Corporate Relocation and Housing Market Spillovers

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December 2020

Abstract: Using a comprehensive database of corporate relocation events in the U.S. from 1994 to 2017, we investigate the impact of headquarters relocation on the local economy by examining its spillover effects on the housing market. Our baseline results show that headquarters moving into a district is significantly associated with 10% higher housing price growth rate in the district. Moreover, we document a temporal spillover effect as housing prices increase one year before the relocation and rise further until two years afterwards, and a spatial spillover effect of corporate relocation on nearby districts' housing markets of up to 15 miles. We further find agglomeration economies exacerbate the effect of corporate relocation on the housing market. Overall, our study shows how corporate relocation exhibits positive spillovers to the local economy.

Keywords: Corporate Headquarters Relocation; Housing Market; Housing Price Speculation & Expectation; Spatial Spillover; Agglomeration Economies; Local Economic Activity

JEL Classifications: D22; R30; R31

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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1. Introduction

Relocating a company's headquarters is a significant decision for the firm. In general, firms relocate their headquarters when the perceived benefits outweigh the cost of moving. A large strand of the literature examines the rationales for firm relocation, and the general consensus is that firms relocate for lower taxes, lower operating expenses, more resources, or a more highly agglomerated economy (e.g., Burns, 1977; Davis and Henderson, 2008; Erickson and Wasylenko, 1980; Evans, 1973; Garcia-Mila and McGuire, 2002; Klier, 2006; Lovely et al., 2005; Strauss-Kahn and Vives, 2009; Voget, 2011). Prior studies also document a positive capital market reaction when the relocation is value enhancing (Alli et al., 1991; Chan et al., 1995; Ghosh et al., 1995; Tirtiroglu et al. 2004). However, few studies have investigated the impact of corporate relocation events on the local economy, despite theories that imply spillover effects through channels such as labor migration, wage substitution, or an agglomeration economy (Aksoy and Marshall, 1992; Coulson et al., 2013; Davis and Henderson, 2008; Kerr and Robert-Nicoud, 2020; Saiz and Wachter; 2011).

In this paper, we examine the externalities of how the impact of corporate headquarters relocation spills over to the local economy, with a particular focus on the residential real estate market. This market is interesting, because housing is not merely a consumption good, but is also used for speculative and investment purposes (Gao et al., 2019), thus enables investors to act early to profit on the relocation announcements. Moreover, real estate properties are spatially distributed and location-specific, and hence allow us to assess variation in the impacts of a relocation event across space (Pope and Pope, 2015).

Anecdotal evidence also implies that corporate headquarters relocation exerts a significant impact on the local housing market; the impact is felt before the actual relocation event, and it extends to more than one district. When Amazon announced in 2018 that it would build its second headquarters (HQ2), many cities submitted bids in the hope that HQ2 would boost local economic activities. However, there were also opponents, due to concerns about potential negative externalities induced as a result of HQ2's arrival. They argued that Amazon's new headquarters would cause skyrocketing residential housing prices that would, in turn, lower the supply of affordable housing (Garfield, 2018). These effects were clearly evident in Seattle, which is Amazon's first headquarters location. Amazon has rebutted these criticisms, contending that there is no evidence to imply any direct correlation between Amazon's hiring and local home prices

(Passy, 2019). Yet such worries quickly became a reality after Arlington, Virginia, was announced as HQ2's location. Housing prices started to rise in Arlington County and the surrounding area immediately after the announcement at the end of 2018 and long before Amazon's arrival. By the end of 2019—one year after Amazon's announcement—residential house prices in Arlington County had already increased by 33%, according to the financial news website Market Watch. The media extensively reported speculation on the local housing market in anticipation of Amazon's relocation event (e.g., McDonald, 2019; Telford et al., 2019). Moreover, evidence also shows a strong correlation between proximity to the HQ2 location and increases in housing prices (McLaughlin, 2019).

However, Amazon is not just any firm, because of its size and influence, and thus the appreciation in housing prices observed in its new headquarters location and the surrounding area may not be generalizable to other firms' headquarters relocations. Moreover, the importance of headquarters locations, and hence relocation, may have diminished over time due to globalization and the decentralization of corporations (Asu and Marshall, 1992). Further, some corporations may have relocated only on paper for tax reasons, without moving the bulk of their operations and employees to the new headquarters location. Lastly, the net effect of corporate headquarters relocation on the local economy and housing market is not obvious if existing firms are crowded out from the local area. In that case, existing firms exit the region, along with their employees, and may create downward pressure on the local economy and the housing market.[1]

In this study, we empirically analyze the impact of corporate relocation on the local economy by analyzing how its effect spills over to the housing market. As corporate headquarters relocation is expected to bring along an influx of labor and local input demand, we quantify its impact by providing an estimate of the general effect of corporate relocations on housing prices. Importantly, in addition to examining the contemporaneous effect of corporate relocations, we also assess the temporal spillover effect of how the impact of corporate relocation extends to the period before, due to speculation and expectation, and the period after, due to an increase in real economic activities. Further, we investigate how the effect of relocation spreads from the districts the corporate headquarters move into to nearby districts, due to spatial spillover. Lastly, we examine the enhanced impact of agglomeration economies induced by the relocated headquarters on the

[1] Several studies have examined the effects of opening of a Walmart store on local employment opportunities and investment and obtain mixed findings on the net effects on the region (Basker, 2005; Hicks, 2007; Khanna and Tice, 2000; Neumark et al., 2008).

local housing market. Overall, our study considers the important positive externalities of corporate relocation that extend beyond the mere increase of local input demand brought upon by the relocated firms.

To offer a comprehensive analysis of the relationship between corporate headquarters relocation and the local housing market, we employ a large sample of relocation events in the U.S. based on firms' business address in SEC filings. Specifically, we identify corporate relocation events in the U.S. over the period 1994-2017, with headquarters location data collected from Augmented 10-X Header Data in SEC filings.[2] We observe that corporate headquarters relocation, while not a common occurrence, is hardly a rare event. Over the sample period, the number of corporate relocations is 16,191, and the average annual rate of corporate relocation is 7.92%. We measure changes in local housing prices by districts (at Zip Code level) over the period 1997-2017 using data from the Zillow Home Value Index (ZHVI) of All Homes.

Our baseline results regarding the relation between corporate headquarters relocation and local housing markets reveal that relocation is significantly positively associated with housing price changes where the new headquarters is located. In the year of relocation, housing prices increase by 0.35% for districts with a corporate headquarters relocation. The impact is economically significant, translating into about 10% higher housing price growth for districts with a corporate headquarters relocation compared with those without. We also find that the positive association between corporate headquarters relocation and local housing price changes is increasing in the number of headquarters that relocate to a district.

Relocation events are commonly announced before the actual relocation year (Gregory and Lombard, 2005), so the local housing prices may start increasing before the year of the move. Housing prices may also continue to increase after the relocation, due to a boost in housing demand and surge in real economic activities that result from the firm's relocation. We thus examine the pre- and post-relocation impact of corporate headquarters relocation from the year before to the year after the relocation. We find that housing prices increase by 0.29% in the year before the relocation, which demonstrates a speculation and expectation effect of the relocation before relocation of employees and surge in local input demand brought upon by the relocation events. In the year after relocation, housing prices continue to increase by 0.34%, which signifies the

[2] We do not use location data from Compustat, because Compustat reports the address of a firm's *current* HQ location and backfills this information for previous years (Chow et al., 2018; Calluzzo et al., 2018).

prolonged economic impact of corporate relocation on the local housing market. When we extend the pre- and post-relocation impact to up to 3 years around a relocation event, we further find that housing prices increase in the second year by another 0.23% after relocation. The cumulative effect from year *t-1* to *t+2* translates into more than 30% higher growth in housing prices for districts with corporate relocation than in those without. Overall, these findings indicate that a corporate relocation exerts a strong effect on the housing market due to the *speculation and expectation* effect before the relocation, as well as the *real* effect from the surge in local economic activities induced by the arrival of the relocated headquarters.

Because the benefits that arise from the relocated headquarters could extend from the relocation district to the surrounding area, housing demand in those districts will also increase, which drives up prices. Hence, we also examine the spatial spillover effect of corporate relocation on nearby districts. We find that the positive spillover effect of corporate relocation indeed extends to neighboring regions, with the impact being the strongest for districts up to 5 miles from the relocated headquarters. The impact is economically significant and reflects about 19.6% higher growth in those districts than in districts without a nearby corporate relocation event. Further, the impact of the relocated headquarters is significant on local housing markets up to 15 miles from the new headquarters location, though its impact is decreasing in distance, consistent with the spatial attenuation of agglomeration economies (Rosenthal and Strange, 2020).

We next examine an unique and crucial channel through which corporate headquarters relocation affects the local housing market by the economies of agglomeration. The benefits of agglomeration can derive from the synergies of related businesses located in close proximity, given the cost reductions and gains in efficiency that result from such proximity (Abdel-Rahman, 1990; Dougal et al., 2015; Duranton and Puga, 2001). We document an agglomeration effect that increases housing prices when a firm relocates to a district in which other firms from the *same* industry locate their headquarters, and when the relocating firm belongs to the *same* industry as one of the top five major industries in the region.

A main concern regarding our empirical results is that the corporate headquarters relocation decision may not be exogenous. Certain latent location attributes could drive the corporate relocation decision and also affect local housing price dynamics. Hence, the association between corporate relocation and increases in housing prices could be spurious, and instead reflect the desirability of the location. We conduct a robustness analysis by creating a matched sample using the propensity score matching (PSM) method (e.g., Abadie and Imbens, 2006; Becker and Ichino, 2002; Campello et al, 2010). Specifically, we match districts on macroeconomic, time, and geographic factors, as well as the main policy factor that induce relocation decisions—the state-level corporate income tax changes (Chow et al, 2018; Heider and Ljungqvist, 2015). In addition, it is possible that our findings are subject to reverse causality: The relocation decision could be the outcome, instead of the determinant, of improving local economic activities in the region (Adelino et al. 2015). We address this endogeneity concern in another robustness analysis by employing a Bartik instrumental variable (IV) approach and use the shift-share prediction of the number of relocated firms as the instrument (e.g., Card, 2001; Ottaviano and Peri, 2006; Saiz and Wachter, 2011). This IV is highly correlated with actual relocation events, and is exogenous to economic conditions at the district level (Saiz, 2007). In further robustness tests, we employ additional control variables and include geographic and time fixed effects to better control for potential omitted variables, and we also refine our identification of headquarters relocations to address for potential measurement error. All these robustness tests generate results that are qualitatively similar to our main analysis.

