---|---|---|---|---|---|
| | 1: Low | 2: High | 1: Low | 2: High | 1: Low | 2: High |
| **ETFownership*Q** | **-0.0163** | **-0.0445*** ** | **0.0182** | **-0.0281*** ** | **-0.0320** | **-0.0287** ** |
| | **(0.0163)** | **(0.0162)** | **(0.0179)** | **(0.0095)** | **(0.0195)** | **(0.0127)** |
| ETFownership | 0.0459 | 0.0936*** | -0.0168 | 0.0738*** | 0.0479 | 0.0667** |
| | (0.0336) | (0.0315) | (0.0321) | (0.0211) | (0.0319) | (0.0277) |
| *Q* | 0.6430*** | 0.8140*** | 0.5140*** | 0.6760*** | 0.7360*** | 0.7110*** |
| | (0.0808) | (0.1020) | (0.0600) | (0.0482) | (0.0814) | (0.0678) |
| InverseAssets | 0.7570 | 0.3590 | -0.0572 | -0.0173 | 0.2540* | 0.1500 |
| | (0.4940) | (0.5880) | (0.0619) | (0.0525) | (0.1300) | (0.1450) |
| CashFlow | 0.0633*** | 0.0475** | 0.0349*** | 0.0259*** | 0.0245 | 0.0514*** |
| | (0.0158) | (0.0204) | (0.0097) | (0.0077) | (0.0165) | (0.0139) |
| ETFown*Cashflow | -0.5810 | -0.3410 | -0.5410 | 0.1460 | 0.0474 | -0.0358 |
| | (0.4010) | (0.3830) | (0.3390) | (0.1980) | (0.4460) | (0.3000) |
| FutureReturn | -0.1270** | -0.0823 | -0.1550*** | -0.0758** | -0.1730*** | -0.0335 |
| | (0.0536) | (0.0538) | (0.0379) | (0.0313) | (0.0467) | (0.0454) |
| Constant | 0.0175*** | 0.0121*** | 0.0177*** | 0.0154*** | 0.0133*** | 0.0159*** |
| | (0.00222) | (0.00287) | (0.0019) | (0.0016) | (0.00184) | (0.00240) |
| Time & Firm FE | YES | YES | YES | YES | YES | YES |
| Adj. R2 | 21,247 | 22,388 | 0.318 | 0.296 | 31,986 | 32,988 |
| Observations | 0.402 | 0.420 | 40,917 | 62,916 | 0.412 | 0.373 |

**Table 9: Dividend Policy, Operating Performance and ETF Ownership**

This table presents results from OLS panel regressions, with dividend policy as the dependent variable in the left Panel and operating performance in the right Panel. Dividend Policy is measured with either the natural logarithm of the dividend payments or the dividend ratio, and operating performance using sales growth or return on assets. The definitions for all the variables are in Table A.1 of the Appendix. All variables, except *Cashflow and FutureReturn* are lagged by one quarter. The estimates of *Q*, *FutureReturn*, and *Cashflow* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | Dividend Policy | | Operating Performance | |
|---|---|---|---|---|
| | 1: Ln(Dividend) | 2: Dividend Ratio | 1: Sales Growth | 2: Return on Assets |
| **ETFownership*Q** | **0.9590*** ** | **0.0599** ** | **-0.0872** ** | **-0.0198*** |
| | **(0.353)** | **(0.0274)** | **(0.0365)** | **(0.0111)** |
| ETFownership | -0.495 | -0.1320*** | -0.094 | 0.1360*** |
| | (0.7720) | (0.0496) | (0.0629) | (0.0372) |
| *Q* | 0.356 | 0.1080** | -0.0124 | 0.0121 |
| | (1.4400) | (0.0489) | (0.1400) | (0.0733) |
| InverseAssets | 3.4010*** | 0.275 | 1.0400*** | -0.2360** |
| | (0.9040) | (0.321) | (0.1680) | (0.1150) |
| FutureReturn | -7.1400*** | -0.0479 | 0.8980*** | -0.2730*** |
| | (0.7390) | (0.0331) | (0.1220) | (0.0980) |
| Cashflow | -54.2000*** | 0.6720 | 131.200*** | 77.500*** |
| | (15.1000) | (0.7300) | (4.2600) | (4.3500) |
| ETFown*Cashflow | 2.6440*** | 0.4710* | 3.5490*** | -2.0320*** |
| | (0.5170) | (-0.2550) | (1.1230) | (0.5620) |
| Constant | 0.7560*** | 0.0022 | 0.0253*** | -0.0110*** |
| | (0.0598) | (0.0023) | (0.0067) | (0.0019) |
| Time & Firm FE | YES | YES | YES | YES |
| Adj. $R^2$ | 0.151 | 0.01 | 0.103 | 0.097 |
| Observations | 122,876 | 122,876 | 112,148 | 126,128 |

