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Article

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KDI Journal of Economic Policy

Provided in Cooperation with:

Korea Development Institute (KDI), Sejong

Suggested Citation: Kim, Woo Jin; Yang, Dong-Ryung (2016) : CEO to the Rescue: Residential Proximity of Private Firm CEOs and the Evolution of Corporate Profitability, KDI Journal of Economic Policy, ISSN 2586-4130, Korea Development Institute (KDI), Sejong, Vol. 38, Iss. 4, pp. 1-21, <https://doi.org/10.23895/kdijep.2016.38.4.1>

This Version is available at:

<https://hdl.handle.net/10419/200796>

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CEO to the Rescue: Residential Proximity of Private Firm CEOs and the Evolution of Corporate Profitability

By WOOJIN KIM AND DONG-RYUNG YANG*

This paper documents how the net profit margin of private firms improves when the CEOs of the companies relocate their primary residence to be closer to the corporate headquarters. By reviewing 127 Korean non-public companies belonging to 66 private business groups, we find that the top managers move closer to the headquarters when the profitability of the firms has recently deteriorated. A one basis point decline in the margin causes CEOs to relocate their homes approximately two kilometers closer to their corporate headquarters. The profit margin rebounds after their relocation. This finding implies that physical proximity can serve as a proxy for personal commitment.

Key Word: CEO, Corporate Governance, Geographic, Commitment
JEL Code: G30, G34, G39

I. Introduction

Chief executive officers (CEOs) are individuals who make critical decisions regarding their corporations. Therefore, their level of commitment is essential for their businesses to flourish. However, the current literature rarely touches upon the issue of how to measure the level of CEO commitment. Most studies dealing with the link between CEOs' efforts and firm performance assume that CEOs are best incentivized when their personal net incomes are maximized.¹ However, the literature seldom provides any specific channel by which CEOs commit to their business. In this paper, we examine how close CEOs' residential homes are to their corporate headquarters as a proxy for their level of commitment and study how different levels of the commitment are related to the profitability of their firms.

There are several reasons that make it more than a simple and random choice for

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* Received: 2016. 6. 27

* Referee Process Started: 2016. 7. 1

* Referee Reports Completed: 2016. 10. 21

¹See Brown *et al.* (2007) and Bergstresser and Philippon (2006), among others.

CEOs when they decide where to live. First, residential relocation is not an easy decision considering the time and expenses required when searching for a desirable residence and considering factors such as school transfers for children. Therefore, once CEOs choose a certain region, it is highly likely that they will stay for a while, trying to remain at ease in the location as long as they can. As residential relocation is such a difficult decision, it represents significant determination of any type once made by a CEO. Second, CEOs can choose a residential area without rigid budget constraints and can also afford long commutes in general compared to low-ranked employees. Unlike most low-ranked employees, CEOs may have far fewer financial restrictions with regard to selecting where to live, and they may have a wider range of options when choosing a residential area. CEOs can also more flexibly decide when they should appear in their offices. In other words, they have more discretion in adjusting their schedules such that they do not need to come to their offices at a fixed time on a daily basis. This sort of flexibility makes CEOs more able to endure a long commute, as they can manage most of their official duties and minimize losses of their personal time during business hours, and compensate for the long commute accordingly. Under circumstances which allow wider options with regard to their residence, when CEOs relocate closer to corporate headquarters, it distinguishes them as individuals willing to pay more attention to daily business operations.

To study the link between CEO residential proximity and firm performance, a specific group of companies was deliberately selected to best fit our research purpose. The group covers pairs (or 'trines') of Korean private companies, both (or all) of which are managed by a single CEO. There are several reasons behind the selection of this sample set.

First, large listed firms do not serve our research purposes well, as the daily business operations of these types of firms are mostly conducted by a group of professional managers who are well equipped with their own specialties. Under such an environment, a different commitment level of a single CEO does not have a critical impact on the firm's profitability, as more of critical decisions are not made by the single CEO but by a group of professional managers compared to a private company, where a single CEO maintains more dominant leadership. Equivalently, for large listed firms, the CEO's residential proximity to corporate headquarters becomes less relevant to their level of commitment because, for listed firms, it is not a single person but a management system that manages most daily business operations. The management system inside large listed firms is well supported by state-of-the-art business intelligence software which gathers and analyzes massive amounts of information efficiently, providing timely reports to assist with critical decisions. This type of systemic approach to the general management of large listed firms makes the CEO's geographical commitment less influential over how well the firm is managed.

Second, we study and compare only pairs (or trines) of companies controlled by the same CEO for the following reasons. Suppose that we find that a firm's profitability deteriorates when the CEO of the firm relocates his/her home further from the firm's headquarters. Such a finding establishes a false causality if we naively interpret it as evidence that the CEO's relocation to a more remote region reflects a reduced level of commitment and, therefore, compromises profitability.

In fact, the decision to relocate farther away may not be an indication of a lower level of commitment but merely a simple move to provide a better schooling environment for the children of the CEO. As a partial remedy, we opt to trace changes in the CEO's residential proximity and firm profitability after controlling for CEO-fixed effects that may be embedded within each private business group. Despite the possibility of a CEO living away (closer) from (to) the corporate headquarters for unrevealed personal reasons, it reduces the chance to establish false causality when we study the values of residential proximity between a pair or trines of companies under the same CEO's supervision. Therefore, if we can find any systemic evidence showing that changes in commuting distance are related to differences in profitability in the firms controlled by identical CEOs, the evidence becomes less vulnerable to the potential criticism of spurious causation.

Third, the Korean regulatory system provides unique data, such as annual financial data for private companies and the history of the CEO's residential addresses. This informational advantage makes a study of this type feasible in Korea, as it would be unachievable in other countries. Korea is a country where business groups are prevalent even among private companies and where a public financial data warehouse ("DART") reliably provides financial statements from private companies, as long as the size of the company exceeds a certain threshold.² This unique environment indicates that Korea is a good place to analyze pairs of private firms under the control of the same CEO.

Fourth, without exception, the CEOs studied in this paper are all controlling shareholders of our sample firms. This phenomenon prevails, as relatively small-sized family businesses can seldom afford high-quality professional managers and/or the owner-managers are presumably most dedicated to the specific fields in which they spot new business opportunities. The individuals exert themselves to promote opportunities to build their family business empires. This unique environment, specifically the perfect match between CEOs' private incentives and the prosperity of their family businesses, makes research on their level of commitment more reliable than a study of professional managers whose personal incentives are often not best aligned with those of the firms for which they work.

