

Where are the shareholders' mansions?

CEOs' home purchases, stock sales, and subsequent company performance

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Abstract: We study real estate purchases by major company CEOs, compiling a database of the principal residences of nearly every top executive in the Standard & Poor's 500 index. When a CEO buys real estate, future company performance is inversely related to the CEO's liquidation of company shares and options for financing the transaction. We also find that, regardless of the source of finance, future company performance deteriorates when CEOs acquire extremely large or costly mansions and estates. We therefore interpret large home acquisitions as signals of CEO entrenchment. Our research also provides useful insights for calibrating utility based models of executive compensation and for understanding patterns of Veblenian conspicuous consumption.

Keywords: residential real estate, insider trading, CEO entrenchment, conspicuous consumption.

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1. Introduction

Purchasing a home represents a significant economic decision, involving aspects of both investment and consumption. The buyer generally adjusts his portfolio, often taking on secured debt and liquidating assets to pay the acquisition cost. Thereafter, the homeowner enjoys benefits related to the size, comfort, and location of the property. Affluent persons sometimes acquire impressive homes as signals of their personal wealth, power and importance, an age-old behavior labeled “conspicuous consumption” by sociologist Thorstein Veblen.

We study real estate purchases of major company CEOs, compiling a database of the principal residences of nearly every top executive in the Standard & Poor's 500 index of major U.S. companies. We test whether CEOs' decisions about the size, cost, and financing of their homes contains information useful for forecasting future performance their companies, and we find patterns with strong statistical and economic significance. When a CEO buys a home, future company performance is inversely related to the CEO's liquidation of company shares and options as a source of financing for the transaction, even though these stock sales are often small relative to the CEO's total holdings in his firm. We also find that, regardless of the source of finance, future company performance deteriorates when CEOs acquire extremely large or costly

mansions and estates.

According to an ancient saying, “A man’s home is his castle.”¹ This adage might apply especially well to American CEOs, many of whom are known for having enormous wealth and imperial personalities. The Hearst Castle, built in California by newspaper magnate William Randolph Hearst between 1919 and 1947, is probably the most celebrated home of a U.S. business leader, but it is hardly the only one. Mansions built by J.P. Morgan, Andrew Carnegie, and Henry Clay Frick remain landmarks today in New York City, all having been converted to service as museums.² In modern times, Microsoft Chairman Bill Gates received notoriety for constructing a 66,000 square foot home in Washington State, part of an estate valued at \$140 million, while Mittal Steel (India) founder Lakshmi Mittal paid \$128 million in 2004 for a London townhouse with a 20 car garage near Kensington Palace, the largest amount ever paid worldwide for an existing single family home. Conversely, Berkshire Hathaway CEO Warren Buffett is famous for having lived since 1958 in a house he bought for \$31,500 in an ordinary neighborhood of Omaha, Nebraska.³ When he was the richest man in the world in the early 1970s, industrialist Howard Hughes lived a secret residence that became the subject of constant press speculation.

In our database of S&P 500 CEOs, we observe considerable differences in the timing, value, size, location, and financing of their real estate acquisitions. Some CEOs purchase

¹ According to www.phrases.org.uk, the classical phrasing is “An Englishman’s home is his castle,” and the earliest known references to the proverb date from 1581.

² Christopher Gray, “Carnegie vs. Frick: Dueling egos on Fifth Avenue,” *The New York Times*, April 2, 2000.

³ The Gates, Mittal, and Buffett residences are described in “Homes of the billionaires,” *Forbes*, March 10, 2005.

modest townhouses or condominiums just a few miles from headquarters, while others live on sprawling beachfront estates more than an hour from work. Some finance their homes entirely out of pocket (or by sale of their prior residences), while others liquidate significant amounts of shares and options very near the transaction date. Based upon theories from the principal-agent contracting literature, we conjecture that when CEOs buy new homes, they may indicate commitment to their firms, something that might be valued by boards, shareholders, and other constituencies such as bondholders or labor. Alternatively, CEO home purchases may indicate entrenchment, meaning that the CEO feels secure in his position and is not concerned with the possibility of removal by the board.

To differentiate between these commitment and entrenchment hypotheses, we look first at whether the CEO sells shares of company stock to finance the home purchase. Although buying a house appears to offer a *prima facie* personal liquidity reason for CEOs to sell their own shares, most are wealthy enough to acquire homes with other sources of finance. We find a strong temporal pattern of CEOs exercising options and selling shares in the period leading up to their home acquisition dates. These stock sales are often small relative to the CEO's total investment in the firm, with a mean of about \$450,000 and a median of zero. However, they appear to give significant signals about future company performance, a pattern that is all the more surprising due to the apparent personal liquidity rationale for the sales.

Separate from the decision of whether to sell shares, we look at the size of homes acquired by CEOs. In principal, a large home purchase could indicate either commitment or entrenchment, since reversing the purchase requires significant time and transactions costs. Our analysis supports the entrenchment hypothesis, as we observe an inverse association between the

value and size of a CEO's residence and the returns on his company's stock. This relation holds cross-sectionally for the year following the effective date of our sample, and it also holds when tested as a hypothetical trading rule implemented at the acquisition date of each residence, for the subsample of CEOs who acquire their homes after taking office.

To our knowledge, our research represents the first exploration of housing decisions made by a large sample of wealthy people. These data should be informative to researchers in a variety of fields of economics, including managerial incentives, consumer behavior, and the market for residential real estate. By interacting the real estate purchase data with executives' legal insider trading decisions, we also gain insight into aspects of stock-based incentive compensation.

The remainder of the paper is organized as follows. Section 2 presents a literature review and hypothesis development. Section 3 describes the data collection process. Section 4 contains analysis, and Section 5 concludes.

2. Literature review and hypothesis development

Residential real estate is costly to acquire, impossible to move, and it generally can be liquidated only with time and expense. For these reasons, a home purchase by a corporate executive can represent a form of commitment by which he bonds himself to his organization. Many principal-agent models utilize commitment devices, through which the agent takes a costly and/or irreversible action as a means of bonding. The agent's commitment provides a credible signal to the principal of the agent's high ability level or desire to work within the principal's organization, perhaps because of confidence in the organization's future course.

Commitment strategies are quite common in models of capital structure, generally involving actions such as increasing dividends or replacing equity with debt as a source of finance. See, for example, Jensen (1986) or John and John (1993). In labor markets, the typical commitment strategy involves the agent investing in human capital that has little or no use outside the firm. Fama and Jensen (1983) provide the classic example of a Catholic priest, who undertakes years of training in a seminary to acquire credentials that have little marketability in any other line of work and are subject to forfeiture in the event of poor performance. Other forms of commitment by a corporate executive can include investing in the company's shares or agreeing to a compensation package that includes a deferred or performance contingent element.

To our knowledge, no prior research into agents' commitment strategies has studied investments in fixed assets by the agent as the commitment device. We use residential real estate acquisitions for this purpose. Acquiring property can indicate a commitment to the company by a corporate manager, a signal that would be especially important if a CEO is a leader who has the potential to leave the firm and work elsewhere. Hayes and Schaefer (1999) show that successful CEOs can be "raided" by other firms. If a CEO moves from one company to another after a raid, the hiring firm typically sees its stock price increase while the opposite happens at the CEO's former employer. Boards of directors are often very concerned with retaining talented CEOs and binding them to the company; much of the design of executive compensation, such as its vesting over time, addresses this concern. We conjecture that a CEO can reduce these costs of retention by voluntarily undertaking actions that demonstrate commitment, indicating that he is unlikely to entertain offers from other firms. The CEO would expect to be rewarded for this commitment by his current employer. From the board's perspective, commitment by the

CEO can facilitate long-term investment planning, establishment of a logical timetable for management succession, and may also contribute to reaching agreements with labor unions or securing access to long-term finance.

In conjunction with the decision to invest in local real estate, a CEO could signal commitment to the firm through his decision about how to finance the cost of that investment. A long literature has studied legal insider trading by managers as a signal of their confidence in the firm. See, for example, Ke, Huddart, and Petroni (2003), which includes a list of references to earlier studies, the general theme of which is that managers are more likely to sell shares when the firm's prospects are poor. We therefore tabulate data about insider selling of shares and exercise of options around the time of home purchases by CEOs. We note that the literature on stock-based compensation cites information-neutral motives for insider selling, stressing that personal consumption needs such as the purchase of a house often motivate employees to exercise options early and immediately sell the shares acquired. See, for example, Huddart and Lang (1996). Our data on insider selling proximate to home purchases therefore offer an opportunity to test whether stock sales that appear to have a consumption motive may nevertheless also be driven by the CEO's private information about the firm. If an information pattern exists, one might argue that insiders rely on apparent liquidity needs as a pretext for selling company shares, since management selling is sometimes discouraged or prohibited by the board of directors (Core and Larcker, 2002) or company compliance policies (Bettis, Coles, and Lemmon, 2000) and also disfavored by outside investors.