Furthermore, we examine the heterogenous impact of firm size on the association of corporate relocations and the local housing market. The size of the relocated firms can affect the local housing market through two channels. The first channel is the firms' employee bases, since the influx of relocated employees gives rise to increased housing demand. We find that the impact of corporate relocation is indeed greater when the relocating firms have a higher total number of employees. The second channel is the direct economic input from larger relocated firms, which may lead to higher housing demand (Davidoff, 2006). We find confirming evidence that the impact of corporate relocation is greater for relocating firms with larger combined sizes moving into the district. These findings are further supported by the results in which cross-state relocations (that entail more human capital relocations and higher demand of local input) are observed to have larger impacts than relocations across cities or districts.

Lastly, it is possible that the incoming headquarters could also crowd out existing headquarters. We examine the simultaneous impact of corporate headquarters moving in and out of a district on the local housing market. While we continue to find a significant positive association of corporate headquarters moving into a district and changes in housing prices, we observe a marginally negative, but much smaller impact of headquarters moving out of a district before the relocation event. This finding implies that corporate relocation is not a zero-sum game, as it signifies the positive spillover effect of a corporate relocation event outweighs its negative crowding out effect.

Overall, our study contributes to the literature by showing that corporate headquarters relocation is an important firm event that has a significant spillover effect on the local residential real estate market. We add to the scant literature that examines how corporate decisions and performance affect local housing market dynamics where the firm or business is located. For instance, Pope and Pope (2015) show that the opening of a Walmart store increases nearby housing prices post-opening. However, the announcement effect before the official opening is only marginally significant, which indicates that there is little speculation effect associated with Walmart openings. Moreover, the spatial spillover effect of a Walmart opening is relatively small and limited to within 1 mile of the store's location. Our study documents much more significant temporal and spatial effects brought upon by a corporate relocation event. Coulson et al. (2013) show that earnings projections for corporations in an MSA positively predict future house prices in that MSA. They interpret their results as follows: Projected earnings growth for corporations in a given MSA forecasts the demand for labor—which, in turn, anticipates the demand in that MSA for housing for the new labor. We complement Coulson et al. (2013) by empirically showing the agglomeration effect through which corporate relocations could further engender local housing demand. Recent studies such as Butler et al. (2019) and Hartman-Glaser et al. (2019) show that IPOs have a positive spillover effect on local real estate markets where the firms are headquartered.[3] Joslin and Konchitchki (2018) show that changes in the profitability of firms headquartered within a region provide information on and implications for regional real estate valuation. To the best of our knowledge, our study is the first to provide comprehensive evidence on corporate headquarters relocation, which we find happens more frequently than commonly thought, for its impact on the real estate market.

In broader terms, our study also adds to the growing literature that examines the macroeconomic consequences of corporate entry and exit in a region. Adelino et al. (2017) show that the opening of startups, rather than the expansion of existing firms, is responsible for the majority of employment growth in a region. Greenstone et al. (2010) find that the productivity of

[3] In contrast, Cornaggia et al. (2019) show that IPOs stunt local economic growth when large firms grow outside of their local economies.

a region, measured by the total factor productivity of incumbent plants in an area, is higher with the entry of a large manufacturing plant in the same area. Bernstein et al. (2019) show that the bankruptcy of an establishment in a given area has an adverse effect on the local economy, which leads to lower growth of existing establishments and reduced entry of new establishments into the area. Pirinsky and Wang (2006) show that firms that relocate their headquarters have increased (decreased) stock price contagion with firms in the new (old) location. We contribute to this line of literature by exploring an interesting aspect of how such agglomeration effect spreads beyond the industry to the local economy, and in so doing, we demonstrate the general economic value for districts of having a cluster of firm headquarters close by.

Lastly, this study offers important implications for policymakers and market practitioners. Our findings imply that local regions must carefully consider unintended consequences when trying to attract corporate headquarters. Since corporate relocation events typically result in housing price appreciation, city and state policymakers must carefully weigh their potential benefits against the costs associated with local housing affordability and economic welfare. For market practitioners, our study implies that housing market forecasts should also take corporate spatial decisions into consideration, given the intertwined relationship of corporate policy and residential real estate prices.

The rest of the paper is organized as follows. Section 2 describes the sample selection process and presents descriptive statistics. Section 3 presents the empirical design, and baseline and main results of our analyses. Section 4 reports the results of robustness tests. Section 5 presents additional analyses, and Section 6 concludes.

2. Data

2.1 Sample Construction and Key Measures

We obtain our sample of corporate headquarters relocation events over the period from 1994 to 2017. The information on headquarters location is collected from the Augmented 10-X Header Data, which captures all of the information in the header section of 10-K/Q SEC filings on EDGAR. There are 1,285,447 filings for 42,368 firms with a unique Central Index Key (CIK) over the sample period. In each filing, we obtain the headquarters location from the firm’s business address, from which we then extract the corresponding information on the state, city and district by the five-digit Zip Code. Firms with incorrect business addresses and firms with incorrect state abbreviations are eliminated from the sample. Our final sample contains 1,194,158 company filings with valid headquarters information.

To identify the incidence of a corporate headquarters relocation, we identify changes in the business address in firms' SEC filings over the years, following the methodology of Chow et al. (2018) and Calluzzo et al. (2018). Instead of relying only on 10-K filings, as in prior studies, we also examine 10-Q filings, which provide richer information for our identification. We use the business address in each firm's *first* filing (10-K/Q) in year *t* as the initial headquarters location for the firm in year *t*. If the firm has a different business address in the first filing in year *t+1*, we consider that the firm relocated its headquarters in year *t*. Although the exact month of the relocation is not observable, using the change in business address in the first filing of the year provides a good identification strategy, because our data contain the quarterly report mandated by the SEC (i.e., the 10-Q filings).[4]

Since our identification strategy only requires the first filing, we eliminate subsequent filings after the first filing of the calendar year, which leaves us with 247,048 filings and firm-year observations. We further exclude observations in which filings for the subsequent year are missing. Our final sample contains 204,373 firm-year observations from 29,183 firms over the period 1994 to 2017. We obtain firm fundamental data from Compustat for our supplemental analysis.

We measure changes in housing prices at the district level, because spillovers are usually highly localized (Arzaghi and Henderson, 2008; Rosenthal and Strange, 2020). Following prior studies that examine housing markets, we gather our housing price data from the Zillow Home Value Index (ZHVI) of All Homes (e.g., Anenberg and Kung, 2020; Brown and Matsa, 2019; Lang, 2018; Raymond et al., 2016). Specifically, we collect the monthly housing price index at the district (Zip Code) level from ZHVI, which is available since April 1996, and use the index for December of each year as the calendar year-end housing price. The annual growth of the housing price in year *t* is thus calculated as the change in the housing price in logarithmic form from year *t-1* to year *t*. We obtain a sample of 347,446 district-year observations covering the period 1996 to 2017. Since our empirical analysis requires data on housing price changes, our final sample covers the period 1997 to 2017, with 315,137 district-year observations. Table IA1 in the Online Appendix further delineates the sample selection process.

[4] If the company relocates in calendar year *t+1* but before they file the first quarterly report, our identification of relocation time will be earlier than the actual time. However, this will not impact our conclusion regarding the speculation and expectation effects that occurred before our identified relocation time.

We control for macroeconomic fundamentals in our multivariate analyses. Personal income, at the core-based statistical area (CBSA) level, is obtained from the U.S. Bureau of Economic Analysis (BEA). Population and unemployment rate, available at the state level, are obtained from FRED Economic Data. We further obtain geographic information at Zip Code level from ESRI Limited.

2.2 Summary Statistics

Table 1 presents summary statistics for corporate headquarters relocation events over the sample period. The overall percentage of corporate headquarters relocation is 7.92%, and the total number of corporate relocations is 16,191. We further divide the relocation events into corporations that relocated across states, across cities, and across districts at Zip Code level. Of the 7.92% of firms that relocated their headquarters, an average of 3.10% per year relocated across states, 2.85% across cities within the same state, and 1.97% across districts within the same city. Figure 1 shows the distribution of corporate headquarters in the U.S. over the sample period. Panels A and B show the distribution at the beginning and the end of our sample period, respectively. Panel C shows the change in distribution over the sample period. Notably, California has experienced the most significant increases in the number of headquarters relocations moving into the state.

[--- Insert Table 1 about here ---]

Table 2 presents our descriptive statistics for variables used in the main empirical analysis. The average housing price is $198,000. The average annual change in housing prices, in logarithmic form, is 3.506%. $Relocation_t$, an indicator variable that equals one if a corporate headquarters relocates into the district in the year (zero otherwise), has a mean of 0.031. $Relocation\ Number_t$, the number of headquarters that move into the district in the year, has a mean of 0.042.[5] As for the macroeconomic variables that serve as controls in the empirical analysis, $Personal\ Income_t$ averages $38,440 per capita at the CBSA level, and $Population_t$ has a mean of 11.683 million at the state level. $Unemployment\ Rate_t$ over the sample period, at the state level, has a mean of 5.721%.

[5] Most districts with a corporate relocation event have one corporate headquarters relocating into the district in a given year (79.83%). The distribution of relocation events is 12.86% for 2 relocated firms in a district in a given year, and 7.31% for more than 2 relocated firms in a given year.

The probability of a district's experiencing a corporate relocation event within 5 miles, 5-10 miles, 10-15 miles, 15-20 miles, and 20-25 miles has a mean of 0.129, 0.236, 0.273, 0.291, and 0.295, respectively. We also examine agglomeration effect by including *Existing* HQ_{t-1} and *Existing HQ Same* $Industry_{t-1}$, which are indicator variables that equal one if the district has at least one existing headquarters and if the district has a relocated firm and at least one existing headquarters of a firm in the same industry (zero otherwise), respectively. The means of these two variables are 0.184 and 0.008. The mean of 0.008 translates into a probability of 25.8% (0.008/0.031) that the relocated firm would be in the same industry as an existing headquarters in the district given a corporate relocation event. *Top 5 Major* $Industry_{t-1}$, an indicator variable that equals one if the relocated firm belongs to one of the top five major industries in the state, has a mean of 0.026. This translates into a probability of 83.9% that the relocated firm would belong to one of the top five major industries of the state.