Lastly, the home addresses of CEOs managing private companies are obviously private information and are not obtainable from public sources in general. This characteristic of the information has thus far made geographical analyses of private companies challenging. Fortunately enough, the Korean Supreme Court runs a public corporate registration system (www.iros.go.kr) where various bodies of corporate information are disclosed to the public when there is any change for such information. Although the system does not offer data in a fully automated manner, it still allows any individual to examine the business information of any company, as long as the individual pays a certain processing fee and is willing to endure the laborious task in flipping through corporate profiles in the system. The corporate information includes the history of CEO turnover, the CEO's residential addresses, the total amount of equity issued or to be issued, debt issuance, and other pertinent

²DART stands for Data Analysis, Retrieval and Transfer, which is a data warehouse managed by the Korean Financial Supervisory Service ("FSS"). A private company in Korea is required to report audited financial statements to DART, once the company's total asset exceeds KRW 10 billion, equivalent of USD 10 million.

information. By seeking this type of corporate information in the registration system, we construct a dataset of how each private company CEO's home address changes over time. This unique data enables us to study how geographic factors at the individual level affect firm-level performance among private companies.

Several questions are proposed regarding the relationship between a CEO's residential proximity and their firm's accounting performance. How does a firm's profitability change as the CEO moves their home further away (closer) from (to) the corporate headquarters? How does year-over-year profitability of a given firm evolve before and after the CEO relocates their residence? What motivates a CEO to move closer to their corporate headquarters?

The overall empirical findings of this paper indicate that the CEO's residential proximity and the firm's accounting performance are positively correlated after controlling for CEO-fixed effects and industry-specific factors. Private firms' accounting performances improve when the CEOs of the firms move their residences closer to the corporate headquarters. When we look into year-over-year progress on net profitability within each private company, the profit margin in excess of the industry average is found to grow when the CEO's residential home is closer to their corporate headquarters. A test of average profitability before and after the CEOs' relocation closer to the firm reveals that, on average, the net profit margin is weaker before the relocation than it is after the CEOs move closer. An investigation of the ten-year progress of net profitability across such relocations also confirms that the net profit margin consistently declines during the four years before the CEOs' residential move closer to the head offices whereas the margin improves in the long run after their relocation. Combining the findings above, we show that the CEOs of private firms commit themselves to their businesses by relocating closer to the firms once they find persistent and serious declines in corporate profitability and that such commitment rewards the CEOs given the revitalization of the profitability in the long run.

Existing literature proposes a possible mechanism to explain how individual-level commitment enhances corporate profitability. Porter (1996) argues that "dedicated positioning" is critical to earning and maintaining excessive profits, and finds that profitable companies are more likely to implement one of the following positioning strategies: releasing differentiated products, offering a competitive edge on cost management, or a combination of the two. The author stresses that such competitive positioning becomes viable only with the serious dedication of related stakeholders. Allen and Meyer (1990) conceptualize under what circumstances individuals commit themselves to their work. The authors argue that individuals show high levels of dedication when they are emotionally attached to the workplaces ("affective commitment"), when they have fewer alternative career options outside their current job ("continuance commitment"), and/or when they regard loyalty toward their current employers as a sort of "norm" and feel obligated to stay with them ("normative commitment"). Lee and Miller (1999) found that employee commitment is positively correlated with corporate profitability and argue that dedication in employees makes an organization more profitable.

The CEOs investigated here are unique in the sense that they are capitalists whose incomes are mostly generated from individual instances of capital investment. However, at the same time they maintain their status as corporate

employees, being paid for their labor for the organization. With the existing framework presented by Allen and Meyer (1990) applied, top executives become eligible candidates for testing the effects of an alleviated level of professional commitment on firm profitability. The companies investigated in this study were either founded by the CEOs themselves or inherited from their parents. Due to the nature of family heritage, the CEOs have a solid reason to be affectionate about the business empire nurtured by their family successfully, going through countless hardships (“affective commitment”). Shouldering the family legacy, the CEOs grow accustomed to the loyalty to their family business as a norm to abide by (“normative commitment”). Moreover, as most of their personal wealth heavily relies on the success of the business, the controlling individuals of private firms have a serious incentive to commit themselves to the businesses. Once the family business goes under, the individuals’ career options outside the firms are limited, as they have spent most of their professional careers within their family circles (“continuance commitment”). The unique characteristics of the CEOs of private firms make them most likely to be committed to the firm and enable us to test how their individual levels of commitment influence the profitability of their companies.

However, measurements of professional commitment tend to be subjective and remain difficult to quantify. This paper contributes to the related literature by presenting one possible measurement of the commitment level which is more objective and more appropriate for quantifying the depth of dedication. The study uses private firm CEO residential proximity to gauge the level of commitment and reports that a corporation becomes more profitable when the CEO move closer to the firm. Additional empirical tests reveal that CEOs relocate their residences closer to corporate headquarters when the firms recently record poor performance. With their CEOs moving closer, firm profitability gradually improves in the long run. As proposed by Porter (1996), such personal dedication enables the CEOs to manage costs more intensely and to innovate with current products, both of which lead to higher profitability. While a previous study (Lee and Miller 1999) reports a positive correlation between employee commitment and corporate profitability, this paper differentiates itself from earlier studies by presenting a concrete method with which to quantify personal dedication. Lee and Miller (1999) use questionnaire surveys to measure individual commitment, a method often vulnerable to the possible criticisms of biased sample selection and dishonest responses. In contrast, our paper measures professional commitment in a more objective manner, i.e., the commuting distance of top executives, and quantifies the impact of their commitment on corporate profitability. Our results suggest that the CEOs of private Korean companies move approximately two kilometers closer to their corporate headquarters in response to a one basis point decline in the net profit margin.

This paper contributes to the body of work in interdisciplinary geographic and corporate finance fields by initially arguing that physical proximity serves as a good proxy for personal commitment, especially when (1) a person’s success (or wealth) is best aligned with the business for which they work; (2) the individual is determined to be devoted to the business, but (3) the prosperity of the business is in peril. We report that the individual reveals his/her commitment to the business by relocating his/her residence closer to the business so that he/she may handle daily operations better, especially when the profitability of the enterprise substantially

drops. The effort to turn the enterprise around requires additional years to see the business eventually revive.

Previous studies interpret proximity as an intermediary of information sharing or networking opportunities. On the other hand, this paper conceives of proximity by presenting the new possibility that physical adjacency means another aspect, that is, personal commitment, rather than concepts already proposed in the literature. Within the new frame, proximity is not an intermediary by which information or social bonds are shared but an outcome which is realized by an individual's effort and dedication.

The remaining part of this paper proceeds as follows: Section II reviews the current literature related to geographic topics within the financial economics context, while Section III shows the empirical results of tests on the questions raised above. Section IV concludes the paper with brief comments on its limitations.