In contrast to the commitment hypothesis, an alternative hypothesis is that CEO real estate purchases indicate that a manager is unconcerned about the costs of liquidating the

property and has therefore become entrenched in his position. An entrenched CEO perceives himself as immune from discipline by his board and is uninterested in maintaining or improving his performance to attract outside offers. Acquiring an expensive house would provide a dual stream of benefits to an entrenched CEO: utility in consumption, and also a public signal about the executive's status and security. If CEO acquisitions of nice houses are consistent with entrenchment, they should augur badly for future shareholder returns.

An emerging line of finance research studies the role of visible "trophy" assets as motivational devices, in the context of perquisites awarded to executives by their firms. Rajan and Wulf (2006) discuss a range of theories about how perquisites such as company planes, cars, and the like can serve as incentives to managers, both because they provide comfort and pleasure but also because they signal the executive's power in the organization to a variety of audiences. The implication of this research is that a CEO might value the opportunity to exhibit a sports car, private jet, or mansion as an example of the spoils of his position.

Related studies raise questions about the performance of CEOs who attract trappings of success such as large perks or adulation in the news media. Yermack (2006) studies the most visible type of executive perk, corporate jets, and finds evidence of marked underperformance in firms whose CEOs obtain personal use of company aircraft. Similar results appear in Malmendier and Tate (2005), who find below-average performance for CEOs subsequent to receiving public awards given by the national business press. These studies include a number of conjectures about why CEOs who receive significant psychic rewards subsequently perform poorly. It is possible that these CEOs work less hard than before, believing they are securely entrenched in their positions and immune from discipline by their boards. These CEOs may also

become preoccupied with outside interests, including the maintenance of their newly acquired assets. Alternatively, the attention focused upon the CEO and his possessions may demoralize other executives in the organization. If a large estate or mansion acts as a vehicle for self aggrandizement, signaling the CEO's power and prestige to a variety of audiences, then its acquisition might foretell future underperformance in the same way as the use of a corporate jet or receipt of a national magazine award.

A related area of recent research illuminates connections between the personal circumstances of CEOs, such as marriages, children, and family illnesses, and the performance of their firms. See Bennesen, Nielsen, Perez-Gonzalez, and Wolfenzon (2006) and Bennesen, Perez-Gonzalez and Wolfenzon (2006). Knowing about the size, value, timing, and location of CEOs' home purchases might help researchers augment and extend the results of this nascent literature. For example, CEOs may tend to trade up to larger houses after a divorce and remarriage, or after the birth of a child. If real estate purchases are correlated with these family events, they might exhibit associations with the performance of the CEO's company. Large mansions or homesteads might be also owned more often by CEOs who are scions of company founding families that have been wealthy for more than one generation. These next-generation CEOs, who owe their positions more to blood relationships rather than intrinsic ability, have been shown to perform below market benchmarks (Villalonga and Amit, 2006).

Beyond the implications of our study for understanding signals of commitment and entrenchment, we expect that our cross-sectional sample of CEOs' real estate holdings will have general interest for researchers into management incentives. In this literature, the most advanced theoretical approaches involve utility-based models of management incentives that use the

manager's outside wealth as one of several input variables. Excellent expositions of such models appear in Lambert, Larcker, and Verrecchia (1991), which uses a utility based model to value stock option awards, and Kahl, Liu, and Longstaff (2003), which takes a similar approach to valuing restricted stock. Each of these papers uses numerical algorithms to generate the certainty equivalent of how much cash a manager would trade for an uncertain position in his own firm's options or shares. In both cases, the answer is higher if the manager's outside wealth is higher, due to decreasing absolute risk aversion.

In empirical work, calibrating these models requires information about the size and riskiness of the manager's personal wealth apart from his investment in the firm. In the U.S., data about the outside wealth of individual CEOs is almost unknown, a gap that our research helps fill. In the absence of such data, most papers make ad hoc assumptions about a manager's outside holdings. For Lambert et. al (1991), each manager is assumed to hold a fixed \$10 million of outside wealth. In Kahl et. al (2003), outside wealth is expressed as a fraction of wealth held inside the firm, and different solutions are provided for different relative values. The same relative wealth approach is taken by Hall and Murphy (2002) in their valuation of stock options. Two interesting exceptions are Becker (2006) and Dittman and Maug (2007). Becker obtains data about the outside wealth – including real estate – of CEOs in Sweden, a country in which the government conducts wealth audits of individuals and uses the information as the basis for taxation, with all records available to the public. Becker finds that richer Swedish CEOs receive higher incentives from their firms, a pattern consistent with the decreasing risk aversion that would accompany greater wealth. A limitation of his research is that most of the Swedish CEOs in his sample run smaller companies and are far less wealthy

than their counterparts in the U.S. Dittman and Maug (2007) construct a time series of all compensation received by the executives in their U.S. sample. They assume that all after-tax compensation is saved by each executive each year and invested at the prevailing risk-free rate so that its value grows over time. This approach allows the authors to build a cumulative time series estimate of the outside wealth held by each CEO in their panel.

Our data also has relevance to researchers in consumer behavior who study Veblen's conspicuous consumption hypothesis. High-end real estate purchases have long been believed to exemplify conspicuous consumption by buyers, who seek to use their estates to impress and intimidate their peer group. These impulses are expressed through history in the construction of royal palaces (such as Peter the Great's attempt to build Peterhof to exceed the grandeur of Louis XIV's Versailles), and in modern times through mansions built or acquired by industrialists or hedge fund managers. This behavior tends to drive up the prices for luxury assets, a pattern captured in the theoretical model of "Veblen effects" presented by Bagwell and Bernheim (1996). However, empirical tests of conspicuous consumption tend to focus not on real estate, which can be extremely expensive and illiquid, but rather on more easily traded goods such as art, sports cars, fine wines, and jewelry. To our knowledge, the only prior research into aspects of luxury real estate purchases by affluent consumers appears in Ait-Sahalia, Parker, and Yogo (2004), which studies the macro associations between Manhattan luxury co-op price indices and movements in the stock and bond markets.

Beyond testing theories of conspicuous consumption, our data may provide more general insight into consumer behavior in the market for real estate. By analyzing the home purchases of CEOs, real estate economists might learn more about what motivates successful people to

acquire real estate and whether these acquisitions are connected to surges in personal income or productivity.

3. Data description

Our analysis is based upon a sample of the principal residences of all CEOs of companies in the S&P 500 index in office at the end of 2004. We search for each of the 500 CEOs in on-line real estate records of property taxes and deed transfers in the geographic area around each company's headquarters. These databases, which are compiled at the state level, serve as our primary data sources. They are available on Lexis-Nexis and other Internet portals. We choose the effective date of year-end 2004 for our sample because the databases are updated with varying degrees of time lag. We are able to identify the home addresses of about two-thirds of company CEOs in this straightforward manner.

When the CEO's home address is not immediately available from our primary sources, we can often obtain it from secondary sources which we then cross-check for accuracy against the primary databases. These secondary sources include state voter registration records, CEO employment contracts, Federal Election Commission campaign donation reports, and various Internet "people search engines" such as Zabasearch and Intelius. In some cases these sources provide an exact address, and for other observations they help us identify the correct geographic region in which to search property records more closely. These methods are especially useful for identifying CEOs who maintain their principal residences a great distance from corporate headquarters – sometimes across the country, several thousand miles away. They are also helpful in resolving ambiguities that arise when a CEO has a common name, such as Patrick

Ryan of Aon Corp., one of several homeowners by that name in the greater Chicago area.

For the remaining observations, we collect data by exploiting our knowledge of strategies sometimes used by wealthy persons to shift ownership of property for privacy, tax, estate planning, alimony, or other reasons. Some CEOs reside in properties nominally owned by their spouse. We are able to identify the names of wives and husbands from various search engines, wedding announcements, directories of prominent business persons, and the like. We then use the spouse's name to search property records in the relevant geographic area. Other CEOs transfer property ownership to trusts with anonymous sounding names. We identify these transfers by searching for real estate records that list the CEO and/or spouse as the seller and a trust (often named using the CEO's initials) as the buyer. We then verify that the trust remains as the legal owner of the property through December 31, 2004. A related problem comes from intra-family transfers of property that occur rather frequently in our sample for estate planning, tax, and other reasons. To identify the original date of acquisition and purchase price of a property, we must sometimes work backward through a sequence of intra-family transactions involving the CEO, spouse, and various trusts.