Relocated $Employee_t$, which is defined as the total number of employees from all relocated firms in thousands in a district, has a mean of 0.055. *Relocated* TA_t and *Relocated* MV_t, the sum of total assets and market values, in billions, of the relocated firms in a district, respectively, have means of 0.036 and 0.020.[6] We find that, given that a corporate relocation occurs, it is more likely the relocating firm has moved into the district from another state or from another city in the same state (both with probability of 0.014), than from another district within the same state and city (with probability of 0.007). The average number of relocations across state, city, and district are 0.017, 0.016 and 0.009, respectively. Lastly, *Move* Out_t, an indicator variable that equals one if at least one corporate headquarters relocates out of the district in the year (zero otherwise), has a mean of 0.030. We provide detailed definitions of all variables in the Appendix.

[--- Insert Table 2 about here ---]

3. Method and Results

3.1 Empirical Design

In this study, we propose that corporate headquarters relocation exerts a significant impact on the local housing market. We first examine the effect of corporate relocation on

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[6] The means are calculated across all districts with or without corporate relocation. At the firm level, the average total number of employees of the relocated firms is 3,662. The average total assets and market values of the relocated firms amount to USD 3.145 billion and 1.339 billion, respectively.

contemporaneous local housing price changes in the year of relocation by estimating the following model:

$$Y_t = \alpha + b_1\, Relocation_t + b_2\, Log\,(Personal\ Income_t) + b_3\, Log\,(Popoulation_t) + b_4\, Unemployment\ Rate_t\ + e_{it} \qquad \text{------ (I)}$$

The dependent variable, Y, measures the local housing price changes for the district in year t. The key variable of interest in model (I) is $Relocation_t$, an indicator variable that equals one if at least one corporate headquarters relocates into the district in the year (zero otherwise). We expect the coefficient of b_1 to be positive and significant if corporate relocation exerts a positive spillover effect on the local housing market. Alternatively, we also run model (I) with $Relocation\ Number_t$, which represents the number of corporate relocation events in the district in a given year, as the key variable of interest.

We control for several macroeconomic fundamentals that affect the housing market: income, population, and employment (e.g., Butler et al., 2019; Cornaggia et al., 2019). In all of our analyses, we control for the logarithmic forms of $Personal\ Income_t$ and $Population_t$, $Log\ (Personal\ Income_t)$ and $Log\ (Population_t)$, and $Unemployment\ Rate_t$. We expect that personal income and population have positive impacts on the housing market, while unemployment has a negative impact. To control for the time trend and other unobserved time-invariant location characteristics, we also include time (year) and geographic (CBSA) fixed effects in all of our regressions.

The impact of corporate headquarters relocation could extend to the period before the relocation because of speculation and expectation. Moreover, the increase in local input demand could have real prolonged effects on the housing market in the subsequent period. In Figure 2, we plot the average annual growth rate in housing price for districts with a corporate headquarters relocating into the district (Panel A), compared with those districts without any corporate headquarters relocation (Panel B), over the period from 8 years before to 5 years after the relocation event.[7] Panel A clearly demonstrates the presence of a speculation and expectation

[7] To better visualize the impact of relocation events, we plot the residuals after regressing the housing price growth on a set of dummy variables denoting year and district fixed effects. We also show a longer pre-relocation period in our graphical analysis to ensure there is little differential pre-trends between districts with and without headquarters relocation before the announcement dates of corporate relocations, which, albeit unobserved, are presumed to happen in advance of the actual events.

effect due to the relocation event, since the average local housing price growth rate jumps noticeably in about 2 to 3 years before the relocation event. This finding is consistent with the anecdotal evidence regarding Amazon's HQ2 and demonstrates housing price increases due to speculation and expectation after the relocation decision is announced to the public but well before the increase in local economic activities.[8] On the other hand, we observe no significant change in the housing price growth rate for districts without any headquarters relocation.

In the years after a relocation event, we observe that the average housing price growth rate remains higher in districts with corporate relocation events in the years after relocation, and it gradually reverts to a level closer to that of districts without a corporate relocation as time goes by. This finding documents the prolonged effect of headquarters relocation, which could be due to corporations moving their headquarters in phases or to the delayed effects of increased local economic activities and agglomeration. Nonetheless, it implies that corporate headquarters relocation induces a real and sustained economic boost to the local housing market.

We formally examine the pre-relocation and post-relocation spillover effects of corporate headquarters relocation events on the local housing market using a regression framework, by modifying equation (I) and estimating the following model:

$$Y_t = \alpha + b_{11}\,Relocation_t + b_{12}\,Relocation_{t+1} + b_{13}\,Relocation_{t-1} + b_2\,Log\,(Personal\ Income_t) + b_3\,Log\,(Popoulation_t) + b_4\,Unemployment\ Rate_t + e_{it} \qquad \text{------ (II)}$$

For model (II), the variables of interest are the series of indicator variables of $Relocation_t$, $Relocation_{t+1}$, and $Relocation_{t-1}$. $Relocation_{t+1}$ is the ex-ante pre-relocation indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in the *next* year (zero otherwise). If the corporate headquarters relocation event induces a speculation and expectation effect in the local housing market, we expect a positive and significant coefficient for b_{12}. $Relocation_{t-1}$ is the ex-post post-relocation indicator variable that equals one if there exists at

[8] Unfortunately, in our large-sample research design, it is impossible to obtain the exact announcement dates for the corporate headquarters relocation events. Moreover, the announcement dates contain measurement error as there could be media speculation before the official relocation announcements for some high-profile firms such as Amazon. Hence, one caveat of our research design is that we cannot further disentangle the announcement effect. Nonetheless, our research design enables us to evaluate the *total* speculation and expectation effect of corporate relocation before the actual relocation event.

least one corporate headquarters relocation into the district in the *past* year (zero otherwise). If the corporate headquarters relocation event exerts a real and prolonged impact on the local housing market, we expect a positive and significant coefficient for b_{13}. Similarly, we examine the pre-relocation and post-relocation effect for up to 3 years before and after,[9] by augmenting model (II) with additional pre- and post- indicators $Relocation_{t+2}$, $Relocation_{t-2}$, $Relocation_{t+3}$, and $Relocation_{t-3}$. We include the same set of control variables and time and geographic fixed effects as in model (I).

The impact of corporate headquarters relocation could also extend to nearby districts due to a spatial spillover effect, which implies the far-reaching impact corporate relocation events have on the local housing market. In our next analysis, we examine the spatial spillover effect in a district with respect to its proximity to the headquarters location. Prior studies have documented various spatial spillover effects for infrastructure and governmental spending (e.g., Baicker, 2005; Hanson and Roblin, 2013; Yu et al., 2013). More closely related to our study, Pope and Pope (2015) examine the spatial spillover effect of business operations (i.e., Walmart openings). To examine the spatial spillover effect of corporate headquarters relocation, we modify the independent variable, $Relocation_t$, and add a dummy variable that equals one and zero otherwise for nearby districts if there exists a corporate relocation event within 5 miles ($Relocation\ 5\ Miles_t$). We use the centroid of the district with the relocated headquarters and the centroids of nearby districts to measure distance. We estimate the following model:

$$Y_t = \alpha + b_{11}\, Relocation_t + b_{12}\, Relocation\ 5\ Miles_t + b_2\, Log\ (Personal\ Income_t) + b_3\, Log\ (Popoulation_t) + b_4\, Unemployment\ Rate_t + e_{it} \qquad \text{------ (III)}$$

For model (III), the variable of interest is the indicator variable $Relocation\ 5\ Miles_t$, which equals one if there exists at least one corporate headquarters relocation in nearby districts within 5 miles (zero otherwise). If the corporate headquarters relocation event generates a spatial spillover effect, we expect a positive and significant coefficient for b_{12}. Similarly, we examine the spatial spillover effects for up to 25 miles from the relocated headquarters, by augmenting model (III) with additional variables indicating relocation event in nearby districts within 5-10 miles ($Relocation\ 5\text{-}10\ Miles_t$), within 10-15 miles ($Relocation\ 10\text{-}15\ Miles_t$), within 15-20 miles

[9] We constrain our regression analysis to include pre- and post- indicators up to 3 years before and after the relocation events to avoid excluding more samples in early and late years of the sample period.

(*Relocation 15-20 Miles*$_t$), and within 20-25 miles (*Relocation 20-25 Miles*$_t$). We include the same set of control variables, along with time and geographic fixed effects, as in model (I).

3.2 Baseline Results on the Effect of Headquarters Relocation on Housing Price

For our baseline empirical analysis, we estimate model (I) using OLS regressions with time (year) and geographic (CBSA) fixed effects. In all regressions, we control for potential cross-correlation by clustering robust standard errors at the city level. Table 3 reports the estimation results. In Columns (1) and (2), we report the regression estimation results of model (I) without and with the control variables, respectively, with year and CBSA fixed effects. The results show that the coefficients on $Relocation_t$ are significantly positive (at the 1% level) in both columns, which implies that the annual local housing price changes for districts that have at least one corporate headquarters relocation event are statistically higher than for those without. The coefficients for b_1 in Columns (1) and (2) are 0.3560 and 0.3520, which translate into 10.2% and 10.0% incremental increases in log housing price changes, respectively for districts with corporate headquarters relocation compared with those without.

Columns (3) and (4) present the results of replacing $Relocation_t$ with *Relocation Number*$_t$. We continue to find strong positive associations (statistically significant at the 1% level) between *Relocation Number*$_t$ and local housing price changes. The findings indicate that the positive association between corporate headquarters relocation and housing price changes is increasing in the number of headquarters relocating to the district.