# Appendix

## Table A.1 Variable Definitions

| | |
|---|---|
| CAPX | Capital expenditure scaled by total assets. |
| CAPEXR&D | Capital expenditure plus R&D scaled by total assets. |
| ChangeAssets | The change between total assets in quarters *t* and *t*-1, scaled by total assets. |
| ETFownership | Following Ben-David, Franzoni and Moussawi (2017), ETFownership is the sum of ownership of all ETFs holding the stock at the end of that quarter. Using each individual ETF portfolio weight, quarterly ETF ownership in each stock of the ETF portfolio is inferred by multiplying the weight by the quarter-end ETFAUM and quarterly stock capitalization. ETF ownership in each stock is then aggregated across all ETFs that hold the stock in their portfolios. |
| ETFownership(gnz) | Following Glosten, Nallareddy, Zou (2016), *ETFownership(gnz)* is the percentage of common shares outstanding of that stock held by ETFs at the end of that quarter. |
| Ln(ETFnumber) | Natural logarithm of the number of ETFs holding that stock at the end of that quarter. |
| Added | Dummy equals one for a firm in that quarter where the firm is added in S&P500 index, and zero otherwise. |
| Listed | Dummy equals one for a firm in all quarters where the firm is listed in S&P500 index, and zero otherwise. |
| *Q* | The market value of equity plus book value of total assets minus book value of equity, scaled by book value of total assets. |
| InverseAssets | One over total assets. |
| Future Return | The value-weighted market adjusted three-quarter cumulative return, starting from the end of the investment quarter. |
| Cashflow | The sum of net income before extraordinary items, depreciation and amortization expenses, and R&D expenses, scaled by total assets. |
| KZ4 | Following Baker, Stein, and Wurgler (2003), KZ4 is a four-variable version of the Kaplan-Zingales measure (1997). It is a weighted sum of *Cashflow*, cash dividends, cash balances and leverage, scaled by total assets. For more details see Chen et al (2007) page 638. |
| Leverage | Debt in current liabilities plus long-term debt, scaled by total assets. |
| AdjSalesVolatility | Volatility in sales revenues of past seven quarters, scaled by the mean of sales revenues in past seven quarters. |
| InstOwn | Percentage of shares owned by institutional investors other than ETFs. |
| Mktvalue (Firm Size) | Common shares outstanding at the end of quarter multiplied by the end of quarter closing price (in $ million). |
| Cash | Cash and short-term investments, scaled by total assets. |
| Retained | Retained earnings, scaled by total assets. |
| Tangibility | Plant, property, equipment net total, scaled by total assets. |
| Firm Age | The number of years the firm has existed in the CRSP database. |
| SalesGrowth | Quarterly growth rate in sales revenues. |
| Return on Assets | Operating income after depreciation, scaled by the sum of debt in current liabilities, long-term debt, and common shares outstanding at the end of quarter multiplied by the end of quarter closing price. |
| Ln(dividend) | Natural logarithm of dividend payments plus one. |
| Dividend Ratio | Dividend payments, scaled by total assets. |
| Analyst coverage | The natural logarithm of one plus the number of analysts who issue one-quarter ahead earnings forecasts for the firm. |