II. Literature Review

One of the most celebrated topics linking local factors in the finance literature is how location affects stock returns. Coval and Moskowitz (2001) report portfolio managers' excess returns as earned by nearby investments. Mutual fund managers are found to invest more in firms located closer to pertinent individuals, as managers are in a better position to investigate firms located closer to them and to gain the upper hand when attempting to possess the timely and accurate information necessary for successful investment decisions. In consequence, the investment professionals gain superior returns from the decisions with the benefit of regional proximity. Malloy (2005) finds that an analyst covering firms in close proximity provides more accurate forecasts. The research on equity analysts is in line with the previous findings on mutual funds (Coval and Moskowitz 2001) in the sense that regional proximity provides an informational advantage.

In addition to the informational advantage of investment professionals, Pirinsky and Wang (2006) document that co-movements of the stock returns are stronger when their headquarters are located in close proximity. The authors find stronger co-movements when the stocks are traded more by less experienced individual investors who are not as equipped with sophisticated financial knowledge and who rely more on regional information resources. Such co-movements, the authors argue, reflect the fact that a geographic element plays an important role in pricing equities. Zhu (2002) proposes a different perspective to explain why individual investors are overweight on nearby companies when constructing their stock portfolios. Their perspective indicates that individuals buy more regional stocks not because they are savvier in their understanding of local businesses but rather because they are more familiar with the enterprises and, therefore, become more agile at responding to pricing-moving corporate issues. Grinblatt and Keloharju (2001) expand the subject, linking regional factors to investors' stock-picking behaviors in an international study. Using Finnish individual-level data, they report that individual investors trade more on companies located closer to their homes.

Korniotis and Kumar (2013) also argue that state-level economic variables

predict the returns of stocks of which the headquarters are located in the same state. One of these authors' contributions to geographic studies within the body of financial literature is an extension of the co-movement phenomenon captured among closely located companies in a nationwide context. The paper also presents a possible rationale behind this type of co-movement, holding that the equity performances of companies in the same region are affected by common economic factors.

For individual-level studies, Hong *et al.* (2004) show that stock market participation is affected by social interactions. They point out that people who more actively interact with neighbors tend to invest more in equity markets, interpreting this finding as evidence that an individual feels more attached to markets of which their friends are a part (see also Brown *et al.* 2005).

Froot *et al.* (1999) present more direct evidence supporting the contention that regional components are priced into equity valuation. They compare the stock returns of companies of which shares are simultaneously listed on multiple stock exchanges around the globe. The rationale of their empirical test design is that stocks should show identical returns as long as the underlying businesses are identical. However, they found that the returns of stocks traded on multiple exchanges deviate from each other. The only difference among these stocks is that they are listed in different locations. With this evidence, the authors elect region-specific factors to explain the deviations.

Hong *et al.* (2005) test how social interactions among investment professionals influence their stock-picking behavior and report that mutual fund managers living in same local community show similar patterns in their portfolio selections. In the paper, they also find that fund managers whose workplaces are located in different regions still show similar stock-picking patterns as long as the individuals reside in the same area. The paper concludes that living in the same region has as much of an impact as working in the same region in establishing social bonds and in sharing common views.

On a different note, recent studies well recognize the importance of the impact of geographic factors on corporate behavior. More recently, Dougal *et al.* (2015) find that a firm's investment is significantly related to the investments of other companies of which the headquarters are in close proximity to the firm. The paper argues that the co-movements of the capital investments are found even among companies coming from different industries, as long as the firms locate their headquarters in the same region. The authors interpret this as evidence that locally clustered economies play a role in determining the level of corporate investment. One possible channel by which regional factors affect corporate behavior was also recently reported (Gan 2007). She contends that Japanese companies use their real estate properties as collateral to back new capital expenditures. As the price of the asset class is highly sensitive to the regional economy, a crash of the real estate market deters firms from executing new investments, possibly due to the lack of sufficient collateral to support the new projects. In a similar vein, Chaney *et al.* (2012) claim that the appraised value of real estate properties has a positive impact on corporate investment when the properties are used as collateral to finance new projects.

Another stream of studies focuses on what factors influence companies when

they choose the venues for their corporate headquarters. Carlton (1983) points out that regional labor costs, energy prices, taxes and municipal incentive programs, and regional technical advantages are the determinants, while an excellent airport system and the clustering of firms within same industries are also important considerations (Strauss-Kahn *et al.* 2009). Start-ups are less likely to bloom in states with higher tax rates (Papke 1991). Garcia-Mila *et al.* (2002) note that local governments, securing their tax base, provide tax incentives to firms willing to relocate headquarters to their municipalities.

Aksoy and Marshall (1992) study how corporate restructuring affects the local economies. As the restructuring effort cuts employment and causes firms to be more dependent on outsourcing, local economies become less vibrant. Davis and Henderson (2008) divide factors determining the location of the corporate headquarters into elements beneficial to manufacturing aspects and elements influencing the sales side. Henderson and Ono (2008) argue that there exists a trade-off between locating the head office closer to a metropolitan area and positioning the office close to production facilities. The authors maintain that headquarters in an urban location make it easier to contract out to support sales activities, while the location choice requires firms to exert more effort in managing production activities that occur far from the firms' headquarters.

Durantón *et al.* (2001, 2005) argue that the regional advantage of locating the head office in an urban area changes from sector specification to a functional specification. Ghosh *et al.* (1995) find that relocating the corporate headquarters induces subsequent stock price movements. The authors report empirical evidence showing that stock markets undergo a positive reaction to the relocation of corporate headquarters when the relocation is related to cost reductions.

For studies dealing with other geographical issues within the corporate finance context, Uysal *et al.* (2008) find that companies acquiring target firms located in nearby regions record higher returns than companies buying entities located farther away. Jaffe *et al.* (1993) study the spillover effect of new patents within nearby regional areas and find that a patent issued by an entity is more likely to be cited by companies located in the same state. Using European data, Orpurt (2004) finds that analysts more familiar with specific regions are better at forecasting the performance of companies active in those regions.

Although previous papers suitably provide firm-level analyses of the relationship between the locations of firms and how they affect corporate behavior, how geographic factors at the individual level affect corporate behavior is rarely touched upon within the corporate finance context. This paper provides new insight into the individual-level analysis of the geographic influence on corporate behavior by studying how the CEO's residential proximity is related to the profitability of their companies.

As noted earlier, the existing literature mostly views geographical proximity as an intermediary through which economic agents share knowledge, build social networks, and achieve early access to location-specific information. This paper differentiates itself from the literature in the sense that proximity is not merely a transmitter by which nearby knowledge spreads or economic agents gain informational advantages on region-specific factors. In contrast, we argue that proximity can occasionally be a result of personal commitment, a *status quo* made

by corporate CEOs exerting themselves to revitalize their businesses after a downturn.

III. Empirical Results

A. Sample Selection and Data Construction

To be qualified as a sample firm for our analysis, a firm needs to be incorporated in Korea, privately held, and have sibling firms managed by the same CEO. As our main research question is how the CEO's residential proximity to their firm is linked to the firm's profitability, pairs (or trines) of private firms affiliated within the same business group become ideal candidates for the reasons explained in section I.