[--- Insert Table 3 about here ---]

3.3 Temporal Effect of Headquarters Relocation on Housing Price

In Table 4, we present the estimation results of model (II). In Columns (1) and (2), we report the results without and with the control variables, respectively, and with the inclusion of year and CBSA fixed effects. In both columns, we find that $Relocation_t$ continues to be positively significant (at the 1% level). We also find that the variables of $Relocation_{t+1}$ and $Relocation_{t-1}$ are both significant (at the 1% level). The differences in coefficient estimates between these variables (b_{11} versus b_{12} versus b_{13}) are statistically insignificant, which indicates that the increases in housing prices that occur before the relocation due to the speculation and expectation effect are comparable to the contemporaneous and post-relocation effects due to the real economic impacts of relocation. This result provides strong evidence of speculation and expectation in the local housing market, which shows that a substantial proportion of the increases in housing prices occur before the influx of employees and before the increases in real local input demand from the relocated headquarters. The finding on post-relocation also shows that the real economic impact of relocation extends beyond the year of the corporate relocation event. Overall, the combined effect of corporate headquarters relocation on the local housing market is substantial. The sums of the coefficients for b_{11} to b_{13} in Columns (1) and (2) are 0.9176 and 0.8998, respectively, which translate into a cumulative effect of 26.2% and 25.7% higher growth in log housing price over the period from year *t-1* to *t+1* for districts with corporate relocation compared with those without. We report similar findings in Columns (3) to (6) when we examine pre-relocation and post-relocation effect over the period year *t-3* to *t+3*. In addition, we find consistently significant results whereby the impact of the relocation event also extends to 2 years after the relocation, as the variable $Relocation_{t-2}$ is positively significant across all specifications (at the 1% or 5% level). Overall, the cumulative effect from year *t-1* to *t+2* translates into an average of about 31.4% higher housing price growth for districts with corporate relocation compared with those without.

[--- Insert Table 4 about here ---]

3.4 Spatial Effect of Headquarters Relocation on Housing Price

In Table 5, we present the estimation results for model (III). In Columns (1) and (2), we report the results without and with the control variables, respectively, and with the inclusion of year and CBSA fixed effects. In both columns, we find that $Relocation_t$ continues to be positively significant (at the 5% level). Importantly, we find that the impact on housing price growth is highly significant for nearby districts in close proximity to districts with relocated headquarters within 5 miles (at the 1% level). The effect on these nearby districts is even stronger than the effect on the host district, with the differences in the coefficient estimates between these variables (b_{11} versus b_{12}) statistically significant (at the 1% level). We attribute our findings to the possibility that many headquarters are clustered and specialized in business districts within a city (Ono, 2006; Tonts and Taylor, 2010), and close proximity to commercial districts may impose negative externalities such as noise or congestion (Li and Brown, 1980).

Overall, the economic impact on nearby districts is highly significant, and reflects an average of about 19.6% higher growth in these nearby districts within 5 miles compared with those without a corporate relocation event nearby. We report findings in Columns (3) to (6) when we examine the spatial spillover effect at greater distances. The influence of a corporate headquarters relocation is also significant for districts within 5-10 miles, but the effect is decreasing in distance. The differences in the coefficients for relocations within 5 miles and within 5-10 miles are statistically significant (at the 1% level). We further find that the effect of corporate relocation remains significant for districts within 10-15 miles, but the impact is again decreasing. Overall, our findings indicate that the increases in housing pricing changes are notably stronger in districts closer to the corporate relocation event, consistent with the findings of Pope and Pope (2015); however, we document much more substantial spatial spillover effects than they do. Assuming a driving speed of 30 miles/hour, our findings indicate that a corporate relocation event can affect local housing markets within 30 minutes' driving distance from the relocated headquarters.

[--- Insert Table 5 about here ---]

3.5 Agglomeration Economies Effect of Headquarters Relocation on Housing Price

The increased local economic activity and boost to the local housing market could be due to agglomeration economies, as firms benefit from talent pool and knowledge spillover by locating in proximity to each other. Some firms are seen as drivers of local economic activity not only because they provide exogenous spending, but also because they act as triggers for agglomeration (e.g., Davis and Henderson, 2008; Tesla, 2006). Shilton and Stanley (1999), for example, show that locations with more corporate headquarters are associated with higher income per capita. The prestige and branding of corporations in one region may help in attracting more investment and a better workforce (Tesla, 2006). When more firms in related business fields cluster together, their costs of production may decline significantly due to competing multiple suppliers, greater specialization, and division of labor. As agglomeration derives predominantly from synergies with related businesses (Abdel-Rahman, 1990; Dougal et al., 2015; Duranton and Puga, 2001), we next examine the agglomeration effect when the relocated and existing firms in the district belong to the same industry. We test our conjecture by estimating the following model:

$$Y_t = \alpha + b_{11}\, Relocation_t + b_{12}\, Existing\ HQ_{t-1} + b_{13}\, Relocation_t * Existing\ HQ_{t-1} + b_{14}\, Relocation_t * Existing\ HQ\ Same\ Industry_{t-1} + b_2\, Log\ (Personal\ Income_t) + b_3\ Log\ (Popoulation_t) + b_4\, Unemployment\ Rate_t + e_{it} \quad \text{------ (IV)}$$

For model (IV), the variable of interest is the interaction term of $Relocation_t$ and $Existing\ HQ\ Same\ Industry_{t-1}$, which equals one (zero otherwise) if the relocated firm belongs to the same industry as at least one of the firms with existing headquarters in the same district. We conjecture that agglomeration could further increase prices in the local housing market when the relocated firm belongs to the same industry as the existing firms in the district.

In Table 6, we present the estimation results for model (IV) in Columns (1) and (2), without and with the control variables, respectively, and with the inclusion of year and CBSA fixed effects. In both columns, we continue to find the coefficients on $Relocation_t$ positively significant (at the 5% level). We also find that $Existing\ HQ_{t-1}$ has a positive impact on increasing local housing prices. This finding corresponds to Shilton and Stanley (1999), who show that the number of headquarters is positively associated with the per capita income of a region.

Importantly, while we do not observe an agglomeration effect between $Relocation_t$ and $Existing\ HQ_{t-1}$, we find significant positive coefficients (at the 10% level) for the interaction term $Relocation_t$*$Existing\ HQ\ Same\ Industry_{t-1}$. The findings imply that local housing prices increase when the relocating firm belongs to the same industry as at least one of the existing firms with headquarters in the district.

Alternatively, agglomeration economies do not necessitate the clustering of firms' headquarters. Firms can benefit by locating in proximity to their suppliers, customers, or intermediaries. To further examine the importance of agglomeration economies on the relationship between corporate headquarters relocation and housing price, we estimate the following model:

$$Y_t = \alpha + b_{11}\ Relocation_t + b_{12} Relocation_t * Top\ 5\ Major\ Industry_{t-1} + b_2 Log\ (Personal\ Income_t) + b_3\ Log\ (Popoulation_t) + b_4 Unemployment\ Rate_t\ + e_{it} \quad \text{------ (V)}$$

For model (V), the variable of interest is the interaction term of $Relocation_t$ and $Top\ 5\ Major\ Industry_{t-1}$, which equals one (zero otherwise) if the relocated firm belongs to the top five major industries in the state. In Table 6, we present the estimation results for model (V) in Columns (3) and (4). In both columns, the coefficients of $Relocation_t$ are no longer significant. However, we find significant positive coefficients (at the 5% and 10% level, respectively) for the interaction term $Relocation_t$*$Top\ 5\ Major\ Industry_{t-1}$. The findings imply that the impact of corporate relocation on increases in local housing prices is predominantly driven by relocating firms that belong to the same major industries in the region. Overall, these results are consistent with prior studies (e.g., Dougal et al., 2015), whereby agglomeration benefits from firms in similar industries that locate in proximity to each other. Our findings show that this agglomeration effect is also apparent, and it spills over to the local economy, as it exerts a positive effect on the housing market. This channel also explains the observed decreasing spatial spillover effect up to 15 miles in nearby districts, because agglomeration economies attenuate in space (Rosenthal and Strange, 2020).

4. Robustness Analysis

A corporate headquarters relocation decision may be driven by the unobserved desirability of a location that also affects housing prices. Reverse causality may also be present, especially for the result for housing speculation in the year before the relocation; this is because the relocation decision could be the outcome of increasing local economic activities, which are reflected in rising housing prices, in the region. Adelino et al. (2015) show that MSAs with the highest housing price increases experience the largest increases in establishment growth. Hence, a booming local economy could be the driving factor for a firm's relocation decision. Lastly, since the exact announcement dates of the relocation events are unobserved, our findings are subject to potential measurement error on our key variable of interest. To alleviate these concerns regarding unobserved heterogeneity, endogeneity, and measurement error, we implement several robustness testing strategies: a propensity score matching approach, an instrumental variable analysis, controlling for additional variables and fixed effects, and alternative identifications of relocation events.

4.1 Addressing Unobserved Heterogeneity Using a Propensity Score Matching Approach

To match relocation districts with those without relocation, we estimate the propensity score on the likelihood of relocation for each district, using macroeconomic factors and CBSA and year fixed effects as explanatory variables. As documented by Chow et al. (2018), corporate income tax movements at the state level significantly impact corporate relocation decisions, so we also include two dummy variables for tax cut and tax increase in the previous year (Chow et al. 2018; Heider and Ljungqvist 2015) to proxy for factors that affect firms' relocation decisions. Specifically, we regress $Relocation_t$ on these variables using probit regression, and the result is reported in Column (1) of Panel A, Table 7. After projecting all of the districts into this propensity score space, we then match each district that has at least one corporate relocation event with the districts without such events based on the closest estimated propensity score.

Following Campello et al. (2002), we then validate that districts with a relocation event (the treatment sample) and the matched districts without a relocation event (the control sample) have balanced distributions in propensity scores. Figure 3 presents the propensity scores of the treatment and control samples before and after matching for $Relocation_t$. Finally, we estimate the treatment effect in model (I) using the matched subsamples (Abadie and Imbens, 2006). In Columns (2) and (3) of Table 7 Panel A, we present the estimation results for the matched sample tests. We find that our main findings remain intact under the matched sample design.