**Table A.2. Correlation coefficients**

This table presents correlation coefficients for the variables used in our analysis, which are defined in table A.1 in the Appendix.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. CAPX | 1 | | | | | | | | | | | |
| 2. CAPEXR&D | 0.8043 | 1 | | | | | | | | | | |
| 3. Change Assets | 0.1113 | 0.1294 | 1 | | | | | | | | | |
| 4. ETF ownership | 0.006 | -0.021 | 0.0031 | 1 | | | | | | | | |
| 5. ETFownership(gnz) | 0.0068 | -0.0252 | 0.0015 | 0.9011 | 1 | | | | | | | |
| 6. Ln(ETF number) | 0.0532 | -0.0138 | 0.036 | 0.7318 | 0.6993 | 1 | | | | | | |
| 7. *Q* | 0.0836 | 0.2825 | 0.2068 | -0.0037 | -0.0088 | 0.1189 | 1 | | | | | |
| 8. Inverse Assets | -0.0862 | 0.1134 | 0.0043 | -0.3226 | -0.3163 | -0.3625 | 0.1363 | 1 | | | | |
| 9. Future Return | -0.0399 | -0.0422 | -0.0486 | 0.0084 | -0.01 | -0.0297 | -0.1451 | -0.0028 | 1 | | | |
| 10. Cash flow | 0.1279 | 0.1499 | 0.2533 | 0.1017 | 0.0964 | 0.1805 | 0.3001 | -0.1404 | 0.0367 | 1 | | |
| 11. KZ4 | 0.0491 | -0.0888 | -0.0926 | -0.048 | -0.0379 | -0.0505 | -0.3771 | -0.1803 | 0.0363 | -0.2425 | 1 | |
| 12. Leverage | 0.0647 | -0.0818 | -0.0511 | 0.0017 | 0.0019 | 0.0559 | -0.2585 | -0.2325 | 0.0326 | -0.1415 | 0.7184 | 1 |
| 13. AdjSalesVolatility | -0.0048 | 0.1907 | 0.0419 | -0.1079 | -0.099 | -0.149 | 0.1696 | 0.2029 | -0.0596 | -0.216 | -0.066 | -0.0531 |
| 14. InstOwn | 0.0404 | -0.0266 | 0.047 | 0.5206 | 0.5076 | 0.6624 | 0.084 | -0.5884 | -0.0177 | 0.1913 | 0.0278 | 0.0476 |
| 15. Mktvalue | 0.0318 | -0.0096 | 0.0145 | 0.0639 | 0.0556 | 0.303 | 0.1289 | -0.1999 | -0.0389 | 0.1201 | -0.0253 | 0.0467 |
| 16. Cash | -0.1671 | 0.1886 | 0.0144 | -0.0347 | -0.0406 | -0.0701 | 0.4256 | 0.2639 | -0.0417 | 0.0059 | -0.5067 | -0.4204 |
| 17. Retained | 0.0948 | -0.2237 | 0.0003 | 0.138 | 0.1439 | 0.2262 | -0.203 | -0.4755 | -0.0115 | 0.2326 | 0.0327 | 0.0447 |
| 18. Tangibility | 0.5436 | 0.3021 | 0.0072 | 0.0039 | 0.0223 | 0.0403 | -0.1984 | -0.1768 | 0.0244 | 0.0185 | 0.2886 | 0.3262 |
| 19. Firm Age | -0.0163 | -0.1462 | -0.0431 | 0.217 | 0.2053 | 0.2711 | -0.1894 | -0.1888 | 0.0061 | 0.0337 | 0.0412 | 0.1245 |
| 20. Sales Growth | 0.0693 | 0.0809 | 0.2589 | 0.0013 | -0.001 | 0.0088 | 0.0983 | 0.0036 | 0.0103 | 0.1936 | -0.0287 | -0.0044 |
| 21. Return on Assets | 0.0338 | -0.0779 | 0.1255 | 0.0847 | 0.0815 | 0.1269 | 0.0103 | -0.1667 | 0.024 | 0.3084 | 0.0172 | 0.072 |
| 22. Ln(dividend) | 0.0741 | -0.0668 | -0.0191 | 0.1865 | 0.177 | 0.4139 | -0.0292 | -0.3038 | -0.0226 | 0.0816 | -0.1629 | 0.1549 |
| 23. Dividend Ratio | 0.0093 | -0.0131 | -0.0289 | 0.0252 | 0.018 | 0.0441 | 0.0637 | 0.0126 | -0.0063 | 0.0615 | -0.2924 | -0.0145 |