We attempt to identify the primary residence of each CEO, and problematic cases arise in several situations. When a CEO owns more than one property, we generally choose the one closest to headquarters, especially if the other property is a great distance away and located in a common vacation venue such as Florida or Martha's Vineyard. When the CEO owns two properties that are both reasonably close to headquarters, as in the case of several CEOs that have both Manhattan co-ops and houses in Connecticut or Westchester County, we search secondary sources such as campaign finance reports to ascertain which property the CEO

personally designates as his home address. When a CEO appears to live a great distance from headquarters, we attempt to verify the arrangement through at least one secondary source, and we are successful in doing so in a majority of such cases. A number of these long-distance CEOs are relatively recent hires who have not yet moved their families from their former homes, while others are simply commuters who apparently prefer to live far from the company's offices or perhaps near the firm's manufacturing or marketing locations.

After persistent research, we identify the principal residences of 488 of the CEOs in the S&P 500. The remaining 12 CEOs may be renters who own no property or may live outside the United States (one of the 12 works for a company with a Bermuda headquarters). The number of observations that appear in our analysis of stock returns is slightly smaller than 488, because some firms either entered or were deleted from the S&P 500 index around year-end 2004 due to mergers, IPOs, or bankruptcies, with the consequence that an uninterrupted time series of stock returns is not available for them.

After pinpointing the home address of each CEO, we attempt to obtain more information about the characteristics of each property, including acreage, floor area, year of construction, number of rooms, and the nature of the surrounding area, such as whether the property is adjacent to a golf course or waterfront. Some of this information appears directly on the primary databases of deed transfers and property tax records. For most observations, however, we rely on the online databases www.zillow.com and www.realty.com, which are comprehensive search engines of all residential real estate in the U.S., including aerial photographs of most properties. These databases also provide estimated market values for each home, and we download these values in November and December 2006. We use the average of the two market values when

both are available. For observations for which these two public Internet sites give incomplete information, we are able to fill in a number of missing values by accessing a commercial real estate agents' property database made available to us by a professional mortgage broker. We calculate the distance of each CEO's residence from corporate headquarters by using driving distances provided by Google maps.

Figure 1 plots some basic descriptive information about CEOs' residences. The graph shows the estimated market value of each property tabulated as a function of the CEO's years tenure in office. A univariate regression line between these two variables and an intercept has a slope of 0.15 (t-statistic = 3.97), as also shown on the graph. This slope suggests that for every doubling of a CEO's tenure in office, he moves up to a residence 15 percent more valuable. This may occur due to some combination of higher income, greater job security, and greater commitment to staying with the firm, all of which should be correlated with tenure in office. The figure also shows CEOs' residences that were purchased before and after their assumption of the top job, indicated by white and dark circles, respectively. These circles indicate that a majority of CEOs still live in homes they owned before being promoted, and that some of these homes are quite valuable. A CEO's probability of trading up to a new home appears to increase with tenure in office. When a CEO does buy a new home, it typically is more valuable than homes acquired by CEOs before their promotions.

Table I provides descriptive statistics about CEOs' residences. Information for the entire sample of 488 is shown on the left side of the table, and data for the 165 properties acquired subsequent to a CEO's taking office is shown on the right. Of the 488 residences in the entire sample, 431 are single-family houses and the remainder are condominiums, co-operatives,

townhouses or apartments. Because property records are often incomplete for one or more variables, we indicate the number of useable observations for each data item out of either 488 or 165 total observations. We set land acreage equal to missing for all condos, co-ops, apartments, and townhouses.

Data in Table I indicate that CEOs' residences are large. The median home includes 11 rooms plus 4.5 bathrooms, with a floor area of more than 5,600 square feet. It sits on land with a median area of one and quarter acres. Twelve percent of CEOs' homes are situated on waterfronts, and 8.5% are adjacent to or on the grounds of golf courses. All of these statistics are slightly higher in the subsample of homes purchased after CEOs' promotions. Aerial photographs indicate that outdoor swimming pools, tennis courts, boathouses, formal gardens, and detached guest houses or servants' quarters are common features of CEOs' homesteads (we do not tabulate these items). At least one CEO's estate includes private polo fields and an equestrian ring. The median home's 2006 market value is \$2.3 million. By comparison, the median sales price for all homes sold in the U.S. in 2004 was \$274,500, and the median home constructed in the U.S. in 2004 had 2,140 square feet of area with two bathrooms.⁴ The maximum value reported in Table I is almost certainly not the true sample maximum; our sources for value estimates do not cover some of the very largest homes in the sample, probably because no reasonable benchmark sample of transactions exists with which to infer their value.⁵

⁴ These overview data about the U.S. housing market are published annually in *Housing Facts and Figures*, a pamphlet distributed by the National Association of Home Builders.

⁵ Table I does not reflect data for the \$140 million, 66,000 square foot Bill Gates property described at the beginning of the article. Gates had surrendered his CEO position at Microsoft prior to the effective date of the sample, so the company is represented in our data by current CEO Steve Ballmer, who lives in a more modest 4,100 square foot home with a value of about \$8 million in Hunts Point, WA. Baller is a neighbor of the CEO of Costco Wholesale, who lives on the same street one-quarter mile away in a slightly larger and more valuable home.

The median CEO lives 12.5 miles from corporate headquarters. Data from the 2000 U.S. census indicate that the median commuting time for an American worker is 25.5 minutes, a statistic that implies that CEOs typically live about as far from headquarters as other workers. However, the distribution of CEO commuting distances has an extremely long right-hand tail, with 16 CEOs in our sample living more than 1,000 miles from headquarters (some live considerably farther), and another 16 who live between 250 and 1,000 miles from work. Therefore, about 6% of CEOs appear to live at least a plane ride away from the office, and it is likely that they reside in apartments or hotels during the work week. Due to this skewness of the data we do not report descriptive statistics for commuting distance other than the median. As noted above, for a large number of these cases we verify CEOs' long-distance commutes from press reports and other sources.⁶

Figure 2 presents a histogram of the timing of acquisition of CEOs' homes, relative to the timing of their appointments to their CEO positions. The data show a clear tendency for CEOs to buy new homes in the year of their appointment (year 0 on the graph), a pattern driven by the need for many CEOs to relocate if they are outside hires or had previously worked in a division of the firm away from headquarters.

Table II presents data about sources of financing for CEOs' home purchases, based on an

⁶ Well known examples of long distance CEOs include Craig Barrett, who lived in the Phoenix, AZ area for many years while serving as CEO of Intel Corp. (Santa Clara, CA), and Gerald Grinstein, a longtime resident of Washington State who has continued to keep his home there while serving as CEO of Delta Air Lines (Atlanta, GA). In each of these cases the CEO appears to have owned no property near headquarters and appears to have lived in company-subsidized housing. Recent proxy disclosures for these two firms report perquisite compensation related to "apartment near corporate headquarters" (Barrett) and "relocation expenses" (Grinstein).

In a handful of cases we identify companies that list the nominal mailing address of headquarters at one location but have the actual head office elsewhere; Tyco International, for example, is officially domiciled in Bermuda but has its de facto headquarters in West Windsor, NJ, and Federated Department Stores lists its address in Cincinnati, OH, while its headquarters office is actually in New York City. In these cases we use the de facto location to measure the CEO's commuting distance.

analysis of the 165 observations of homes purchased after promotion to the CEO position. The table shows data for 125 transactions in the overall sample, those for which we could obtain information about the property's purchase price. We also show data for four subgroups of roughly equal size stratified by purchase price, and for the subsample of CEOs hired from outside the company who must relocate to the geographic area of headquarters. Financing for these purchases could come from a variety of sources, including borrowing, cash on hand, equity from the sale of a previous residence, and the liquidation of other assets such as shares or options in the CEO's company's stock.