[--- Insert Table 7 about here ---]

4.2 Addressing Endogeneity Concern Using an Instrumental Variable Approach

Next, we employ an IV approach to address the endogeneity concern. Ideally, the IV should correlate with the decision to relocate corporate headquarters, but it should be exogenous to local economic activity and housing prices. We follow the methodology of Bartik (1991)[10] and predict the number of headquarters relocating into a district in year *t* using the shift-share approach. Specifically, for each industry, we use the number of headquarters in a district,[11] relative to the nation's total number of firms in that industry, in year *t-1* as the previous share in the district. We then calculate *shift-share* in the district as the product of this share measure in year *t-1* and the total number of relocating firms in the same industry *across the U.S.* in year *t.* The predicted number of relocated headquarters in the district is equal to the sum of the *shift-shares* across all industries. We use this shift-share predictor as an instrument for $Relocation_t$ in the first-stage regressions. The assumption is that the existing industry distribution would attract firms in the same industry to relocate into the district due to agglomeration, but the total number of relocations at the national level is exogenous to local economic activities at the district level (Saiz, 2007). We further test the validity of our instrument by ensuring the ex-ante distribution of industries has little association with subsequent changes in housing prices, following the methodologies in Goldsmith-Pinkham et al. (2020). First, we test the impact of industry share at time t-1, measured by the

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[10] The Bartik (1991) IV methodology has been used widely in economics literature. For example, see Card (2001); Ottaviano and Peri (2006); Saiz (2007); and Saiz and Wachter (2011).

[11] We follow the industry classification from the SEC (https://www.sec.gov/info/edgar/siccodes.htm).

number of headquarters in an industry in that district divided by the country's total number of firms in that industry, on housing price growth. Second, we test the impact of industry concertation at time t-1, measured by the Herfindahl-Hirschman Index (HHI) of industry types in that district, on housing price growth at time t. The results are consistent with the exclusion restriction required for our instrument, and they are presented in Online Appendix Table IA2.

The first-stage IV results are presented in Columns (1) and (2) of Table 7 Panel B, which show that the Bartik predictor is highly positively correlated with the test variable $Relocation_t$ in both regression specifications (significant at the 1% level). The F-statistics for the first-stage estimations are over 200 and highly significant, which demonstrates that our instrument is strong. We then report the second-stage IV estimation results in Columns (3) and (4) of Panel B. We continue to observe a significant impact of corporate relocation on housing price changes.[12]

4.3 Addressing Omitted Variable Biases by Including Additional Controls

Third, we further alleviate unobserved heterogeneity and endogeneity concerns by including additional controls in the regression models. In our main analysis, we include controls for time and CBSA fixed effects. However, some influential observed or unobserved factors, such as state taxation, may vary at the state level. While the CBSA fixed effects should encompass most unobserved variations across states, we replicate model (I) by replacing CBSA with state fixed effects. The results, reported in Online Appendix Table IA4 Panel A, confirm that our findings are robust to the inclusion of state fixed effects.

In addition, the time and geographic fixed effects in our baseline models could only control for time trend and time-invariant features at the district level. To better capture the impact of unobserved time-variant factors that might influence relocation decisions, we further include the state times year fixed effects in the model as a robustness check. The estimation results are presented in Online Appendix Table IA4 Panel B, which indicate that our findings remain robust.

Furthermore, to deal with the potential endogeneity issue in model (I), whereby the previous housing price growth in a district could both impact a later relocation decision and be serially correlated with later housing price growth, we include prior housing price growth in year

[12] We also adopt the PSM approach and the IV analysis to ascertain the pre-relocation and post-relocation effect of relocation events. The results are presented in Panels A and B of Online Appendix Table IA3, respectively. We continue to find that the relocation event exerts a positive impact on the local housing market in the year before and the year after relocation.

t-1 as an additional control variable in model (I). Also, most studies on housing returns (e.g., Butler et al., 2019; Huang and Tang, 2012; Saiz, 2010) include variations in income, population, and unemployment as controls. We do not include population density with population in our main analysis, since these two variables are highly correlated. Nor do we include urbanization rate in the main analysis, as this is available from the U.S. Census only every 10 years, and thus the same rate must be applied for the in-between years (Huang and Tang, 2012). Nonetheless, we include these additional control variables as a robustness check. Our findings remain robust as presented in Online Appendix Table IA5.

4.4 Alternative Identifications of Headquarters Relocation Events

In this section, we discuss an additional robustness analysis using the alternative identification of headquarters relocation events. Although the Augmented 10-X Header Data has headquarters location information that is updated each year, it does not report the exact dates of the relocation events. In the main test, we compare the first SEC filings at the beginning of year *t* and year *t+1* to infer whether a relocation has taken place in year *t*. Noteworthy that relocations could have occurred after the calendar year-end but before the first 10-K/Q filing in the next calendar year, which introduces a bias whereby we measure contemporaneous house price changes before the actual relocation event date.

To address this potential measurement issue, we further compare the first and last filings of year *t*. If the address in the last filing of year *t* differs from that of the first filing, we confirm that the relocation occurred in year *t*. If the address remains unchanged in all filings in year *t* but is changed from the last filing in year *t* to the first filing in year *t+1*, we propose two alternative identification methods for robustness: (1) we designate the relocation as having occurred in the next year instead; (2) we exclude these relocation events from our sample. These two methods generate results consistent with our main findings, and we report the estimation results in Online Appendix Table IA6.

5. Additional Analysis

5.1 The Heterogeneity Effects of Employees and Economic Bases

We next conduct heterogenous analyses to examine conditions in which corporate headquarters relocation events could exert differential impact on the local housing market. An extensive literature links the local labor market with housing demand (Abraham and Hendershott, 1996; Capozza et al., 2002; Coulson et al., 2013; Hwang and Quigley, 2006; Jud and Winkler, 2002; Malpezzi, 1999). Hence, with corporate relocation, we would expect that a larger influx of these skilled employees into the district of the relocated headquarters would trigger higher demand for local housing, and thereby increase housing prices. We test our conjecture by modifying model (I) and estimating the following equation:

$$Y_t = \alpha + b_1 \, Log\ (Relocated\ Employee_t) + b_2 \, Log\ (Personal\ Income_t) + b_3 \, Log\ (Popoulation_t) + b_4 \, Unemployment\ Rate_t + e_{it} \quad \text{------ (VI)}$$

For model (VI), the variable of interest is the logarithmic forms of *Relocation Employee*$_t$, which represents the sum of the total number of employees of the relocated firms (expressed in hundred thousands) in a district in a given year.[13] If the corporate headquarters relocation event affects the local housing market via an influx or the expectation of an influx of employees, we expect a positive and significant coefficient for this variables.

In Table 8 Panel A, we present the estimation results for model (VI) in Columns (1) and (2), without and with the control variables, respectively, and with the inclusion of year and CBSA fixed effects. In both columns, we find that the coefficients of *Log (Relocated Employee*$_t$*)* are positively significant (at the 1% level). These results show that employees at the relocating firms exert a substantial impact on the local housing market. The findings imply that an influx of employees due to the relocation of corporate headquarters has increased the demand for local housing.

[--- Insert Table 8 about here ---]

Relocated corporations could engender demand for local inputs, most notably for business services and other non-tradable goods. For instance, Moretti (2010) finds a multiplier effect of additional jobs created in local goods and services markets when a new business enters the region. Coulson et al. (2013) use the earnings projections of corporations in an MSA to predict future housing prices in that MSA and document a positive association. Along this line, relocated

[13] One caveat is that we do not observe the exact number of employees relocating into the district, as the detailed data on the number of employees working in corporate *headquarters* is not available from Compustat. Nonetheless, as a company's headquarters is where most employees are located, we believe that the total number of employees of a firm is a good proxy for and proportional to employees at the headquarters location, and any evidence to the contrary would bias against our findings.

headquarters with higher economic bases may boost local input demand, leading to a stronger economy for the district and higher demand for local housing. We test our conjecture by estimating the following:

$$Y_t = \alpha + b_1\, Log\ (Relocated\ TA_t) + b_2\, Log\ (Personal\ Income_t) + b_3\, Log\ (Popoulation_t) + b_4\, Unemployment\ Rate_t + e_{it} \quad \text{------ (VII)}$$

For model (VII), the variable of interest is the logarithmic forms of *Relocation* TA_t, which represents the sum of total assets of the relocated firms (scaled by billions) in a district in year *t*. If the corporate headquarters relocation event affects the local housing market via the increase in local input demand from the relocated headquarters, we expect the spillover effect to be greater for larger firms. Hence, we expect a positive and significant coefficient for this variable.

In Table 8 Panel A, we present the estimation results for model (VII) in Columns (3) and (4). In both columns, we find that the coefficients of *Log (Relocated* TA_t*)* are positively significant (at the 1% level). We report in Columns (5) and (6) similar findings using the sum of the market values of firms as an alternative proxy of firm size. Overall, these findings imply that the larger the economic bases of relocated firms, the more significant the impact on the local housing market.[14]

5.2 The Heterogeneity Effects of Relocation Distance

Gregory and Lombart (2005) argue that the relocation distance matters, because short-distance relocation is local in nature and has little impact on the firm and its employees, whereas long-distance relocation could induce corporate upheaval because it creates the most disruptions, such as changing vendors for local services and relocating employees. We next examine the heterogeneous impact of relocation on the local housing market across relocation distances. We classify all relocations into relocations across states, across cities, and across districts.[15] We expect the impact to be strongest for relocations across states, because such relocations would most likely

[14] In results presented in Online Appendix Table IA7, we also scale *Relocated* $Employee_t$ by population, and *Relocated* TA_t and *Relocated* MV_t by local GDP, to capture the *relative* impact of the relocated firms to total local economy. We continue to observe significant positive coefficients for these variables.