**Table A.2. Correlation coefficients, continued**

| | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13. AdjSalesVolatility | 1 | | | | | | | | | | |
| 14. InstOwn | -0.1729 | 1 | | | | | | | | | |
| 15. Mktvalue | -0.1113 | 0.162 | 1 | | | | | | | | |
| 16. Cash | 0.3308 | -0.0773 | -0.0889 | 1 | | | | | | | |
| 17. Retained | -0.3199 | 0.2645 | 0.1216 | -0.3579 | 1 | | | | | | |
| 18. Tangibility | -0.0684 | 0.0035 | 0.0604 | -0.4233 | 0.1737 | 1 | | | | | |
| 19. Firm Age | -0.1808 | 0.157 | 0.304 | -0.2995 | 0.2326 | 0.1962 | 1 | | | | |
| 20. Sales Growth | 0.0973 | 0.0061 | 0.0008 | 0.0344 | -0.024 | -0.0024 | -0.0378 | 1 | | | |
| 21. Return on Assets | -0.1417 | 0.1297 | 0.0547 | -0.1488 | 0.2099 | 0.0562 | 0.105 | 0.1101 | 1 | | |
| 22. Ln(dividend) | -0.1559 | 0.225 | 0.5075 | -0.2553 | 0.2248 | 0.2152 | 0.532 | -0.0144 | 0.1053 | 1 | |
| 23. Dividend Ratio | -0.0187 | -0.0044 | 0.0419 | 0.0192 | 0.033 | 0.0003 | 0.0568 | -0.0107 | 0.0226 | 0.1931 | 1 |

## Table A.3: Relation between ETF Ownership and Investment Sensitivity Using All Firms

This table presents results from OLS panel regressions, with *CAPX*, *CAPXR&D* and *ChangeAssets* as dependent variables. A constant is included in the regression, but is not reported in this table. The definitions for all the variables are in Table A.1 of the Appendix. All variables, except *Cashflow*, *FutureReturn*, and *KZ4* are lagged by one quarter. For the analysis in this table we use also include in the sample firms that are not held by ETFs. The estimates of *ETFownership*, *Q*, *InverseAssets*, *Cashflow*, *FutureReturn*, *KZ4*, *AdjSalesVolatility*, *InstOwn*, *Cash*, *Retained*, and *Salesgrowth* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **CAPX** | | | **CAPXR&D** | | | **ChangeAssets** | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **ETFownership*Q** | **-0.0215*** ** | **-0.0293*** ** | **-0.0308*** ** | **-0.0576*** ** | **-0.0671*** ** | **-0.0485*** ** | **-0.4910*** ** | **-0.4460*** ** | **-0.518*** ** |
| | **(0.0073)** | **(0.0080)** | **(0.00955)** | **(0.0108)** | **(0.0118)** | **(0.0136)** | **(0.0432)** | **(0.0694)** | **(0.0650)** |
| ETFownership | 4.3600*** | 4.5200** | 0.7750 | 7.8900*** | 6.7900*** | 2.9700 | 74.2000*** | 19.4000** | 2.8900*** |
| | (1.6700) | (1.8100) | (2.1500) | (2.2200) | (2.3900) | (2.7200) | (8.4100) | (9.1600) | (1.0800) |
| *Q* | 0.5140*** | 0.5390*** | 0.00537*** | 0.9500*** | 0.9660*** | 0.00842*** | 6.8500*** | 5.8000*** | 0.0521*** |
| | (0.0168) | (0.0179) | (0.000212) | (0.0252) | (0.0265) | (0.000296) | (0.0970) | (0.1080) | (0.00130) |
| InverseAssets | | -0.0949*** | 0.2360* | | -0.1500*** | 0.2400 | | 1.1200*** | 5.1300** |
| | | (0.0096) | (0.1250) | | (0.0164) | (0.2520) | | (0.1180) | (2.3500) |
| Cashflow | | -0.3340*** | 0.2400 | | -1.0200*** | 0.4000 | | -11.8000*** | -4.3300 |
| | | (0.0499) | (0.1690) | | (0.0932) | (0.3530) | | (0.6820) | (3.6600) |
| ETFown*Cashflow | | 0.4640*** | 0.326** | | 0.0111*** | 1.078*** | | 0.2193*** | 24.19*** |
| | | (0.1110) | (0.162) | | (0.0019) | (0.277) | | (0.0428) | (2.088) |
| FutureReturn | | -0.1150*** | -0.0810*** | | -0.0803*** | -0.0633*** | | -0.5390*** | -0.3960*** |
| | | (0.0089) | (0.0113) | | (0.0130) | (0.0154) | | (0.0786) | (0.0700) |
| KZ4 | | | 0.0852*** | | | 0.1200*** | | | -5.8100*** |
| | | | (0.0212) | | | (0.0286) | | | (0.4320) |
| AdjSalesVolatility | | | 0.2280*** | | | 0.1780 | | | -0.5990 |
| | | | (0.0808) | | | (0.1210) | | | (0.4390) |
| InstOwn | | | 0.8170*** | | | 0.4470*** | | | -0.0675 |
| | | | (0.1210) | | | (0.1570) | | | (0.5010) |
| Leverage | | | -0.0196*** | | | -0.0246*** | | | 0.0843*** |
| | | | (0.00152) | | | (0.00208) | | | (0.0148) |
| Cash | | | -0.0018 | | | 0.0194 | | | -14.600*** |
| | | | (0.1170) | | | (0.1830) | | | (1.0700) |
| Retained | | | 0.0087 | | | -0.1710*** | | | -0.7730*** |
| | | | (0.0069) | | | (0.0156) | | | (0.0811) |
| Tangibility | | | 0.0519*** | | | 0.0682*** | | | 0.0752*** |
| | | | (0.00306) | | | (0.00367) | | | (0.0122) |
| Salesgrowth | | | 0.0407 | | | 0.0487 | | | -1.0300*** |
| | | | (0.0285) | | | (0.0381) | | | (0.2850) |
| Time & Firm FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Adj. $R^2$ | 0.166 | 0.179 | 0.279 | 0.143 | 0.155 | 0.257 | 0.047 | 0.075 | 0.108 |
| Observations | 444,156 | 382,011 | 189,527 | 444,156 | 382,011 | 189,527 | 468,780 | 397,645 | 190,176 |