Out of approximately 20,000 private firms incorporated in Korea whose externally-audited accounting information is available, we identify 1,717 firms that are classified as affiliates of private business groups. Out of the 1,717 firms, we finally carve out 127 sample firms controlled by 66 CEOs. We define a private business group as a family of private firms controlled by the same controlling shareholders. Records of the shareholding of the CEOs of the sample firms tell that all of the CEOs of our sample firms are also controlling shareholders of the companies.

We download the financial data of the private firms from KIS-Value, a Korean electronic data provider which collects financial information for both listed and private companies. Private companies in Korea are required to report audited financial statements to DART once the company's total assets exceed KRW 10 billion, equivalent of USD 10 million. Financial data providers such as KIS-Value collect and rearrange the contents from the financial statements for public use. In most cases, the footnotes of private companies' financial statements also contain ownership data at the end of each fiscal year. While unlisted companies are not obligated to report their ownership structures, most firms voluntarily report such information. Information on shareholdings is collected manually from the financial statements to be used as control variables in various empirical analyses conducted in this paper.

In addition, we gather time-series address information of CEO residences and the headquarters of their firms and calculate the distance between the CEO residence and the head office. We trace changes in headquarters' addresses from annual audit reports, while assembling CEOs' residential posts from each firm's corporate registration records. As noted above, the Korean Supreme Court runs a public corporate registration system (www.iros.go.kr) which discloses a variety of information whenever there is any change. It also shows when CEOs' residential addresses change. Using a virtual navigation service provided by a domestic portal site (map.naver.com), we measure the distance from the residence to the headquarters. We then record the changes in the distance between the CEOs' residences and their firms' headquarters every year.

Even the shortest commuting route can take many hours if the route traverses

congested areas. In such a case, measuring the driving distance does not serve well as a proxy for commitment. The virtual navigator used to measure distance presents multiple routes when asked to provide possible driving routes from one location to another. The service provider not only provides the path with the shortest distance but also that with the shortest driving time reflecting traffic conditions. For empirical tests in this paper, the route allowing the shortest commuting distance is chosen for calculating the distance only if the route allows the shortest driving time as well.

B. Main Findings

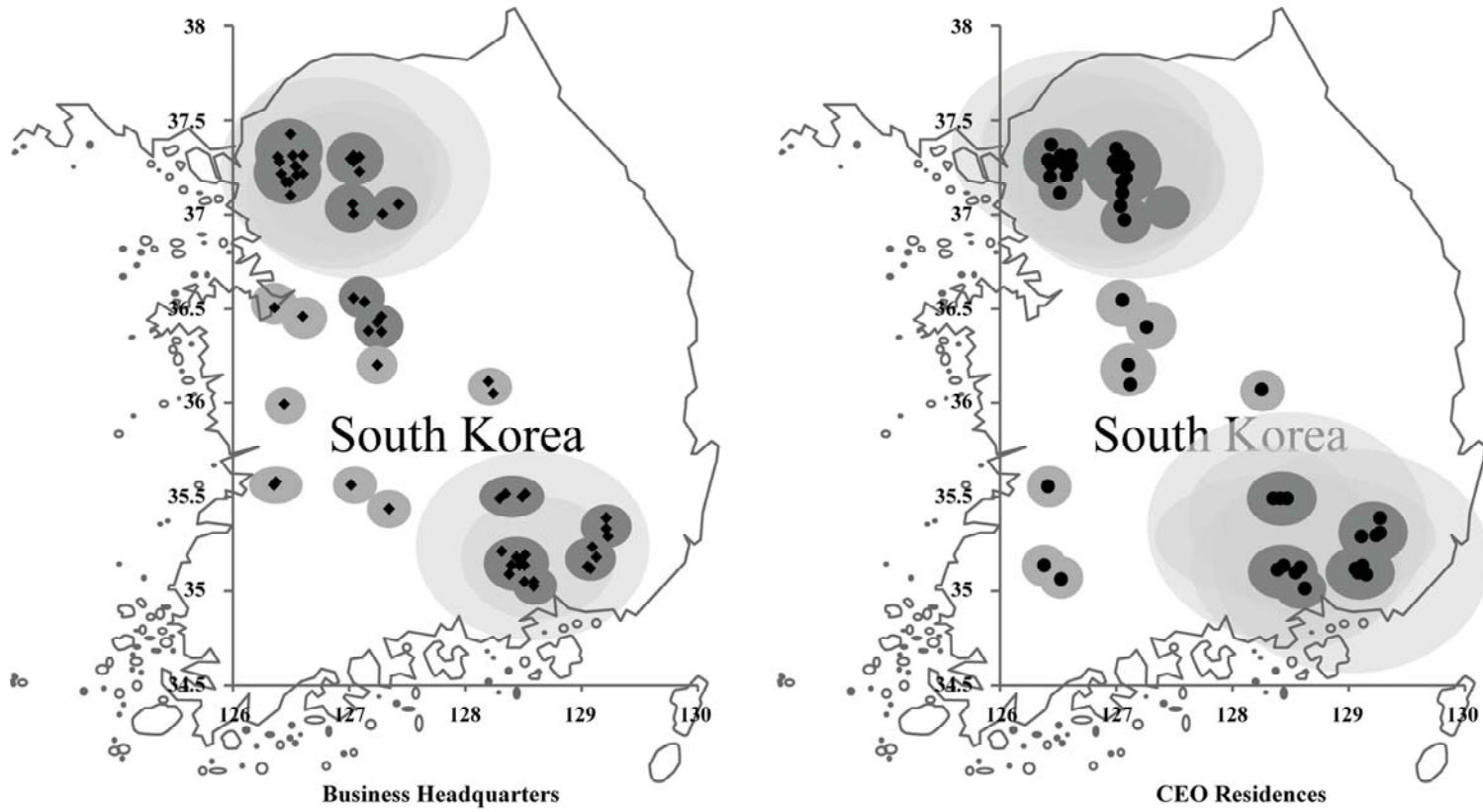
Our basic empirical test strategy is initially to identify the relationship between the *level* of the CEO's residential proximity and the *level* of accounting performance of the firms under the CEO's control. Next, we investigate whether *changes* in proximity are related to *changes* in corporate profitability over time within each sample firm. We implement the two tests, respectively, and confirm that both the *level* and *changes* of residential proximity are positively correlated with accounting performance, even after controlling for CEO- and industry-fixed effects.