[15] Note that we do not use raw distances in the test, as one should not expect a different level of disruptions when the relocation is beyond a certain distance (for instance, it would be equally disruptive for a firm to move to California from Florida or New York).

involve relocating existing employees, hiring new employees, increases in demand for local inputs, and agglomeration economies with firms at the new location. To test this impact, we modify our baseline model (I) by replacing $Relocation_t$ with a series of explanatory variables to indicate relocation events across states, cities, or districts, respectively:

$$Y_t = \alpha + b_{11}\, Relocation\ State_t + b_{12}\, Relocation\ City_t + b_{13}\, Relocation\ District_t + b_2\, Log\ (Personal\ Income)_t + b_3\ Log\ (Popoulation)_t + b_4\, Unemployment\ Rate_t\ + e_{it} \qquad \text{------ (VIII)}$$

In Columns (1) and (2) of Table 8 Panel B, we present the estimation results for model (VIII). We find that the impact on local housing market returns is statistically significant predominantly for relocations across states (at the 1% level), but less so for relocations across cities within the same state or across districts within the same city. Moreover, we further replace the binary explanatory variables with a set of continuous variables equal to the number of relocated firms across states, cities, or districts. The estimation results are reported in Columns (3) and (4) of Table 8, and similar conclusions are obtained.

The results confirm our expectation that the impact on the local housing market is the strongest when the corporate relocation event brings a remote headquarters into the district. In contrast, headquarters that are already located in the same state or city do not seem to exert the same impact on the local housing market. These findings also align with our channel analysis results, which indicate that the positive spillover effect of corporate headquarters relocation could be limited if a firm is only moving the corporate headquarters to a nearby district or city, without a need for its employees to relocate or to change vendors for local input demand.

5.3 The Moving Out Effect of Relocation

If a corporate relocation event leads to housing price appreciation in the district with an incoming headquarters relocation, but its crowding-out effect leads to housing price depreciation due to an outgoing headquarters, such an event could be a zero-sum game. We conduct an additional analysis to examine the simultaneous impact of corporate headquarters moving in and out of a district on the local housing market. We do so by augmenting model (II) with an additional indicator variable, $Move\ Out_t$, that equals one (zero otherwise) if the district has any existing headquarters relocating out of the district, and its pre- and post-relocation variables from 1 year to up to 3 years. We also include *Existing* HQ_{t-1} as a control variable, since it is a precondition that a district must have an existing headquarters for the moving-out of a headquarters. We estimate the following model:

$$Y_t = \alpha + b_{11}\, Relocation_t + b_{12}\, Relocation_{t+1} + b_{13}\, Relocation_{t-1} + b_{14}\, Move\ Out_t + b_{15}\, Move\ Out_{t+1} + b_{16}\, Move\ Out_{t-1} + b_{17}\, Existing\ HQ_{t-1} + b_2\, Log\ (Personal\ Income_t) + b_3\, Log\ (Popoulation_t) + b_4\, Unemployment\ Rate_t + e_{it} \qquad \text{------ (IX)}$$

We report the findings in Table 8 Panel C. In both Columns (1) and (2), we continue to find significant positive associations of corporate headquarters moving into a district and housing price changes in the year of relocation, as well as associations in the year before and the year after the relocation event. However, we do not observe any crowding out effect, as there exists no negative impact of housing price changes as a result of corporate relocation out of a district for the same period from year t-1 to t+1. When we extend our analysis to beyond 1 year, we observe a marginally significant (at the 10% level) negative impact of headquarters moving out of a district on housing price changes 2 years before a relocation event. However, the coefficient is significantly smaller than the sum of the coefficients for $Relocation_t$, $Relocation_{t+1}$, and $Relocation_{t-1}$ (at the 1% level).

The finding highlights that a corporate relocation event signifies a net positive impact on housing price changes for districts that experience the relocation of incoming corporate headquarters. It also shows that the local housing market reacts to the expectation of a headquarters moving out of a district before the moving-in of another headquarters. This is consistent with many firms (such as Amazon) announcing their relocation plan before deciding on the new location, which results in different timing for the spillover effect from the relocation event to the local housing market.

[--- Insert Table 9 about here ---]

6. Conclusion

The housing phenomenon observed when Amazon began the process of choosing its second headquarters implies that a corporate headquarters relocation decision can exert a significant spillover effect on the local housing market, across both time and space. This study empirically examines the impact of a corporate headquarters relocation event on housing market and finds that corporate headquarters relocation is positively associated with local housing price changes. Importantly, we document the temporal effect of corporate relocation, in which housing prices start to increase year before the relocation event, indicating that at least some of the changes in housing prices are due to changes in expectations regarding future prices, which in turn leads to speculative activities on the local housing market. Moreover, we also observe a prolonged real effect on the housing market beyond the year of relocation. Examining the spatial spillover effect of a corporate relocation event, we show that the impact of a corporate headquarters relocation can influence housing price growth for nearby districts up to 15 miles away. We also observe an enhanced effect from the economies of agglomeration, whereby housing demand is boosted further when the relocating firm belongs to the same industry as existing firms or belongs to the top five major industries of the region.

We perform several robustness checks, such as propensity score matching and instrumental variable approaches, to alleviate the unobserved heterogeneity and endogeneity concerns, and our results remain intact. In our heterogenous analyses, we find that the impact of corporate relocation is more pronounced when the relocating firms have a higher total number of employees and larger total economic bases. We also find that the impact of corporate relocation is greater for cross-state relocations than for cross-city or cross-district relocations. Lastly, we show that the benefits of headquarters moving-in are not offset by those moving-out. Overall, our study indicates that corporate relocation exhibits significant influence on the housing market due to the speculation and expectation effect of increases in housing prices, as well as the real effect of increased local economic activities induced by the arrival of the relocated headquarters. Moreover, the impact of corporate relocation has far-reaching effects across nearby districts. We also show the economies of agglomeration engender housing price growth to beyond the stand-alone impact of increased labor and local input demand of the relocated firms.

This study contributes to the literature by providing novel evidence of a significant spillover effect from the corporate setting to the local housing market. We show that the channel of impact through the propagation of headquarters relocation decision on the demand for residential properties results in significant surges in local housing prices. Our focus on the housing market has enabled us to demonstrate both temporal and spatial impact of corporate decisionmaking on the local housing market. Usually, when the capital market responds to corporate policy changes by one firm, the contagion effect at most extends to firms in a related industry or firms in proximity. Our findings show that such a contagion effect also spills over to the local housing market, and thereby affects the pricing of proximate residential properties.

Our study bears significant implications for policymakers by highlighting the benefits as well as concerns regarding economic externalities in corporate relocation decisions. We show that corporate relocation has led to strong and sustained effects on local housing markets. While this induced housing boom could benefit existing homeowners, it could also reduce housing affordability and pose greater challenges for renters and new buyers. Housing is considered by many to be a necessity good. As of December 2017, the real estate sector totaled $39.7 trillion in the U.S. (Joslin and Konchitchki, 2018),[16] of which a substantial proportion was in the housing market. American households contribute a large proportion of their income to housing (Paulin, 2018), and housing affordability has long been a central issue in the economics literature (e.g., Hancock, 1993; Lerman and Reeder, 1987; Roback, 1982; Quigley and Raphael, 2004; Welcher, 1977). Corporate headquarters relocation, which stimulates investor speculation and engenders higher demand for local housing, could act as a double-edged sword that reduces housing affordability.

Our findings also bear important implications for academics and practitioners. Housing price dynamics could have large fluctuations due to speculation resulting from a corporate relocation event. Glaeser (2013) documents a long history of speculation in the U.S. housing market, and Glaeser and Nathans (2017) show that when market participants forecast current and future demand for a local housing market, they may believe that waiting will result in higher prices later, and hence housing prices also exhibit momentum. While our study reinforces the notion that models of housing prices incorporate these forward-looking expectations and speculation regarding urban economic activity (e.g., Coulson et al., 2013), we provide novel evidence that these speculative activities in the housing market could be driven by a forthcoming corporate relocation event. Our results imply that market participants should take corporate spatial decisions into consideration when forecasting housing prices.

[16] As a comparison, the total market capitalization of the U.S. stock market was $26.8 trillion at the end of 2017.

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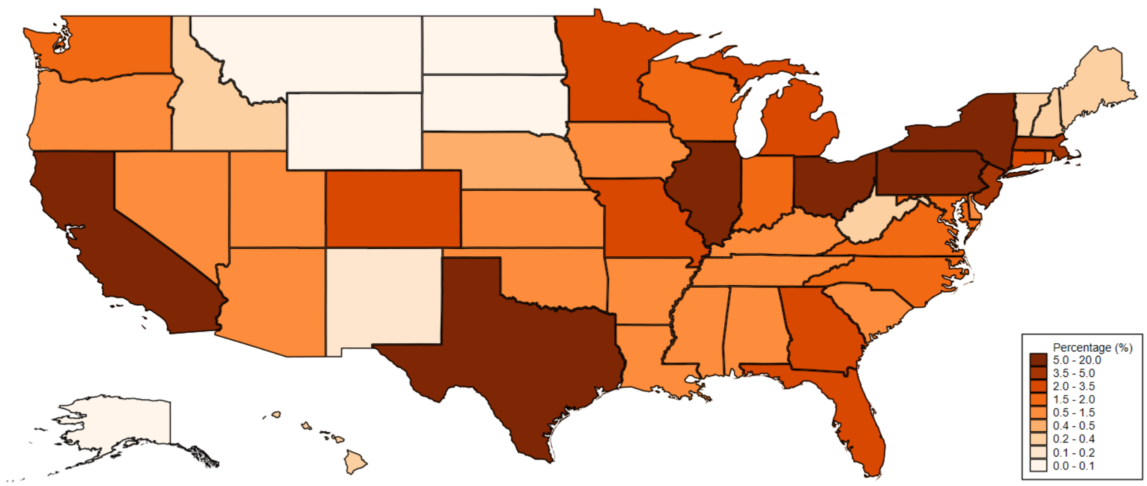
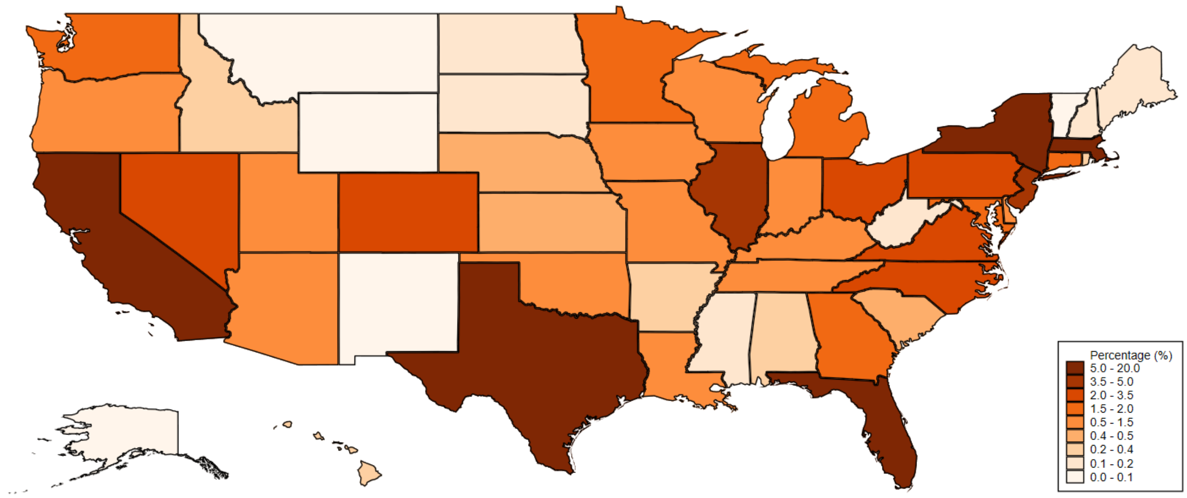
Figure 1: Distribution of Corporate Headquarters by State