## Table A.4: Instrumental Variable Regression Model for Dividend Policy

This table reports results from instrumental variable regression analysis with dividend policy as dependent variables in the second-stage model. The definitions for all the variables are in Table A.1 of the Appendix. In the second stage model all variables, except *Cashflow* and *FutureReturn* are lagged by one quarter. Columns (1) and (2) show the coefficient estimates on the instrument (*Listed* or *Added*) from the first-stage regression, where the dependent variable is ETF ownership. *Listed* is a dummy variable that is equal to one for a firm in all quarters where the firm is listed in S&P500 index, and zero otherwise. *Added* is a dummy variable that is equal to one for a firm in that quarter where the firm is added in S&P500 index, and zero otherwise. The estimates of *Listed, Added, Q, FutureReturn* and *Cashflow* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. For weak and under-identification tests, Cragg- Donald Wald and Anderson Canonical Correlation Likelihood Ratio statistics are shown, respectively. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **First Stage** | | **IV: Listed** | | **IV: Added** | |
|---|---|---|---|---|---|---|
| | **ETF ownership** | **ETF ownership** | **Ln (Dividend)** | **Dividend Ratio** | **Ln (Dividend)** | **Dividend Ratio** |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Listed | 0.3051*** | | | | | |
| | (0.0424) | | | | | |
| Added | | 0.2604*** | | | | |
| | | (0.0944) | | | | |
| **ETFown(fitted)*_Q_** | | | **2.3370*** ** | **0.1130*** ** | **2.8750*** ** | **0.1130*** ** |
| | | | **(0.2110)** | **(0.0264)** | **(0.210)** | **(0.0261)** |
| ETFown(fitted) | | | 13.0400*** | -0.3890 | -7.1550 | 2.5420* |
| | | | (0.9070) | (0.3110) | (33.4300) | (1.3900) |
| *Q* | 11.6400*** | 13.0000*** | -18.9000*** | 0.0032 | -4.3200 | -0.3790** |
| | (1.8100) | (1.8400) | (1.2600) | (0.0451) | (4.3800) | (0.1830) |
| InverseAssets | -0.4140*** | -0.4337*** | 59.6600*** | 0.2310 | 3.5980 | 1.5000** |
| | (0.0123) | (0.0118) | (4.000) | (0.2720) | (14.4900) | (0.6770) |
| FutureReturn | 2.3800 | 2.2200 | -10.5000*** | -0.0462* | -7.5400*** | -0.1110*** |
| | (1.6800) | (1.6900) | (0.5460) | (0.0270) | (0.8790) | (0.0406) |
| Cashflow | 0.0340*** | 0.0357*** | -563.4000*** | 0.7160 | -100.8000 | -9.6900* |
| | (0.0035) | (0.0036) | (33.8000) | (2.4000) | (119.3000) | (5.2300) |
| ETFown(fitted)* Cashflow | | | 48.1200*** | 0.6570 | 48.1400*** | 0.6400 |
| | | | (3.8130) | (0.4810) | (3.7670) | (0.4870) |
| Constant | -0.0003 | 0.0013* | -5.805*** | 0.0137 | 1.268 | -0.137* |
| | (0.0007) | (0.0007) | (0.504) | (0.0142) | (1.725) | (0.0716) |
| Time & Firm FE | YES | YES | YES | YES | YES | YES |
| Weak-Instrument Test | 49.830 | 17.200 | | | | |
| Under-Identification Test | 45.900 | 4.420 | | | | |
| Adj. $R^2$ | 0.434 | 0.433 | 0.863 | 0.261 | 0.863 | 0.261 |
| Observations | 132,862 | 132,862 | 122,876 | 122,875 | 122,876 | 122,875 |