We search public mortgage records and record the amount borrowed by the CEO-purchaser in each transaction. This information is displayed in the second and third columns of Table II. The data indicate that 43 percent of CEOs take out mortgages on their properties, a percentage that tends to increase with the cost of the home. The average mortgage value, including the zero-valued observations, is about \$834,400, implying that the mean value of non-zero mortgages is about \$1.9 million. We find almost a 50-50 split between fixed rate and adjustable rate mortgages (ARMs), as ARMs account for 48 percent of loans by count and 57 percent by dollar value. The heavy use of adjustable rate mortgages by CEOs is intriguing, because fixed rate mortgages tend to dominate ARMs in the marketplace, especially among borrowers with good credit histories. U.S. Federal Reserve Chairman Alan Greenspan attracted wide attention with a 2004 speech suggesting that ARMs should be attractive to more borrowers given the high interest-rate markups charged for fixed rate mortgages, and perhaps CEOs'

affinity for ARMs reflects their above-average financial sophistication.⁷

Overall, new borrowing covers about 27 percent of the cost of home acquisitions for CEOs. However, this number is likely biased downward because it excludes loans made by the CEO's employer that are unlikely to be recorded in local property transfer databases. Though such loans have been illegal since the effective date of the Sarbanes-Oxley Act in 2002, they were a relatively common source of finance for top managers' real estate acquisition purposes prior to that date (Kahle and Shastri, 2004). We find that the percentage of CEOs taking out commercial mortgages at the time of home purchases is modestly higher, 41 percent compared to 35 percent, for homes bought subsequent to August 29, 2002, the effective date of Sarbanes-Oxley.

Information about CEOs' liquidation of their stock-based compensation appears in Figures 3 and 4. Together these figures indicate that CEOs actively exercise stock options and sell shares in a pattern that increases steadily over the twelve months prior to their home acquisitions, peaking just before.

Figure 3 shows monthly averages for the amount spent by CEOs to exercise stock options, displayed in a time series for one year prior to and continuing until one year after their dates of home purchase. The sample includes 160 CEOs who acquire homes within the period covered by the Thomson Financial insider trading database, which begins its coverage in 1986. We show the cost spent to exercise options, as opposed to the net proceeds obtained, because in most cases we cannot identify with certainty whether the CEO sold or retained the shares

⁷ Greenspan's speech to the Credit Union National Association is posted at www.federalreserve.gov/boarddocs/speeches/2004/20040223/default.htm. Data about mortgage products appears in Mortgage Bankers Association (2005), which states that ARMs account for only 23 percent of outstanding mortgages and a lower share among prime credit borrowers, though ARMs have recently gained market share against fixed rate loans.

acquired and, if he sold them, the relevant date of sale. The graph gives a measure of CEOs' willingness to extinguish option value around the time of their home purchases. Because the data is somewhat noisy, a three-month moving average is also shown in order to highlight the trend, which rises steadily upward and peaks shortly before the real estate acquisition date. The data includes amounts spent by the CEO whether in the form of cash or through the delivery of shares in order to satisfy the option exercise price. Option exercises appear to rise very rapidly during the twelve month period preceding a CEO's home acquisition, peaking about three months before.

Figure 4 presents a measure of net equity selling by the 160 CEOs in the sample. The figure, again shown in a monthly time series with a three-month moving average, includes open market sales, dispositions of shares to the company, less open market purchases, less cash spent to exercise stock options. The sum total of these items equals the cash extracted by the CEO from his firm through the liquidation of either shares or options. As shown by the graph, this time series increases steadily through the twelve months leading up to the house acquisition date, peaking exactly in the month before. Note that a displacement of two to three months appears to exist between the time series for option exercise expense shown in Figure 3 and the series for net equity sales in Figure 4; this suggests that a brief period elapses between the dates of share acquisition via option exercise and the dispositions of those shares for at least some CEOs.

We construct a measure of the amount of each CEO's home purchase financed by liquidation of shares and options. This estimate comes from the data used to construct Figure 4, in which we calculate the net cash proceeds to each CEO from option exercises and stock sales over the twelve month period prior to the acquisition of his home. We assume that these

proceeds are used to finance the home purchase price, up to a limit equal to the property's acquisition cost minus the amount raised via mortgage. (In a few cases in which the CEO is a net purchaser of shares, we set this variable equal to zero.) Data about financing from net sales of equity appears in the fourth and fifth columns of Table II. CEOs on average finance about 15 percent of their home costs from selling shares and options, a percentage that is slightly higher for less expensive homes, and slightly lower for new CEOs hired from outside the firm, who likely don't own much internal equity at the time of home purchase. In nearly every case, however, the amount raised from equity sales is relatively modest relative to the CEO's overall stake in the firm. The median equity investment (shares plus Black-Scholes option value) exceeds \$35 million for the CEOs in our sample, and even at the 10th percentile CEOs own \$6.7 million worth of company shares and options. These numbers are an order of magnitude (or more) greater than the amount raised by CEOs through net sales of stock, which equals zero for most observations and has a mean value above \$1 million only among the very largest cohort of homes, according to data in Table II.

4. Analysis

Our central research question concerns the association between CEO real estate purchases and the subsequent performance of their companies. If home purchases represent a signal of commitment by the CEO, subsequent stock performance of the company should at least remain unchanged and possibly improve. Conversely, if home purchases represent a signal of entrenchment, we would expect stock performance to decline after the time of purchase. Either of these effects should increase with the size or cost of the home.

We begin our analysis with some simple partitions of the data as of December 31, 2004, the effective date of our sample, and we measure stock performance for each firm over the next year, calendar 2005. For those CEOs who leave office or have their firms delisted during 2005, we cumulate performance up to the times of their departures.

Table III displays mean and median 2005 stock returns for portfolios of companies sorted according to the value and size of CEOs' residences. For simplicity of presentation, we do not use any market index or model of expected returns in these calculations, since all information is for the same time period and all companies are members of the S&P 500. We have tested the sensitivity of our analysis to adjustments for industry average returns and expected return models such as Fama-French, and none of these changes affects the underlying results.

In the top half of Table III, we partition the sample of CEO residences according to their estimated market values, as obtained from the two Internet real estate sites described earlier. We must discard about 20% of the sample for which these sites do not provide estimates (many of these missing observations are for new construction that has not yet entered the sites' databases). A weakness of our approach is the reliance on market value estimates from late 2006, nearly two years past the effective date of the sample. Unfortunately, historical estimates of market values are not available, so we effectively assume that the market values prevailing in late 2006 are proportional to those at the end of 2004.

Data in Table III indicate that CEOs who live in homes with values above the sample median underperform their counterparts whose homes have values below the sample median. We show this result for the entire sample, on the left side of the table, and for the subsample of CEOs who acquired their home subsequent to taking office, on the right side. The degree of

underperformance by CEOs in the more expensive homes is stronger and more significant within the subsample.

In the lower half of Table III we partition the sample according to the sizes of CEOs' homes. We have several variables available as measures of home size, including floor area, number of rooms, number of bathrooms, and land acreage. For many observations, some or all of these variables are missing. We adopt a simple scheme for classifying a CEO's residence as "large" if it has either 10,000 square feet of floor area or at least 10 acres of land. While this rule is somewhat ad hoc, it fits our data nicely by identifying about 15% of the sample residences as extremely large.

As shown in the lower half of Table III, we find that for the year 2005, CEOs in the largest homes underperform their counterparts in the rest of the sample, with the difference in performance lying in the range of -6% to -10%, depending on the performance metric chosen. Significance levels are somewhat stronger, and the magnitudes are very similar, for the overall sample compared to the subsample of CEOs who purchased homes after taking office.

To test whether the results shown in Table III are unique to the year 2005, we look back to the time at which each CEO purchased his current home, for the subsample whose acquisitions we can identify as having taken place subsequent to their owners' becoming CEO. Summary statistics about these observations appear in the right half of Table I. These companies on average outperform the S&P 500 index due to the survivorship bias in our sample; this bias arises because our sample only has companies that were included in the index at year-end 2004, but all home purchases took place before this date. To be in the index at the end of 2004, firms must have performed well prior to then.

We construct a hypothetical trading rule in which an investor is assumed to take long or short positions in company stocks at the time of their CEOs' home purchases, with the choice of long or short based upon the size of the CEO's new home. Since these home purchases occur at different times, we subtract the contemporaneous S&P 500 return from each observation's raw return to adjust for moves in the overall market. We cannot pursue a similar analysis based on home values, because values would have fluctuated over time (our sample of purchases extends as far back as 1982) and we lack the necessary historical data.

We calculate mean cumulative net-of-market returns on a monthly basis for a portfolio of 23 CEOs' homes that exceed either 10,000 square feet in floor area or 10 acres in land area. The initial month is the first month subsequent to the CEO's purchase of the home, and we continue the analysis for a period of 36 months. We similarly calculate the cumulative mean returns for a separate portfolio of 135 CEOs' homes that either do not meet the size criteria or have missing values for these variables. If a firm replaces its CEO within the 36 month window, we drop it from the analysis at that point. Results of our hypothetical trading strategy are shown in Figure 5. Data displayed in the figure show a steadily widening gap between the profits in the long portfolio and the losses in the short portfolio.⁸ The cumulative difference between these two mean values equals 1.5% after three months, 9.9% after six months, 18.7% after one year, and 47.4% after three years. The cumulative difference in means has a t-statistic that widens from 1.27 after one year, to 1.87 after two years, and 2.34 after three years.