Table 1 summarizes the distances from the CEOs' residences to the pairs of firms

TABLE 1—SUMMARY STATISTICS

This table displays information about the geographical distances between the sample firms' headquarters and their chief executive officers' residences, along with various characteristics of the firms. Panel A shows the distance data and accounting information as of the end of 2014. All distances are in kilometers. "Distance: CEO residence vs. HQ" is the shortest road length between the two locations, automatically calculated by a Korean local geographic information provider (map.naver.com). "Distance: HQ vs. HQ" is the shortest road length between two firms' headquarters under the condition that the two firms are controlled by the same CEO. Panel B presents the time-series variation of "Distance: CEO residence vs. HQ." All accounting information is on an annual basis. Bil KRW stands for Korean won in billions. For reference, one Korean billion won is approximately equal to one million US dollars. Total number of sample firms and CEOs are 127 and 66, respectively.

Panel A: Sample Firms' Characteristics (as of 2014)					
Variables	N	Mean	SD	Min	Max
Distance (km): CEO residence vs. HQ	103	62.02	93.09	0.00	388.54
Distance (km): HQ vs. HQ	64	102.90	118.25	0.00	464.00
Foundation Year	127	1992	9.17	1969	2007
Total Asset (Bil KRW)	127	44.97	33.92	10.65	204.00
Total Sales (Bil KRW)	127	48.40	36.74	2.35	173.00
Return on Equity (%)	127	4.83	6.70	-24.06	23.01
Gross Margin (%)	127	17.80	15.73	-29.69	76.57
Operating Margin (%)	127	3.85	7.98	-34.23	20.64
Net Income Margin (%)	127	2.97	8.72	-40.50	34.32
Panel B: Time-series of CEO Residential Proximity to the Corporate Headquarters					
Fiscal Year	N	Mean	SD	Min	Max
2010	90	53.20	78.34	1.53	359.18
2011	97	57.01	84.24	0.83	385.44
2012	101	59.47	88.09	0.00	385.44
2013	105	61.89	92.30	0.00	388.54
2014	103	62.02	93.09	0.00	388.54



This figure is a visual image of the geographic locations of 103 Korean private firms managed by CEOs who control at least two private firms as of the end of 2014. Numbers on the X-axis are the longitude, while those on the Y-axis express the latitude.

FIGURE 1. DISTRIBUTION OF CEOs RESIDENCE AND FIRMS UNDER THEIR CONTROL (AS OF THE END OF 2014)

controlled by each CEO. South Korea is roughly 500 kilometers long from north to south and major industrial complexes are concentrated around Seoul and Busan, the centers of the northern and southern economies. As shown in the table, the average distance between the CEO residence and the firms under their control is 62 kilometers, approximately 40 minutes when driving. By examining distances between the residence and companies which exceed 400 kilometers, we also find that a few CEOs live at one end of the country while managing companies located at the other. Figure 1 visualizes where CEOs lived and worked between 2010 and 2014.

Most of our sample firms are located in one of the two major industrial complexes, one around Seoul (northwest) and the other close to the city of Busan (southeast), while the location distribution of CEO residences is more widely spread outside the industrial complex areas. The fact that the locations of corporate headquarters are not always within reasonable driving distances from the CEOs' residences, as shown in Figure 1, implies that CEOs managing multiple private companies sometimes live far from their corporate headquarters and potentially show different commitment levels with regard to the daily operation of the companies. Measurement of the commuting distance as a proxy for the level of commitment means that the distance measured should reflect how much easier it becomes to undertake daily business operations once the distance is shortened. Therefore, we measure the distance not from a direct linear perspective but according to the driving distance, as the driving distance becomes a better proxy for the CEO's commitment to their business and, therefore, makes the actual driving distance a better measurement of commitment. Panel B in the table displays relatively minor mean variation across the years, implying that relocations of CEO residences or corporate headquarters do not occur frequently. The fact that CEOs do not move often also supports the contention that individuals' decisions to relocate their residences are not easy and, therefore, such relocations aptly deserve attention. From an econometric perspective, the fact that the distance between the CEO residence and corporate headquarters is not volatile over time creates a severe autocorrelation among the distance variable year over year. As a result, clustered standard errors of any regression analysis using the distance variable become inflated, weakening the power of such an analysis.

In Table 2, we regress the level of profitability of the sample firms on variables that may affect the profitability for each company.³ The key variable of interest is the level of the CEO's residential proximity to their corporate headquarters. In the regression, we control for size, leverage, and whether or not a given company is located in an industrial complex as designated by the Korea Industrial Complex Corporation, along with equity shareholdings of the company possessed by its CEO. As some CEOs are genuinely more capable of managing companies or companies in specific industries yield higher profit margins, we run regressions

³The CEOs of private firms may relocate their residences due to the reasons other than the level of their professional commitment. If a CEO's residential relocation is decided upon for educational or lifestyle reasons, this type of relocation is highly likely to bring them closer to either a metropolitan area or a high-end residential district. We find only six occasions of a change in address implying such advantages. For the empirical analyses in this paper, regressions are re-run after excluding the six cases. We find no significant changes in outcomes from the supplementary tests.

TABLE 2—LEVEL OF DISTANCE (CEO RESIDENCE VS. CORPORATE HQ) AND ACCOUNTING PERFORMANCE

This table displays the results of multivariate regressions where the dependent variables are accounting profitability measures. Fixed effects are controlled for identical business groups and industries. The four-digit and five-digit Korean Standard Industrial Classification Code (“KSIC”) specifications apply to the industry allocation for each sample firm. Explanatory variables include the distance between the CEO residence and the corporate headquarters (“HQ”) under his/her control at a given year. Growth in total assets (%) means year-over-year changes in total assets. CEO’s shareholding represents the percentage of equity shareholding that each CEO possesses for the companies under the individual’s control. The industry complex dummy equals one if the corporate headquarters are in an industrial complex. Whether a certain HQ is located in an industrial complex is determined based upon a guidebook released by the Korea Industrial Complex Corporation (www.kicox.or.kr/home/facility/sevice_link01.jsp). Free cash flow from financial activities denotes the net cash inflow from financing activities and directly comes from corporate cash flow statements. Cash flow from investment activities denotes net cash inflow from corporate actions related to capital expenditures and comes from the cash flow statements issued as a part of the financial statements externally audited and reported to DART (Data Analysis, Retrieval and Transfer), which is a data warehouse managed by the Korean Financial Supervisory Service (“FSS”). FCFE stands for free cash flow for the firm and refers to the net cash inflow during each fiscal year. Foundation year denotes the year when each sample firm was founded. Numbers in parentheses are t-values. ***, **, and * represent the 1%, 5%, and 10% significance levels, respectively.