This figure plots the distribution of corporate headquarters by state in the U.S. The distribution percentage is calculated as the number of corporate headquarters in the state divided by the total number of corporates in our data set. Panel A plots the distribution percentage in 1994, which is the beginning of our sample period. Panel B plots the distribution percentage in 2018, which is the end of our sample period. Panel C plots the change in distribution percentage from 1994 to 2018.

Panel A. Distribution Percentage of Corporate Headquarters in 1994



Panel B. Distribution Percentage of Corporate Headquarters in 2018



Panel C. Change in Distribution Percentage from 1994 to 2018

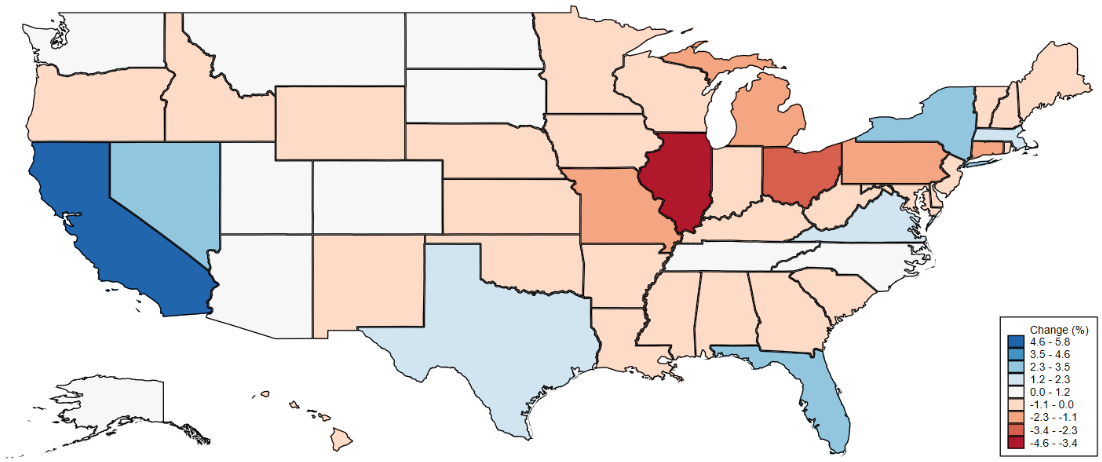
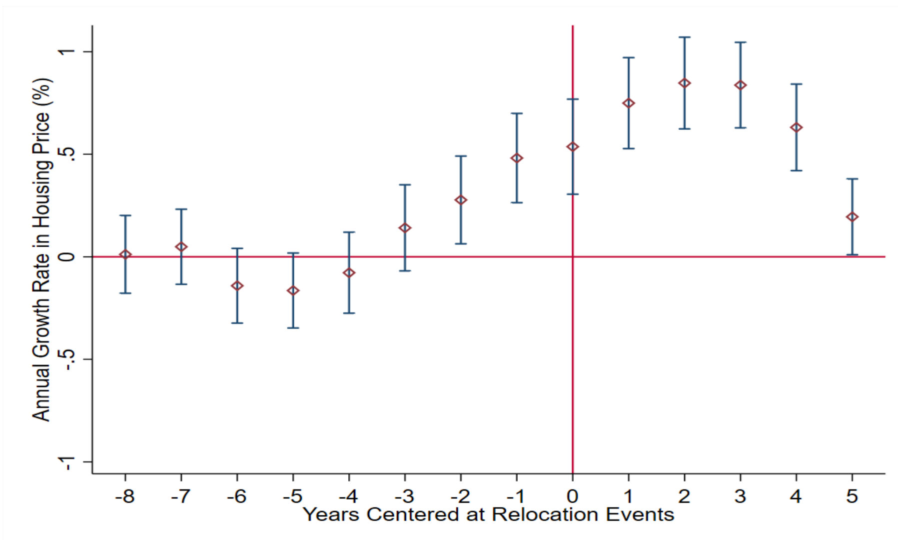


Figure 2: Average Growth Rate in Local Housing Price Centered at Corporate Headquarters Relocation Events

This figure provides univariate comparison of the average growth rate in local housing price for districts with a corporate headquarters relocation and those without any corporate headquarters relocation. Panels A & B show the housing price in districts with and without HQ relocation events respectively, after removing the time trends and district fixed effects. Error bars indicate 99% confidence intervals.

Panel A. Housing Price in Districts with HQ Relocation Events Happening at Time t



Panel B. Housing Price in Districts without HQ Relocation Events Happening at Time t

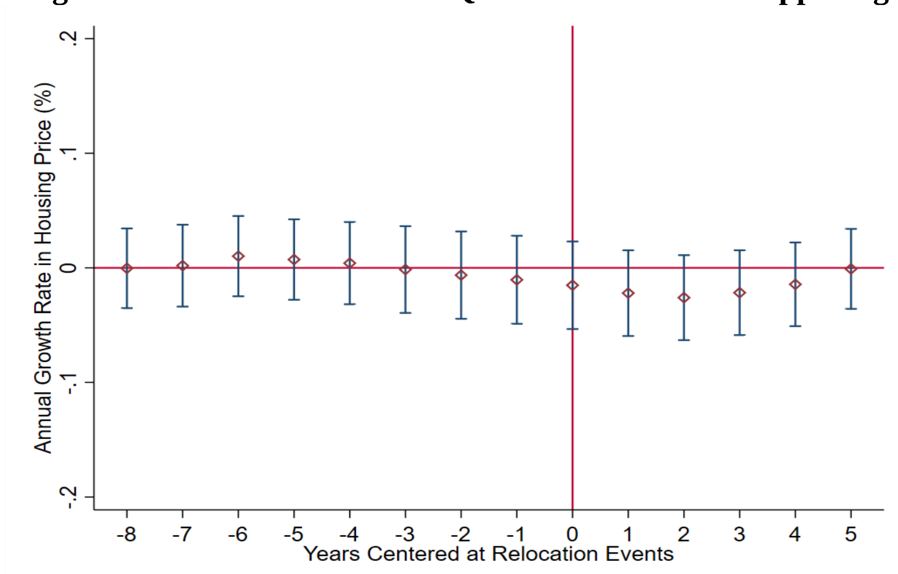


Figure 3: Propensity Score Matching Results

This figure plots the distribution of districts' propensity scores on the likelihood of having relocation events before and after matching. The treated group refers to districts with at least one relocation event in year *t*, and the control group refers to districts without any relocations in year *t*. The propensity score is estimated with probit regressions, controlling for macroeconomic factors and year and CBSA fixed effects.