⁸ The overall sample exhibits positive net-of-market performance prior to 2004, since the criteria for inclusion in the sample is based upon S&P 500 membership in that year, and firms must have performed well prior to 2004 to have survived and earned a spot in the index. This accounts for the upward slope in the top line of Figure 5, which reflects the performance of the majority of the sample. The difference in the two lines, which is the statistic of interest, should not be affected by the general pattern of market outperformance in the sample as a whole.

Together, the evidence for the year 2005 plus the evidence for a trading strategy implemented over time is consistent with a significant difference in performance between CEOs living in very large homes and all other CEOs. A trading strategy to capitalize on this pattern would not have been difficult to implement. Real estate purchases and sales are public information and tend to be highly visible, as are the characteristics of most properties, and even if a trading strategy had implemented with some time lag, the continually widening gap in Figure 5 suggests that profits would have been earned over any interval of reasonable length.

In Table IV we present regression evidence consistent with Figure 5, in a framework that allows us to control for the risk-adjusted expected return of each observation. We estimate a Fama-French four factor model of monthly stock returns for our sample of 165 companies, and the list of independent variables is augmented by a dummy variable that equals 1 if the CEO purchases a large home, according to our cutoff of 10 acres or 10,000 square feet. We cluster standard errors at the firm level; this requires us to use a balanced panel with the same number of observations per firm, so we use a 24-month sample period for which we have 138 firms with continuous data (fewer observations exist for firms that were delisted or whose CEOs left office within 24 months of acquiring their homes). Analysis with non-clustered standard errors indicates almost no difference in results if an unbalanced panel with all 165 firms is used or if the sample period is extended to 36 months. We also produce nearly identical results using different measures of the market index, such as the S&P 500 Index or industry returns in place of market returns.

Results in the first column of Table IV indicate a significantly negative stock performance following the acquisition of very large homes by company CEOs. The magnitude

of this effect, which is significant below the 5 percent level, is quite large, at 1.25 percent per month, which is in line with the data shown in Figure 5. We interpret the stock return evidence as consistent with large CEO home purchases indicating entrenchment and foreshadowing poor future stock performance.

We continue the regression analysis by adding an independent variable equal to the percentage of acquisition cost for each house financed by liquidation of company shares and options, as described in Figures 3 and 4 and Table II. If the CEO purchases the home without selling shares, we interpret it as a signal of commitment and expect more positive stock returns. When the stock financing variable is added to the regression model, it has a negative estimate that is significant at close to the 1 percent level. This result indicates that when CEOs sell shares or exercise options to help pay the cost of a new house, the stock underperforms market benchmarks for at least the next several years and, conversely, when the CEO uses other methods of financing his home purchase but sells no equity, his company stock performs well thereafter, consistent with our commitment hypothesis. This result represents an interesting complement to the extant literature on insider trading. Even though CEOs who are purchasing new houses have an evident liquidity motive for selling equity, the entire sample of insider sales under these conditions continues to send a strong negative signal about future company performance. These CEOs may even see the home purchase as an opportunity to sell shares under a pretext that they are necessary to finance the home acquisition, while the true motive may be more closely connected to private information about the future path of his firm's stock.

Inclusion of the control for equity sales by the CEO has no effect on the estimate for the indicator variable for very large homes, which is virtually identical in columns one and two of

Table IV. Together, the estimates for the two main dependent variables suggest that a grandiose home purchase by a CEO represents a signal of entrenchment, while a purchase financed without sales of company stock represents a positive signal of commitment, and any overlap between these two motives in an individual transaction is purely idiosyncratic.

One can identify certain subsamples of CEOs for whom a home purchase, however large, is unlikely to coincide with an increase in entrenchment. At one extreme, new CEOs hired from outside the firm probably have little job security or control over corporate governance. We construct a dummy variable and set it equal to 1 for CEOs whose purchases take place in their first year in office and who are hired from outside the firm. A group of CEOs with the opposite degree of job security might be members of a company's founding family. According to a literature that begins with Johnson, Magee, Nagarajan, and Newman (1985), CEOs who are either founders or descendants of the founder are often both poor performers and immune from removal through the ordinary processes of corporate governance. Therefore, we expect home purchases to be irrelevant as a signal of entrenchment for this group, since their family relationship makes them entrenched from the date of appointment as CEO. We construct a founding family dummy variable and set it equal to 1 for members of the company's founding family.

We augment the regression model in Table IV by adding two interaction terms between the large home indicator and the indicators for (i) new CEOs hired from outside the firm, and (ii) founding family CEOs. We expect the two interaction terms to be positive, based upon our conjecture that home purchases should not occur contemporaneously with changes in entrenchment for these subgroups. Results shown in the right column of Table IV are in accord

with our predictions. The coefficient on the large home dummy variable indicates underperformance close to 2% per month by CEOs who live in very large homes. However, the effect is negated almost exactly by the magnitude of either of the two interaction terms, each of which is positive and significant with estimates also quite close to 2% per month.

We explore whether several other variables related to home purchases exhibit statistically significant associations with company performance. We use the distance of the CEO's home from headquarters (in several specifications, including log form) as an independent regression variable, conjecturing that CEOs who live far from the office may spend less time at work and have less direct contact with co-workers. Somewhat surprisingly, the distance variable does not come close to having a statistically significant estimate, even in cases of CEOs who live thousands of miles from their offices. We experiment with a dummy variable for new construction, setting it equal to one when the CEO acquires undeveloped land and builds a new house upon it. Our hypothesis is that these CEOs may be preoccupied with blueprints and construction details and therefore underperform. This dummy variable, however, does not yield a statistically significant estimate. Finally, we use aerial photographs to identify CEO properties that are adjacent to golf courses and to waterfronts, in the expectation that the leisure opportunities associated with these homes may lead to CEO shirking. Once again we fail to find a statistically significant estimate when indicator variables for these properties are included in regressions.

5. Conclusions

Using a database of principal residences of company CEOs, we study whether these

executives' decisions about home ownership contain information useful for predicting the future path of their companies' stock prices. We find that CEOs who acquire extremely large properties exhibit inferior ex post stock performance, a result consistent with large mansions and estates being proxies for CEO entrenchment. We also find that the method of financing a home's acquisition is informative about future stock returns. A general pattern of CEO sales of their firms' shares and options exists over the twelve months leading up to the date of home acquisition. However, when the CEO does not sell any shares, his stock performs significantly better ex post than the stocks of firms whose CEOs do liquidate equity to finance their houses. The retention of company shares simultaneous with a new home purchase, despite the presence of an evident personal liquidity need, appears to send a signal of commitment by a CEO to his company.

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Table I
Characteristics of CEO residences

Descriptive statistics for a sample of the primary residences of CEOs of companies listed in the S&P 500 index at year-end 2004. The left half of the table shows data for the full sample of 488 residences. The right half shows data for the subsample of 165 residences acquired after the CEO assumed his current position. Certain variables have missing values for some observations. Each CEO's address was identified by searching databases of real estate records and related documents. Information about the characteristics of each property, including market value estimates, was obtained from two Internet search engines for U.S. residential real estate.

	All CEO residences					Residences acquired after appointment as CEO				
	<u>Obs.</u>	<u>Mean</u>	<u>Std.</u>	<u>Median</u>	<u>Max.</u>	<u>Obs.</u>	<u>Mean</u>	<u>Std.</u>	<u>Median</u>	<u>Max.</u>
Age in years	376	32.6	32.6	17	144	134	28.4	32.7	12.5	123
Floor area (sq. ft.)	365	6,257	3,525	5,667	45,865	134	6,970	4,722	6,052	45,865
Rooms	231	12.0	4.2	11	36	79	13.1	4.6	12	28
Bathrooms	342	4.7	1.9	4.5	12	124	5.1	2.2	4.5	12
Land (acreage)	368	5.35	26.64	1.22	361.63	124	6.29	32.93	1.27	361.63
Distance from office (miles)	488	n.a.	n.a.	13.6	n.a.	165	n.a.	n.a.	13.7	n.a.
Waterfront location	483	0.124	0.330	0	1	164	0.146	0.353	0	1
Golf course location	483	0.085	0.279	0	1	164	0.110	0.313	0	1
Market value (mm., 2006)	405	\$3.1	\$2.7	\$2.3	\$17.4	146	\$3.9	\$3.3	\$3.3	\$17.4

Table II
Financing of home acquisitions by CEOs.