Panel A: KSIC Four-digit Industry Classification			
Dependent Variable (%):	OP Margin	NP Margin	ROE
Distance (100km) (CEO residence vs. HQ)	-0.046* (-1.86)	-0.047* (-1.72)	-0.050* (-1.77)
Changes in capital investment (x10)	0.544 (0.37)	0.544 (0.34)	0.048 (0.29)
Debt-to-equity ratio	-0.135*** (-5.45)	-0.214*** (-7.88)	-0.116*** (-4.22)
CEO’s shareholding	-0.001 (-0.74)	-0.001 (-0.72)	-0.206 (-0.95)
Industrial complex dummy	-0.006 (-0.41)	-0.012 (-0.69)	-0.211 (-0.12)
Total assets (Mil KRW)	0.352* (1.88)	0.013 (0.06)	-0.033 (-1.60)
Growth in total assets (%)	-0.419 (0.24)	-0.354 (0.36)	-0.021 (-0.52)
Sales growth (%)	-0.458* (-1.79)	-0.953*** (-3.41)	-0.057** (-2.36)
Free cash flow from financial activities/FCFF	0.000 (1.06)	0.000 (1.68)	0.000 (-0.23)
Free cash flow from investment activities/FCFF	-0.010 (-0.81)	-0.009 (-0.66)	-0.008 (-0.59)
Foundation year	-0.012 (-0.08)	-0.070 (-0.45)	-0.010 (-0.64)
Business group (CEO) fixed effect	Y	Y	Y
Industry fixed effect (four-digit)	Y	Y	Y
R ²	30.0%	31.2%	36.2%
N	535	535	562

TABLE 2—LEVEL OF DISTANCE (CEO RESIDENCE VS. CORPORATE HQ) AND ACCOUNTING PERFORMANCE (*CONTINUED*)

Panel B: KSIC Five-digit Industry Classification			
Dependent Variable (%):	OP Margin	NP Margin	ROE
Distance (100km) (CEO residence vs. HQ)	-0.046*	-0.047*	-0.050*
	(-1.86)	(-1.71)	(-1.77)
Changes in capital investment (x10)	0.549	0.524	0.047
	(0.38)	(0.33)	(0.29)
Debt-to-equity ratio	-0.134***	-0.217***	-0.116***
	(-5.36)	(-7.90)	(-4.19)
CEO's shareholding	-0.001	-0.002	-0.207
	(-0.74)	(-0.74)	(-0.95)
Industrial complex dummy	-0.006	-0.012	-0.214
	(-0.41)	(-0.71)	(-0.12)
Total assets (Mil KRW)	0.354*	0.007	-0.033
	(1.89)	(0.03)	(-1.60)
Growth in total assets (%)	-0.422	-0.339	-0.021
	(-1.18)	(-0.87)	(-0.51)
Sales growth (%)	-0.455*	-0.969***	-0.058**
	(-1.77)	(-3.45)	(-2.36)
Free cash flow from financial activities/FCFF	0.000	0.000	0.000
	(1.07)	(1.52)	(-0.25)
Free cash flow from investment activities/FCFF	-0.010	-0.008	-0.008
	(-0.82)	(-0.61)	(-0.58)
Foundation year	-0.041	0.064	-7.640
	(-0.19)	(0.27)	(-0.31)
Business group (CEO) fixed effect	Y	Y	Y
Industry fixed effect (five-digit)	Y	Y	Y
R ²	30.0%	31.3%	36.2%
N	535	535	539

while factoring in the CEO and industry-specific fixed effects.

To determine whether the relationship between profitability and the CEO's residential proximity is robust, we employ three different profitability measures while controlling for industry-fixed effects with two separate industry classification codes, one in panel A and the other in panel B. In all of the different classifications, we witness positive correlations between profitability and proximity.

The CEOs of private firms may exert more effort if they see a potential profit in new investment projects. To address this possibility, we control for sales growth and the ages of sample firms. To check whether ongoing capital expenditure projects affect accounting profitability, cash flows from financing and investing activities, scaled by the total free cash flow, are also considered as control variables. Sales growth is found to have a negative impact on accounting profitability. This finding reveals that the firms studied here sacrifice margins to boost their sales turnover.

Next, Table 3 shows the results of firm-level analyses conducted to examine how the selection by a CEO of their residence location is linked to changes in corporate profitability. The regressions in the table use a value in excess of the industry average in the given year, except for changes in the CEO's shareholdings and relocation to an industrial complex. We regress year-over-year changes in the net profit margin on the changes of the distance between the CEO's residence and corporate headquarters along with changes in other control variables. We also use various industry specifications to calculate values in excess of the industry average, but the results are largely unaffected.

TABLE 3—YOY CHANGES IN CEO'S RESIDENTIAL PROXIMITY VS. INNOVATIONS OF EXCESS PROFITABILITY (WITHIN-FIRM ANALYSIS)

This table reports the results of multivariate regressions for which the dependent variable is the year-over-year (“YoY”) changes in net profit and explanatory variables include the CEO’s residential proximity to the corporate headquarters under the CEOs’ control. Other independent variables are changes in the asset growth rate and the YoY evolution of the debt-to-equity ratio. The two independent variables are numbers in excess of the industry average for each year. Fixed effects for the same business group and fiscal year are controlled for in all regression specifications. For each column, the sample period is from 2010 to 2014. For profitability measures, industry averages are calculated based upon four different industry specifications following the Korea Standard Industry Code (KSIC). “KSIC two-digit” is the broadest industry classification, while “KSIC five-digit” is the narrowest. The industrial complex dummy equals one if a firm’s headquarters newly moved into one of the industrial complexes specified by the Korea Industrial Complex Corporation. Numbers in parentheses are t-values. ***, **, and * represent the 1%, 5%, and 10% significance levels, respectively.

Industry Classification	Two-digit	Three-digit	Four-digit	Five-digit
YoY changes in distance (100km) (CEO residence vs. HQ)	-0.391*** (-3.78)	-0.518* (-1.92)	-0.480*** (-5.51)	-0.308*** (-3.30)
Excess asset growth (%)	-0.366** (-2.20)	-0.720* (-1.65)	-0.443*** (-3.11)	-0.345** (-2.28)
Changes in excess debt-to-equity ratio	-0.390*** (-4.68)	-0.312 (-1.42)	-0.298*** (-4.10)	-0.250*** (-3.28)
Changes in CEO's shareholding	-0.990 (-0.49)	-0.307 (-0.06)	-0.270 (-0.16)	0.037 (0.02)
Industrial complex dummy	-0.048 (-1.03)	-0.047 (-0.39)	-0.042 (-1.06)	-0.049 (-1.16)
Business group (CEO) fixed effect	Y	Y	Y	Y
Year fixed effect	Y	Y	Y	Y
N	330	330	330	330

The results shown in the table report that as the CEO’s residence becomes closer to their corporate headquarters, the net profit margin in excess of the industry average improves. This finding is consistent with the findings in Table 2, showing that there exists a positive relationship between a CEO’s residential proximity and their firm’s accounting profitability.