# Internet Appendix

**Table I. 1: ETF Ownership and Stock Price Non-Synchronicity**

This table presents results from OLS panel regression, with *Non-Synchronicity* as the dependent variable, calculated following Chen, Goldstein, and Jiang (2007). Specifically for each firm *i* and each quarter we perform the following regression using daily data: $ret_t = \alpha + \beta_1 Market_t + \beta_2 Industry_t + \varepsilon_t$, where *ret* is the daily return of company *i*, *Market* is the CRSP value weighted market index, and *Industry* is the equally weighted return of a portfolio of firms that belong in the same industry as firm *i* (3-digit SIC). *Non-Synchronicity* for firm *i* in quarter *t* is one minus the $R^2$ from the this regression. This table presents estimates from the model: $1 - R^2_{i,t} = \alpha + \gamma_i + \delta_t + \beta_1 ETF_{i,t-1} + \rho' \boldsymbol{Control_{i,t-1}} + \epsilon_{i,t}$ . The definitions for all independent variables are in Table A.1 of the Appendix. The estimates for *Return, KZ4, AdjSalesVolatility, Cash, Retained,* and *SalesGrowth* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **Non-Synchronicity (1 – $R^2$)** |
|---|---|
| | (1) |
| **ETFownership** | **-1.0030*** ** |
| | **(0.0819)** |
| InverseAssets | -0.5990** |
| | (0.2810) |
| Cashflow | -0.0613** |
| | (0.0249) |
| Return | 0.0083 |
| | (0.0065) |
| KZ4 | -0.0421 |
| | (0.1730) |
| AdjSalesVolatility | -2.8200*** |
| | (0.6530) |
| InstOwn | -0.1090*** |
| | (0.0099) |
| Leverage | 0.0167 |
| | (0.0115) |
| Cash | -3.1600*** |
| | (1.1000) |
| Retained | -0.0152*** |
| | (0.2000) |
| Tangibility | 0.0211 |
| | (0.0218) |
| SalesGrowth | -0.0536 |
| | (0.2410) |
| Constant | 0.8720*** |
| | (0.0135) |
| Time and Firm FE | YES |
| Adj. $R^2$ | 0.213 |
| Observations | 96,973 |