Sources of financing for new home purchases by CEOs of S&P 500 companies. The full sample includes 165 acquisitions of principal residences by CEOs, and 42 observations are excluded because the cost of the transaction cannot be obtained. The chart shows the amount of mortgage financing obtained at the time of purchase according to public real estate records. Net equity sale financing for each CEO equals the net proceeds from open market sales and option exercises in the year prior to the home acquisition; this variable is defined to have a minimum value of zero and a maximum value equal to the difference between the home cost and mortgage financing. Relocating outside hires are CEOs hired from outside the company who live outside the geographic area near headquarters and purchase a new home within one year of their appointments. Home acquisition costs are obtained from deed transfer records available from Internet databases, and net equity sale information is obtained from the Thomson Financial insider trading database.

<u>Sample</u>	<u>Obs.</u>	Financing from mortgage proceeds		Financing from net sales of firm equity		<u>Total home cost</u>	<u>Fraction financed by mortgage</u>	<u>Fraction financed by equity sales</u>
		<u>Freq.</u>	<u>Mean</u>	<u>Freq.</u>	<u>Mean</u>			
Home cost up to \$1 million	33	24%	\$218.9	33%	\$161.7	\$615.6	36%	26%
Home cost \$1 to \$2 million	34	47%	\$483.4	29%	\$196.0	\$1,420.8	34%	14%
Home cost \$2 to \$4 million	30	47%	\$687.1	33%	\$566.8	\$2,960.4	23%	19%
Home cost above \$4 million	28	57%	\$2,143.6	32%	\$1,006.3	\$8,388.0	26%	12%
Relocating outside hires	14	50%	\$574.8	21%	\$851.8	\$3,014.8	19%	28%
All purchases	125	43%	\$834.4	32%	\$457.5	\$3,138.4	27%	15%

Table III
Company stock returns, 2005

Stock returns realized during calendar year 2005 for companies in the S&P 500 index, partitioned according to market value and size of their CEOs' personal residences. On the left half of the table, the analysis includes all CEOs' houses with adequate information available. On the right half of the table, the analysis is limited to those CEOs who acquired their current residences after taking office. Information about the characteristics of each CEO's residence, including market value estimates, was obtained from two Internet search engines for U.S. residential real estate. The indicator for largest homes equals 1 if the property is at least 10 acres large or the house's floor area is at least 10,000 square feet. The analysis based upon home size excludes CEOs who reside in apartments, condominiums, or co-ops. These CEOs are included in the analysis based upon market value.

	All CEO residences			Residences acquired after appointment as CEO		
	<u>Obs.</u>	<u>Mean</u>	<u>Median</u>	<u>Obs.</u>	<u>Mean</u>	<u>Median</u>
Market value above sample median	200	6.43%	4.53%	72	0.27%	1.45%
Market value below sample median	199	9.56%	5.88%	72	8.70%	9.63%
Difference		-3.13%	-1.35%		-8.43%	-8.18%
t-statistic or Wilcoxon rank-sum statistic		1.20	1.51		1.70	1.67
p-value		0.23	0.13		0.09	0.10
Largest homes (at least 10,000 sq. ft. or 10 acres)	51	-1.65%	-1.69%	23	-1.50%	-1.69%
All other homes	382	5.24%	5.99%	122	4.9%	8.12%
Difference		-6.89%	-7.69%		-6.46%	-9.81%
t-statistic or Wilcoxon rank-sum statistic		1.98	2.41		1.28	1.75
p-value		0.05	0.02		0.20	0.08

Table IV
Regression analysis of company stock returns

Ordinary least squares analysis of stock returns for companies in the S&P 500 index in the 24 months following the purchase of new homes by their CEOs. The full sample includes 165 companies in the S&P 500 at year-end 2004, and 26 companies are excluded either because the firm was delisted or the CEO left office within 24 months of the home purchase. The dependent variable equals the firm's monthly stock return minus the risk-free rate. The variable measuring fraction financed by stock sales equals the CEO's proceeds from stock sales and option exercises in the year prior to the home purchase, capped at the difference of the home cost less the amount financed by mortgage. The indicator for large homes equals 1 if the property is at least 10 acres or the house's floor area is at least 10,000 square feet. The founding family indicator equals 1 if the CEO is a member of the company's founding family. The relocating outside hire indicator equals 1 if the CEO is hired from outside the company and purchases his home within one year following his start date. Standard errors clustered at the firm level appear below each estimate in parentheses.

	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
Intercept	0.0016 (0.0020)	0.0042 ^c (0.0024)	0.0038 (0.0024)
Market return - risk-free rate	1.1498 ^a (0.0476)	1.1667 ^a (0.0513)	1.1706 ^a (0.0514)
(High - Low) portfolio	0.2382 ^a (0.0633)	0.2238 ^a (0.0676)	0.2255 ^a (0.0676)
(Small - Big) portfolio	0.1866 ^a (0.0544)	0.1726 ^a (0.0582)	0.1726 ^a (0.0582)
(Up - Down) portfolio	-0.0377 (0.0338)	-0.0260 (0.0362)	-0.0266 (0.0361)
Large home indicator (at least 10,000 square feet or 10 acres)	-0.0122 ^b (0.0050)	-0.0122 ^b (0.0055)	-0.0230 ^a (0.0076)
Fraction financed by stock sales		-0.0139 ^a (0.0050)	-0.0125 ^b (0.0050)
Large home indicator x founding family indicator			0.0199 ^c (0.0122)
Large home indicator x relocating outside hire indicator			0.0241 ^c (0.0133)
Observations	3,672	3,288	3,288
R ²	0.187	0.185	0.188

Significant at 1%(a), 5%(b), and 10%(c) levels.