Tables 2 and 3 demonstrate the positive relationship between CEO residential proximity and accounting performance. Subsequently, we investigate under what circumstances CEOs relocate closer to their corporate headquarters. In Table 4, we compare the four-year average net profit margin before and after each of the relocations. We then calculate the differences in net profit margin for each relocation instance before and after the relocations and test whether the differences are statistically different from zero. Panel A in Table 4 shows that the net profit margins, on average, are lower before the CEOs relocate to be closer to their corporate headquarters, relative to the margins after this move. The differences in the net margins before and after the relocations are statistically different from zero (t -value= 1.84). We interpret this as meaning that the CEOs tend to relocate their residences when they witness the deteriorated level of the net profit margin. Subsequently, the margin improves after the CEOs relocate closer to the head offices, possibly showing greater levels of commitment to their business. In contrast, Panel C in the table shows that the average net margin declines after the

TABLE 4—CHANGES OF NET PROFITABILITY BEFORE/AFTER
CEOs MOVE CLOSER (AWAY) TO (FROM) CORPORATE HQS

This table compares the average net profitability of firms before and after the CEOs of private Korean firms relocate their residences closer to the corporate headquarters (panels A and B) or before and after they move further away from the head offices (panels C and D). The average net profitability is the four-year average value of net income/total sales. In panel A, “Before (After) Moving Closer to HQ” indicates the four-year average net profitability before (after) each of the closer relocations occurs. In panels B and D, the difference in the four-year average net profitability between the post-relocation and prior-relocation time points is calculated for each relocation case. The difference is then tested as to whether such a gap is statistically different from zero. “Before (After) Moving Away from HQ” in panel C denotes the four-year average net profitability before (after) each of the CEO relocations resulting in a longer commuting distance for the individuals. $Pr > |t|$ denotes the p-value. ** is the 5% significance level.

Panel A: Four-year Average NP Before/After CEOs Move Closer to HQ					
	N	Mean	SD	Min	Max
After Moving Closer to HQ	46	4.74%	6.48%	-10.06%	24.33%
Before Moving Closer to HQ	46	4.03%	5.70%	-14.30%	19.19%
Panel B: Difference in Average NP (Before vs. After CEOs Move Closer to HQ; Within Firm)					
	N	Mean	SE	t-value	Pr > t
4-yr Post-Relocation minus 4-yr Prior-Relocation	46	0.71%	2.62%	1.84**	7.26%
Panel C: Four-year Average NP Before/After CEOs Move Away From HQ					
	N	Mean	SD	Min	Max
After Moving Away from HQ	83	3.61%	4.02%	-8.76%	16.89%
Before Moving Away from HQ	83	4.29%	3.75%	-3.49%	16.67%
Panel D: Difference in Average NP (Before vs. After CEOs Move Away From HQ; Within Firm)					
	N	Mean	SE	t-value	Pr > t
4-yr Post-Relocation minus 4-yr Prior-Relocation	83	-0.68%	3.49%	-1.78**	7.83%

CEOs move away from the head offices and that the differences in the profitability before and after these types of relocations are statistically significant (t -value = -1.78).

Panel A in Table 5 shows the ten-year evolution of the net profit margin before and after CEOs move their residences closer to their head offices. The panel displays a downward trend of the margin before the relocations. The margin marks the lowest level (3.16% with a t -value of 2.03) immediately before the CEOs move closer. Profitability shows a slow improvement in the four years after the move. The profit margin eventually revives five years after the CEO relocations.

Panel B in the table displays the evolution of net profitability before and after the CEOs move further away from their corporate headquarters. The evolution of the average profitability in the panel indicates that profitability deteriorates as soon as the CEOs relocate farther from their head offices ($t+1$). After temporary rebounding ($t+2$ through $t+4$), the net margin returns to its lowest level ($t+5$). The empirical findings from panels A and B in Table V consistently report that private companies regain profitability as the top managers move their residences closer to the firms, while any relocation resulting in the executives having a longer commuting distance coincides with declines in the net profit margin.

The findings in Table 5 suggest a possible scenario about how CEOs react to changing levels of profit margins. It is not until the CEOs witness deteriorated margins for consecutive years that they eventually decide to move their residences

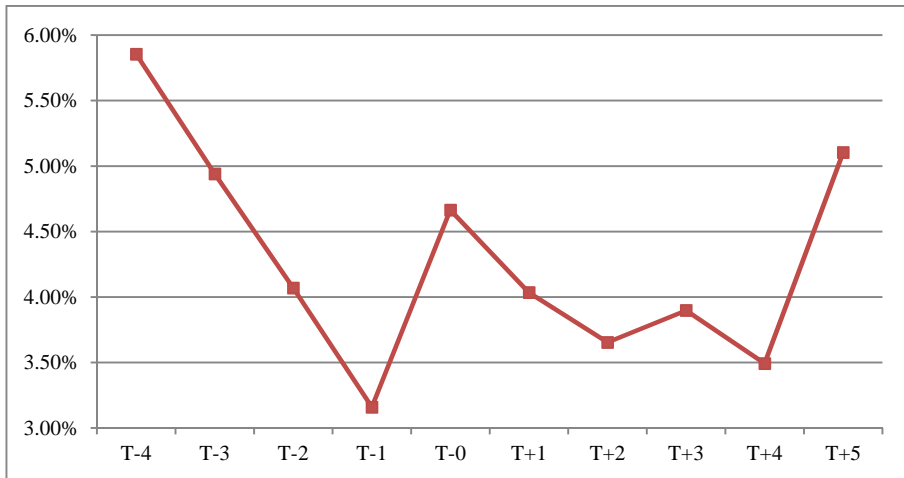
TABLE 5—EVOLUTION OF NET PROFITABILITY AROUND
CEOs' RESIDENTIAL RELOCATIONS TOWARD CORPORATE HQS

This table shows the changes in the average annual net profitability before and after the CEOs of private Korean companies move their residences closer to the corporate headquarters (panel A) and before and after the top managers move away from the head offices (panel B). The sample period ranges from 2000 to 2014. Average Net Profit means the average net profit of a given year for firms when their CEO moves their residence closer (away) to (from) the headquarters of the company under their control. "Year to CEO's Closer Relocation" presents the year(s) before or after the year of the relocations. Each instance of "Average Net Profit" is tested as to whether net profit is statistically different from zero, and the *t*-values from such tests are presented along with *p*-values ("Pr > |*t*|"). *** and ** stand for the 1% and 5% significance levels, respectively.