**Table I.2: ETF Ownership and Investment Sensitivity**

This table presents results from OLS panel regressions, with *CAPX*, *CAPXR&D* and *ChangeAssets* as dependent variables. A constant is included in the regression, but is not reported in this table. The definitions for all the variables are in Table A.1 of the Appendix. All variables, except *Cashflow, FutureReturn,* and *KZ4* are lagged by one quarter. The estimates for *Q, FutureReturn, KZ4, AdjSalesVolatility, InstOwn, Cash, Retained,* and *SalesGrowth* are multiplied by 100. For this table we calculate ETF ownership using "Total_Aum" from Factset. Firm and time fixed effects are included. Standard errors are clustered by firms. The sample period is from 2000 Q1-2014 Q4 including 2011 Q1, Q4 and 2013 Q1-Q3. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **CAPX** | **CAPXR&D** | **ChangeAssets** |
|---|---|---|---|
| | (1) | (2) | (3) |
| **ETFownership*$Q$** | **-0.0412*** ** | **-0.0505*** ** | **-0.1410*** |
| | **(0.0118)** | **(0.0165)** | **(0.0790)** |
| ETFownership | 0.0587** | 0.0561* | -0.0386 |
| | (0.0272) | (0.0333) | (0.1370) |
| $Q$ | 0.6670*** | 0.8040*** | 4.190*** |
| | (0.0321) | (0.0408) | (0.2340) |
| InverseAssets | 0.0746 | 0.3000*** | 5.1630*** |
| | (0.0488) | (0.0702) | (0.4880) |
| Cashflow | 0.0195*** | 0.0506*** | 0.9240*** |
| | (0.0050) | (0.0074) | (0.0553) |
| ETFown*Cashflow | 0.1210 | 1.0170*** | 5.5630** |
| | (0.2340) | (0.3710) | (2.4030) |
| FutureReturn | -0.1090*** | -0.0935*** | -1.4900*** |
| | (0.0213) | (0.0271) | (0.1670) |
| KZ4 | 0.0542** | 0.0964*** | -3.0200*** |
| | (0.0232) | (0.0272) | (0.4830) |
| AdjSalesVolatility | 0.0883 | 0.0101 | 0.1620 |
| | (0.0878) | (0.1390) | (0.7460) |
| InstOwn | 0.6160*** | 0.6540*** | 4.280*** |
| | (0.1180) | (0.1460) | (0.7660) |
| Leverage | -0.0157*** | -0.0219*** | -0.0002 |
| | (0.0017) | (0.0021) | (0.0172) |
| Cash | -0.3280** | -0.1340 | -6.3700*** |
| | (0.130) | (0.1900) | (1.3500) |
| Retained | 0.122*** | -0.4160*** | -1.3600*** |
| | (0.0304) | (0.0529) | (0.3740) |
| Tangibility | 0.0588*** | 0.0712*** | 0.1130*** |
| | (0.0033) | (0.0036) | (0.0165) |
| SalesGrowth | -0.1030** | -0.2020*** | -2.800*** |
| | (0.0413) | (0.0492) | (0.4680) |
| Time & Firm FE | YES | YES | YES |
| Adj. $R^2$ | 0.362 | 0.345 | 0.097 |
| Observations | 111,514 | 111,514 | 111,766 |

**Table I.3: Two-way Clustering**

This table presents results from OLS panel regressions with *CAPX, CAPXR&D* and *ChangeAssets* as dependent variables. The analyses are conducted by clustering the standard errors on two dimension: firms and time (quarters). A constant is included in the regression, but is not reported in this table. The sample period is 2000 Q1-2014 Q4. The definitions for the rest of the variables are in Table A.1 of the Appendix. All variables, except *Cashflow* and *FutureReturn,* are lagged by one quarter. The estimates for *Q* and *FutureReturn* are multiplied by 100. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **CAPX** | **CAPXR&D** | **ChangeAssets** |
|---|---|---|---|
| | (1) | (2) | (3) |
| **ETFownership*Q** | **-0.0588*** ** | **-0.0541** ** | **-0.1880*** ** |
| | **(0.0175)** | **(0.0239)** | **(0.0373)** |
| ETFownership | 0.0645 | 0.0794 | 0.2070** |
| | (0.0512) | (0.0604) | (0.0870) |
| *Q* | 0.5200*** | 1.5700*** | 2.1100*** |
| | (0.0757) | (0.0913) | (0.1740) |
| InverseAssets | -0.1320*** | 0.5200*** | -0.0909 |
| | (0.0395) | (0.0552) | (0.0768) |
| Cashflow | 0.1210*** | 0.0730*** | 0.6910*** |
| | (0.0121) | (0.0186) | (0.0386) |
| ETFownership*Cashflow | 0.7340 | 1.6200*** | -0.5650 |
| | (0.4490) | (0.5850) | (1.5890) |
| FutureReturn | -0.1670 | 0.0501 | -0.9340*** |
| | (0.2010) | (0.2290) | (0.3070) |
| Adj. $R^2$ | 0.038 | 0.140 | 0.066 |
| Number of Firm Clusters | 6,620 | 6,620 | 6,754 |
| Number of Time Clusters | 54 | 54 | 54 |
| Observations | 129,376 | 129,376 | 132,839 |