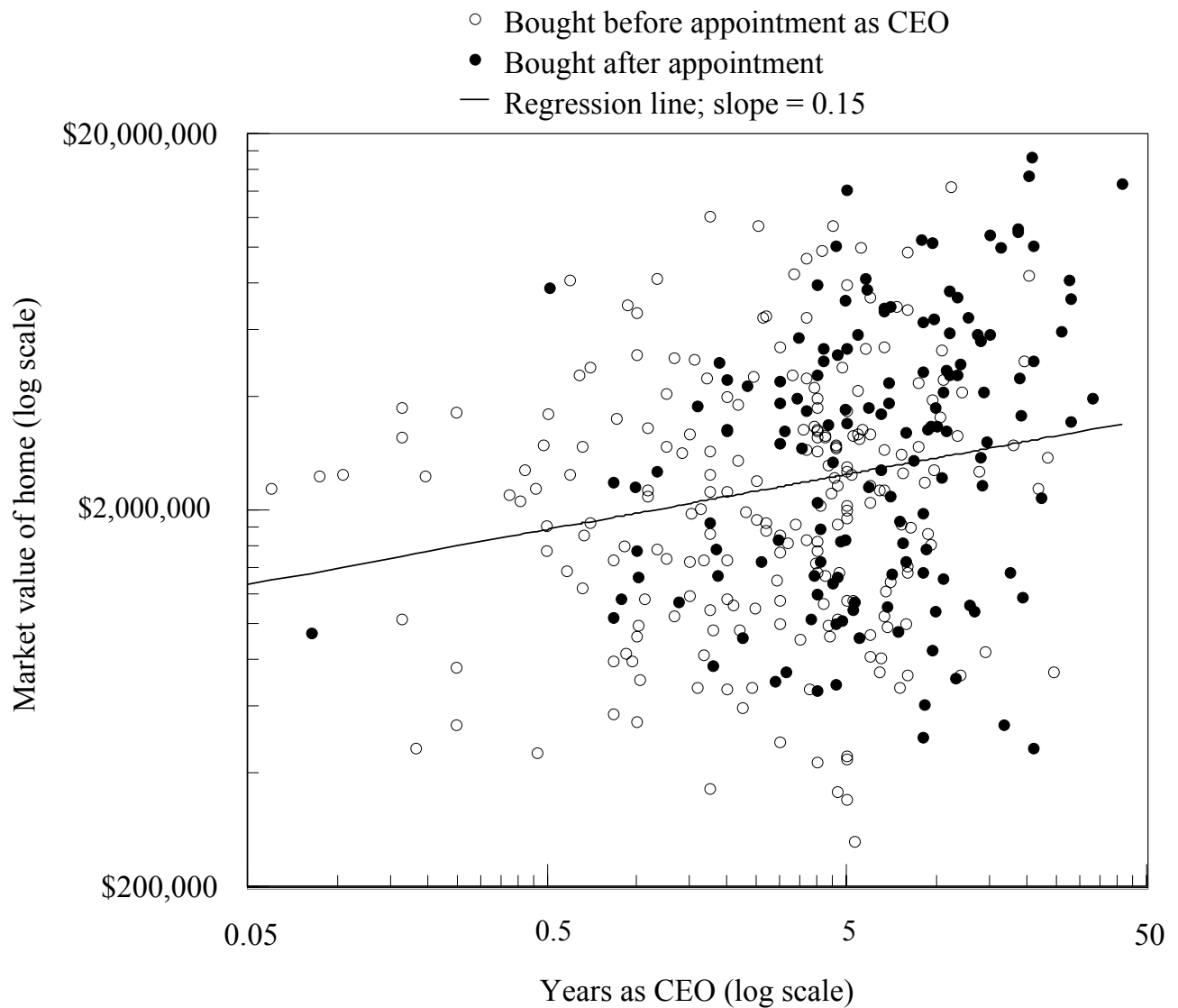


Figure 1
Value of CEO residences vs. CEO tenure in office

The figure plots the market value of CEOs' principal residences against their years in office, with log scales used for clarity. Residences are identified for CEOs of S&P 500 companies as of December 31, 2004. Market values are obtained from two residential real estate websites, zillow.com and reply.com, as of late 2006. The chart shows the 362 observations for which the date of purchase is available and at least one of the two websites provides an estimated market value; an average is used when both sites provide estimates. Dark circles indicate properties acquired by the CEO subsequent to his appointment, while empty circles indicate properties owned by the CEO before promotion in which he remains after becoming CEO. The dotted line is the outcome of a regression of the log of home value against the log of years tenure in office.

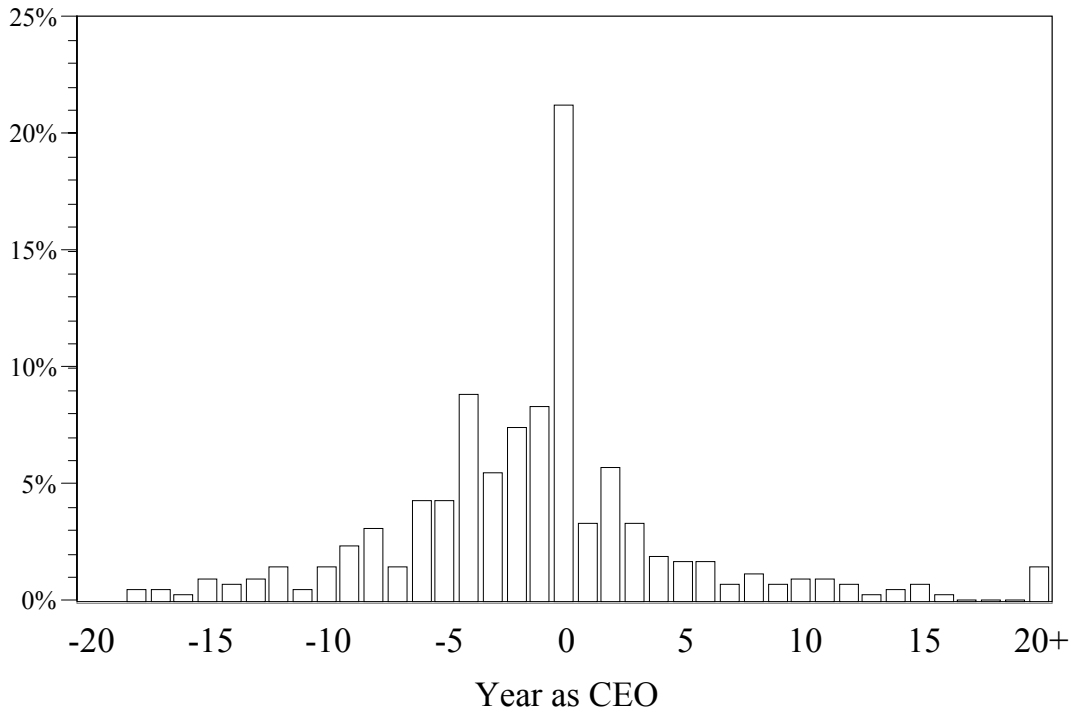


Figure 2
Timing of acquisition of CEO residences

The figure displays the distribution of dates at which CEOs of S&P 500 companies acquired their current principal residences. Year 0 is the year in which the CEO is appointed to his position. Positive values on the x-axis represent home purchases subsequent to the CEO's appointment, while negative values represent homes purchased by the manager before becoming CEO in which he continues to live afterward. The dates of CEOs' home purchases appear on databases of residential real estate transactions that are searchable on the Internet.

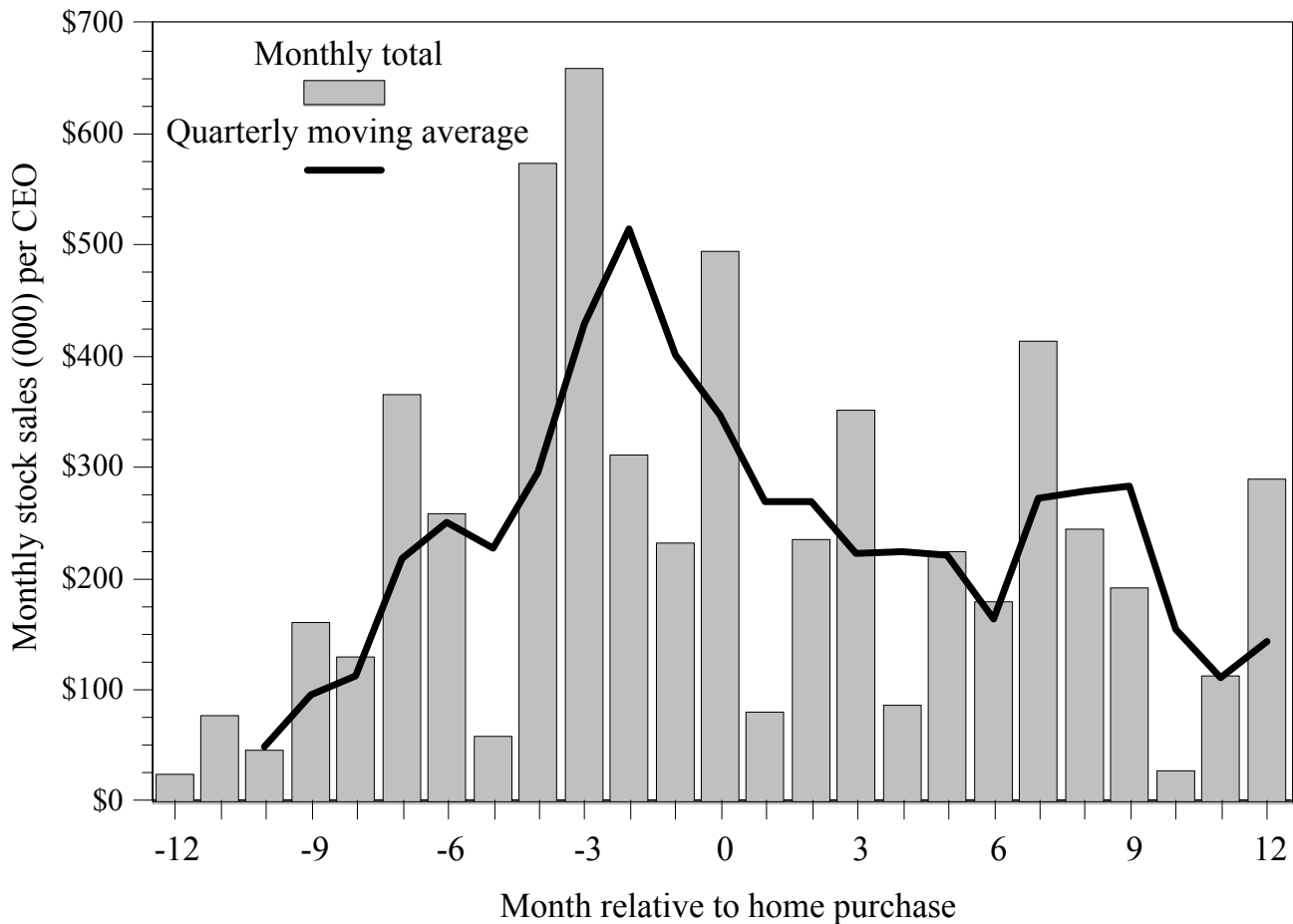


Figure 3
Amount spent by CEOs to exercise stock options, by month

The graph shows mean monthly expense incurred by CEOs of S&P 500 companies to exercise stock options, over the period beginning one year before the purchase of their principal residences and lasting until one year after. The full sample includes 165 CEOs who purchased their homes subsequent to their appointments as CEOs, but four CEOs are excluded because their purchases took place prior to the date of coverage of the Thomson Financial insider trading database, which is the source for data. Monthly option exercise expense equals the amount paid by the CEO to his firm, whether in cash or due to the surrender of shares. A month is defined to equal four calendar weeks for purposes of the analysis.