Panel A: Evolution of Net Profit Margin When CEOs Move Closer to Corporate HQs							
Year(s) to CEO's Closer Move	N	Average Net Profit	SD	Min	Max	<i>t</i> -value	Pr > <i>t</i>
T-4	39	5.85%	7.16%	-7.47%	34.62%	5.11***	<.0001
T-3	39	4.94%	6.53%	-7.10%	27.01%	4.72***	<.0001
T-2	41	4.07%	6.06%	-13.34%	27.71%	4.3***	0.000
T-1	43	3.16%	10.22%	-44.98%	27.71%	2.03**	0.049
T-0	46	4.66%	8.38%	-25.90%	29.99%	3.78	0.001
T+1	39	4.03%	7.29%	-19.75%	24.33%	3.45***	0.001
T+2	29	3.65%	4.45%	-7.69%	14.83%	4.42***	0.000
T+3	20	3.90%	4.87%	-5.94%	13.83%	3.58***	0.002
T+4	7	3.49%	10.30%	-14.86%	14.88%	0.9	0.404
T+5	7	5.10%	3.84%	0.91%	10.38%	3.51**	0.013
Panel B: Evolution of Net Profit Margin After CEOs Move Away from Corporate HQs							
Year(s) to CEO's Further Move	N	Average Net Profit	SD	Min	Max	<i>t</i> -value	Pr > <i>t</i>
T-2	52	2.99%	6.52%	-16.05%	20.76%	3.31***	0.002
T-1	58	4.50%	5.57%	-6.36%	21.64%	6.15***	<.0001
T-0	83	4.10%	6.06%	-8.76%	41.98%	6.16***	<.0001
T+1	77	2.68%	5.04%	-13.45%	12.42%	4.67***	<.0001
T+2	74	4.52%	5.27%	-5.94%	27.71%	7.38***	<.0001
T+3	64	4.05%	5.55%	-14.86%	15.99%	5.84***	<.0001
T+4	50	3.27%	6.58%	-25.82%	24.33%	3.52**	0.001
T+5	31	2.32%	5.62%	-10.14%	21.25%	2.3**	0.029

closer to their corporate head offices. Considering that CEO residential relocations cannot easily be executed often, the officers decide to move their homes closer to their offices only after finding profit margins have weakened for several years. Once the CEOs decide to commit themselves via their residential relocations, it takes additional years until the businesses that the CEOs manage fully regain healthy profitability. The results in panel A of Table 5 show that it requires five years for such revitalization. After this time, the profit margin rises to 5.10% (*t*-value=3.51), a level similar to where it was four years before the relocations.

Figure 2 provides a visualization of the data in Table 5, showing the evolution of the net profit margins in the ten years before and after the CEOs of Korean private companies moved closer to their corporate headquarters. This figure delivers an easier translation of the results from the table, confirming (1) that the CEOs move their homes closer to the corporate headquarters only after they find weakening profit margins for several years, (2) that they decide to relocate when the margin hits its lowest point, and (3) that it take an additional five years to turn around the sluggish business.



This figure is a visualization of Panel A in Table V, illustrating the time-varying trend of the annual net profit margin around the years when the CEOs of private Korean companies move their primary residences closer to the headquarters of the firms. The sample period is from 2000 to 2014, and the inspection window used to track the trend is ten years across the relocations. T-4 through T+5 denote the years before (after) the CEOs' relocations. Numbers (%) on the vertical axis represent the annual net profit margin.

FIGURE 2. EVOLUTION OF NET PROFITABILITY ACROSS CEOs' CLOSER RELOCATIONS TO CORPORATE HEADQUARTERS

As a final experiment, we study under what circumstances the CEOs of private companies relocate their residences closer to their corporate headquarters. If the motivation behind such relocations is to boost the profitability of the businesses managed by the CEOs, unsound profitability in the past should be linked to the CEOs' decisions. To test this possibility, in panel A of Table VI, we employ logistic regressions, with the dependent variable equal to one if the CEOs move closer to the head office in a given year and equal to zero otherwise. For the regression analyses, we include four-year average changes in the variables. The main component of such explanatory variables is the change of the net profit margin during the four years before the CEOs moved closer to the corporate head offices. Alternative possibilities are that (1) only certain types of CEOs or firms undertook residential relocations, and/or (2) only CEOs managing firms belonging to specific industries show such behavior. To control for these possibilities, we run the logistic regressions while taking fixed effects into account. In two of three regression specifications in panel A, poor performance in past influences CEOs to relocate closer to their corporate headquarters at 10% significance level.

Panel B in the table also shows how past performance is related to CEO relocation decisions, but based on a different specification. The dependent variable is a continuous variable, reflecting the changes in distance from previous years while explanatory variables include changes in the net profit margin at $t-1$. For this analysis, we only consider cases where the CEOs move closer to the headquarters by more than 10 kilometers. We find that the past year's decline of net profitability

is significantly related to the decision by the CEO to move closer. In detail, every decline by one basis point in net profitability results in the CEOs relocating their homes approximately two kilometers closer to the corporate headquarters. We do not find any significant relationship between minor distance changes (less than 10 kilometers) and previous net profitability. This type of reduction in the sample may hamper the reliability of our empirical tests, but apparently a more substantial relocation (a reduction of more than 10 kilometers in terms of the commuting distance) better captures the possibility that top executives move their homes closer to their corporate headquarters with serious resolutions. If a CEO decides to relocate closer to the headquarters to supervise her business more intensively, it makes more sense to move much closer to it rather than merely to move within same local community. We acknowledge that the small sample size in panel B may affect the reliability of the tests.

The results in Table 6 confirm that CEOs tend to relocate their residences closer to their headquarters when a negative trend in net profitability arises in the previous four years. Additionally, we find that the CEOs of such businesses are more likely to move closer to larger businesses (see the results from models 1 and 2 in the table). The positive relationship between CEO relocations and the size of the business implies that CEOs move closer to their head offices when their businesses are large, thus requiring of the CEOs more attention to their enterprises.

IV. Conclusion

Existing literature suitably documents what drives corporate CEOs to exert themselves to see their businesses thrive, mostly examining their motivation to maximize their expected monetary compensation. However, the literature rarely finds any specific channel through which CEOs commit to improve the management or performance of their companies. In this paper, using a unique dataset containing CEO residential information, we present a detailed examination of one channel by which CEOs dedicate themselves to better manage their companies.

For econometric concerns, residential relocation is not an event that occurs often and, therefore, year-over-year changes in residential proximity are seldom pronounced. This non-volatile nature of the variables (e.g., year-over-year changes in residential proximity) inflates the clustered standard errors for most of our analyses, weakening the power of this analysis. This caveat is inevitable considering the invariant nature of residential relocations. We explicitly acknowledge this concern and admit that the distinction can potentially exaggerate the power of such empirical tests.

The changes in residential addresses in this study are only detectable when the CEOs report such changes whenever they occur. When individuals fail to report to the public corporate registration system (www.iros.go.kr), the changes in their physical addresses become undetectable. In this sense, our analyses possibly omit cases in which CEOs actually move their residences but such relocations are not captured in our sample due to their failure to report the changes to the public registration system.

Studying a group of private companies managed by the same CEO while considering various fixed effects during the different analyses partially diminishes the risk of concluding false causation but admittedly is far from being complete. This paper nonetheless contributes to the current literature by presenting a new way to measure the level of CEO commitment.

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