### Table I.4: Instrumental Variable Regression Model for Operating Performance

This table reports results from instrumental variable regression analysis with operating performance as dependent variables in the second-stage model. The definitions for all the variables are in Table A.1 of the Appendix. In the second stage model all variables, except *Cashflow* and *FutureReturn* are lagged by one quarter. Columns (1) and (2) show the coefficient estimates on the instrument (*Listed* or *Added*) from the first-stage regression, where the dependent variable is ETF ownership. *Listed* is a dummy variable that is equal to one for a firm in all quarters where the firm is listed in S&P500 index, and zero otherwise. *Added* is a dummy variable that is equal to one for a firm in that quarter where the firm is added in S&P500 index, and zero otherwise. The estimates of *Listed, Added, Q, FutureReturn* and *Cashflow* are multiplied by 100. Firm and time fixed effects are included. Standard errors are clustered by firms. For weak and under-identification tests, Cragg- Donald Wald and Anderson Canonical Correlation Likelihood Ratio statistics are shown, respectively. The sample period is from 2000 Q1-2014 Q4. ***,** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

| | **First Stage** | | **IV: Listed** | | **IV: Added** | |
|---|---|---|---|---|---|---|
| | **ETF ownership** | **ETF ownership** | **Sales Growth** | **Return on Assets** | **Sales Growth** | **Return on Assets** |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Listed | 0.3051*** | | | | | |
| | (0.0424) | | | | | |
| Added | | 0.2604*** | | | | |
| | | (0.0944) | | | | |
| **ETFown(fitted)*$Q$** | | | **-0.2580*** | **-0.1710*** | **-0.2730*** | **-0.1701*** |
| | | | **(0.0508)** | **(0.0192)** | **(0.0507)** | **(0.0194)** |
| ETFown(fitted) | | | -5.7070*** | 1.0850*** | 4.6580 | -0.5090 |
| | | | (1.1130) | (0.1890) | (4.1600) | (0.8860) |
| $Q$ | 11.6400*** | 13.0000*** | 1.0700*** | 0.2790*** | -0.1610 | 0.4790*** |
| | (1.8100) | (1.8400) | (0.1990) | (0.0638) | (0.5670) | (0.1330) |
| InverseAssets | -0.4140*** | -0.4337*** | -1.4670*** | -0.0171 | 2.8780 | -0.6950* |
| | (0.0123) | (0.0118) | (0.4730) | (0.0986) | (1.8110) | (0.3950) |
| FutureReturn | 2.3800 | 2.2200 | 1.0600*** | -0.275*** | 0.838*** | -0.240*** |
| | (1.6800) | (1.6900) | (0.1280) | (0.0904) | (0.1560) | (0.0921) |
| Cashflow | 0.0340*** | 0.0357*** | 1.4010*** | 0.7340*** | 1.0430*** | 0.7910*** |
| | (0.0035) | (0.0036) | (0.0512) | (0.0232) | (0.1520) | (0.0394) |
| ETFown(fitted)* Cashflow | | | 9.2060*** | -1.1730 | 9.1680*** | -1.2700 |
| | | | (1.2580) | (0.9240) | (1.2540) | (0.9270) |
| Constant | -0.0003 | 0.0013* | 0.3680*** | -0.0516*** | -0.1660 | 0.0307 |
| | (0.0007) | (0.0007) | (0.0620) | (0.0096) | (0.2160) | (0.0457) |
| Time & Firm FE | YES | YES | YES | YES | YES | YES |
| Weak-Instrument Test | 49.830 | 17.200 | | | | |
| Under-Identification Test | 45.900 | 4.420 | | | | |
| Adj. $R^2$ | 0.434 | 0.433 | 0.159 | 0.397 | 0.159 | 0.398 |
| Observations | 132,862 | 132,862 | 112,148 | 126,128 | 112,148 | 126,128 |