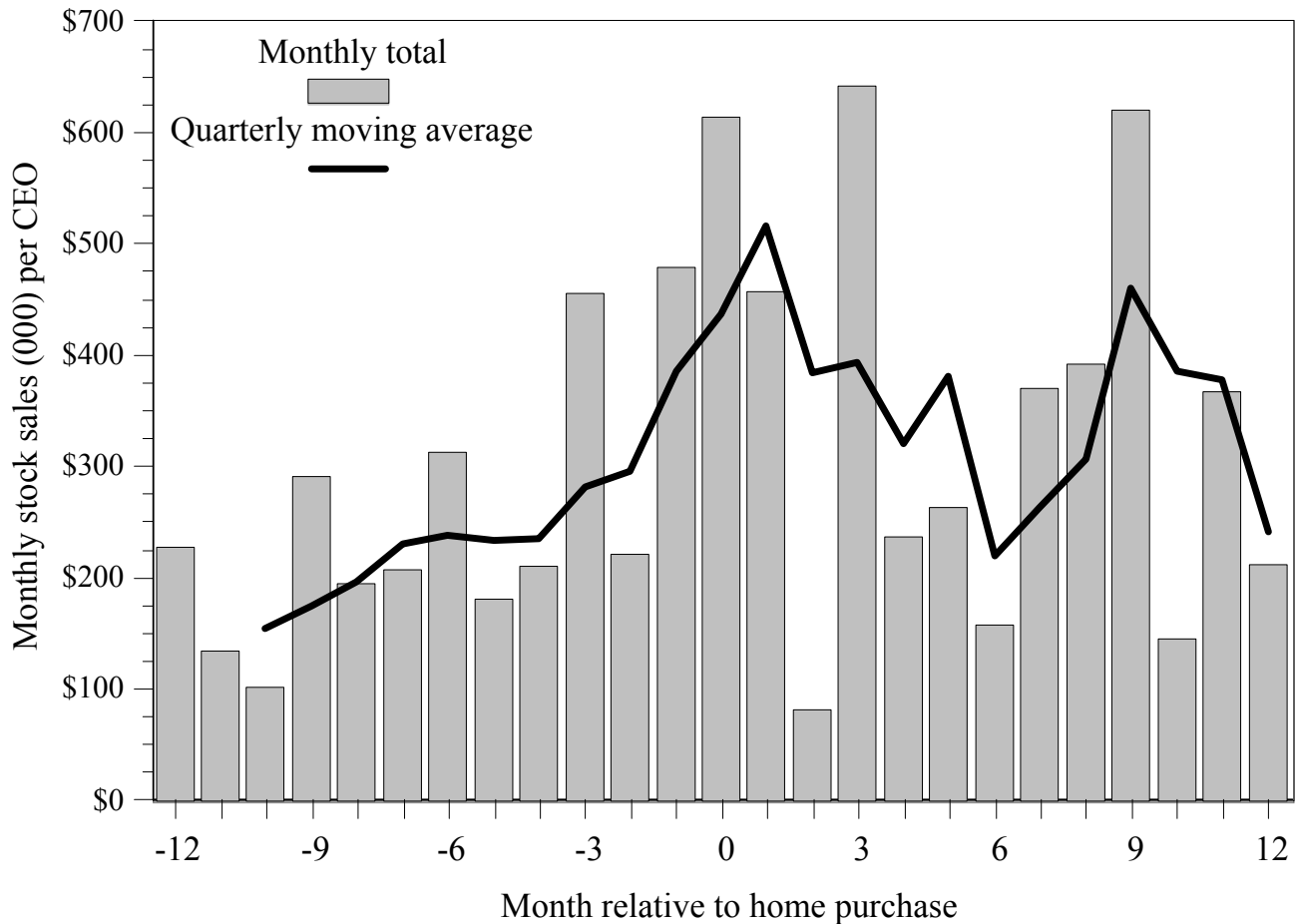


Figure 4
Net CEO equity sales, by month

The graph shows mean net monthly equity sales for CEOs of S&P 500 companies during the period beginning one year before and lasting until one year after the dates of purchase of their principal residences. The full sample includes 165 CEOs who purchased their homes subsequent to their appointments as CEOs, but four CEOs are excluded because their purchases took place prior to the date of coverage of the Thomson Financial insider trading database, which is the source for data. Net monthly equity sales equal the CEO's proceeds from open market sales, plus proceeds from dispositions of shares to the company (except those surrendered for option exercises), minus the cost of open market purchases, minus the out-of-pocket cash cost for exercising stock options. A month is defined to equal four calendar weeks for purposes of the analysis.

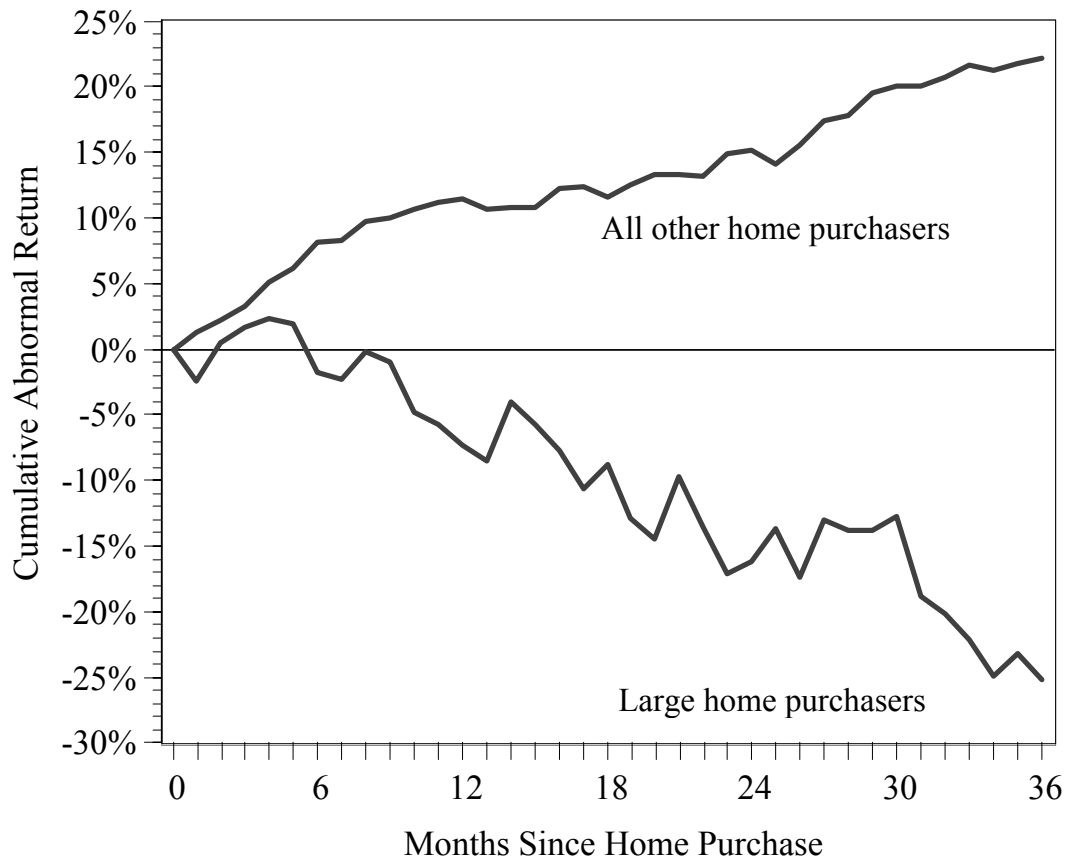


Figure 5
Cumulative abnormal stock returns subsequent to CEOs' home purchases

The graph shows the cumulative abnormal stock performance for a sample of 165 S&P 500 companies in which the CEO acquired his home subsequent to his appointment as CEO. The large home subsample, which includes 23 observations, features residences of at least 10,000 square feet or land area of at least 10 acres. CEOs' addresses and home characteristics were obtained from searches of Internet residential real estate records. Abnormal stock returns are calculated as the difference between the raw stock return and the monthly return on the S&P 500 index.