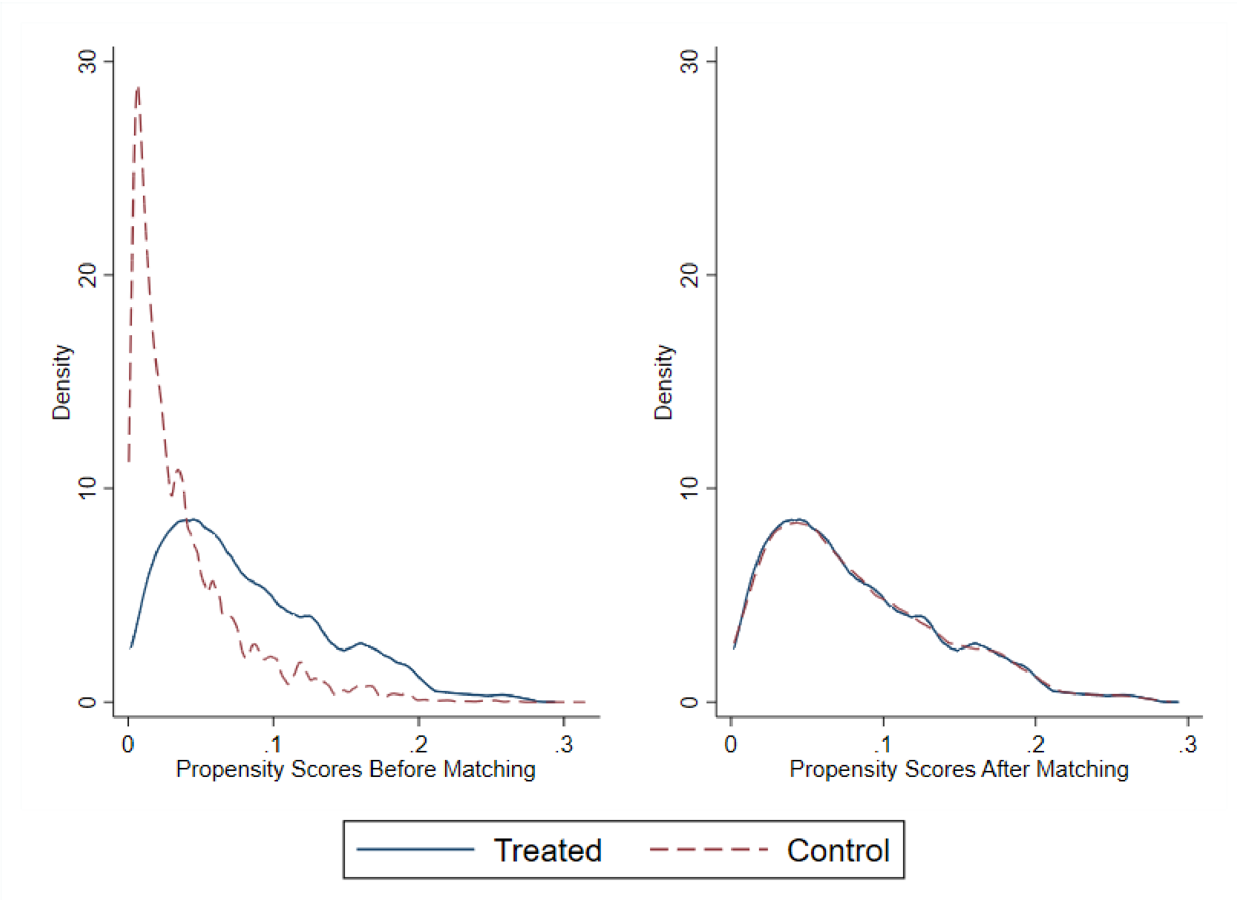


Table 1: Summary Statistics of Corporate Headquarters Relocation

This table presents the summary statistics of corporate headquarters relocation events over the period 1994 to 2017 by year and by type of relocation across states, across cities, and across districts at Zip Code level.

	Total	***Relocation Firm***		***State Relocation***		***City Relocation***		***District Relocation***	
Year	**Obs.**	**Obs.**	**%**	**Obs.**	**%**	**Obs.**	**%**	**Obs.**	**%**
1994	2,119	91	4.29%	28	1.32%	20	0.94%	43	2.03%
1995	5,605	253	4.52%	79	1.41%	76	1.36%	98	1.75%
1996	10,870	562	5.17%	195	1.79%	187	1.72%	180	1.66%
1997	11,251	1,070	9.51%	343	3.05%	403	3.58%	324	2.88%
1998	11,343	1,196	10.54%	403	3.55%	432	3.81%	361	3.18%
1999	11,395	1,165	10.23%	408	3.58%	443	3.89%	314	2.76%
2000	11,870	1,076	9.07%	384	3.24%	429	3.61%	263	2.22%
2001	11,164	780	6.99%	316	2.83%	269	2.41%	195	1.75%
2002	10,289	763	7.42%	299	2.91%	290	2.82%	174	1.69%
2003	9,750	848	8.70%	336	3.45%	303	3.11%	209	2.14%
2004	9,611	739	7.69%	319	3.32%	267	2.78%	153	1.59%
2005	9,189	705	7.67%	293	3.19%	239	2.60%	173	1.88%
2006	8,916	706	7.92%	313	3.51%	240	2.69%	153	1.72%
2007	9,043	698	7.71%	277	3.06%	256	2.83%	165	1.82%
2008	8,461	594	7.02%	255	3.01%	207	2.45%	132	1.56%
2009	7,955	587	7.38%	269	3.38%	214	2.69%	104	1.31%
2010	7,624	601	7.88%	261	3.42%	212	2.78%	128	1.68%
2011	7,364	559	7.59%	254	3.45%	208	2.82%	97	1.32%
2012	7,123	548	7.70%	205	2.88%	208	2.92%	135	1.90%
2013	7,018	605	8.63%	253	3.61%	209	2.98%	143	2.04%
2014	7,005	622	8.87%	267	3.81%	209	2.98%	146	2.08%
2015	6,747	525	7.77%	227	3.36%	181	2.68%	117	1.73%
2016	6,430	452	7.03%	176	2.74%	172	2.67%	104	1.62%
2017	6,231	446	7.17%	173	2.78%	148	2.38%	125	2.01%
Total	**204,373**	**16,191**	**7.92%**	**6,333**	**3.10%**	**5,822**	**2.85%**	**4,036**	**1.97%**

Table 2: Descriptive Statistics

This table presents descriptive statistics for the variables used in the main empirical analysis.

Variables	N	Mean	S.D.	P(25)	Median	P(75)
$Price_t$	315,137	0.198	0.184	0.097	0.145	0.231
$\Delta Log\ (Price_t)$	315,137	3.506	8.450	-0.899	3.582	8.050
$Relocation_t$	315,137	0.031	0.172	0	0	0
$Relocation\ Number_t$	315,137	0.042	0.312	0	0	0
$Personal\ Income_t$	285,538	38.440	11.161	30.356	36.595	44.421
$Population_t$	315,137	11.683	9.557	5.250	8.493	16.689
$Unemployment\ Rate_t$	315,137	5.721	2.034	4.300	5.400	6.700
$Relocation\ 5\ Miles_t$	314,893	0.129	0.335	0	0	0
$Relocation\ 5\text{-}10\ Miles_t$	314,893	0.236	0.425	0	0	0
$Relocation\ 10\text{-}15\ Miles_t$	314,893	0.273	0.446	0	0	1
$Relocation\ 15\text{-}20\ Miles_t$	314,893	0.291	0.454	0	0	1
$Relocation\ 20\text{-}25\ Miles_t$	314,893	0.295	0.456	0	0	1
$Existing\ HQ_{t-1}$	315,137	0.184	0.387	0	0	0
$Existing\ HQ\ Same\ Industry_{t-1}$	313,119	0.008	0.087	0	0	0
$Top\ 5\ Major\ Industry_{t-1}$	315,121	0.026	0.158	0	0	0
$Relocated\ Employee_t$	310,456	0.055	1.833	0	0	0
$Relocated\ TA_t$	310,807	0.036	3.446	0	0	0
$Relocated\ MV_t$	310,076	0.020	1.051	0	0	0
$Relocation\ State_t$	315,137	0.014	0.116	0	0	0
$Relocation\ City_t$	315,137	0.014	0.116	0	0	0
$Relocation\ District_t$	315,137	0.007	0.086	0	0	0
$Relocation\ Number\ State_t$	315,137	0.017	0.183	0	0	0
$Relocation\ Number\ City_t$	315,137	0.016	0.158	0	0	0
$Relocation\ Number\ District_t$	315,137	0.009	0.137	0	0	0
$Move\ Out_t$	315,137	0.030	0.171	0	0	0

Table 3: Contemporaneous Impact of Corporate Headquarters Relocation on the Local Housing Market

This table presents the estimation results of model (I). The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. In Columns (1) and (2), the independent variable of interest is an indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in year *t* and zero otherwise. In Columns (3) and (4), the independent variable is the number of corporate headquarters relocating into the district in year *t*. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)
	Y: Δ*Log (Price$_t$)*			
Relocation$_t$	0.3560***	0.3520***		
	(0.0922)	(0.0916)		
Relocation Number$_t$			0.2008***	0.1997***
			(0.0673)	(0.0675)
Log (Personal Income$_t$)		7.0634***		7.0631***
		(0.8027)		(0.8028)
Log (Population$_t$)		0.2907		0.2893
		(0.2138)		(0.2125)
Unemployment Rate$_t$		-0.2350***		-0.2353***
		(0.0395)		(0.0394)
Constant	3.5245***	-72.0441***	3.5272***	-72.0244***
	(0.0245)	(8.4002)	(0.0240)	(8.4037)
Year Fixed Effect	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y
Observations	288,464	285,538	288,464	285,538
R-squared	0.394	0.395	0.394	0.395

Table 4: Pre-Relocation and Post-Relocation Impact of Corporate Headquarters Relocation on the Local Housing Market

This table presents the estimation results for model (II). The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. In Columns (1) and (2), the independent variables of interest are a series of indicator variables, $Relocation_t$, $Relocation_{t+1}$, and $Relocation_{t-1}$, that equal one if there exists at least one corporate headquarters relocation event in the district in year *t*, in the next year, and in the past year, respectively, and zero otherwise. Similarly, in Columns (3) to (6), we gradually add the indicator variables that denote the existence of a corporate headquarters relocation event in the district in year *t+2*, *t-2*, *t+3* and *t-3*, respectively. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
			Y: $\Delta Log\ (Price_t)$			
$Relocation_t$	0.2674***	0.2640***	0.2705***	0.2677***	0.2720***	0.2733***
	(0.0785)	(0.0781)	(0.0766)	(0.0762)	(0.0840)	(0.0835)
$Relocation_{t+1}$	0.2971***	0.2942***	0.3111***	0.3064***	0.2862***	0.2874***
	(0.0877)	(0.0878)	(0.0892)	(0.0892)	(0.0938)	(0.0938)
$Relocation_{t-1}$	0.3531***	0.3416***	0.3065***	0.2997***	0.3120***	0.3048***
	(0.0771)	(0.0770)	(0.0778)	(0.0776)	(0.0821)	(0.0825)
$Relocation_{t+2}$			0.0815	0.0822	0.0417	0.0412
			(0.0933)	(0.0934)	(0.0974)	(0.0974)
$Relocation_{t-2}$			0.2374***	0.2287***	0.2015**	0.1987**
			(0.0884)	(0.0883)	(0.0897)	(0.0895)
$Relocation_{t+3}$					0.1524	0.1434
					(0.1064)	(0.1067)
$Relocation_{t-3}$					0.1343	0.1255
					(0.0998)	(0.0999)
$Log\ (Personal\ Income_t)$		7.8236***		8.6403***		9.3083***
		(0.8001)		(0.9400)		(1.0486)
$Log\ (Population_t)$		0.3211		0.2859		0.1335
		(0.2267)		(0.2269)		(0.2058)
$Unemployment\ Rate_t$		-0.2471***		-0.2253***		-0.1972***
		(0.0440)		(0.0494)		(0.0527)
Constant	3.3653***	-80.2608***	3.1407***	-88.8737***	2.8550***	-94.9518***
	(0.0247)	(8.5408)	(0.0242)	(10.0283)	(0.0238)	(11.0812)
Year Fixed Effect	Y	Y	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	274,146	271,363	246,510	244,007	218,929	216,706
R-squared	0.398	0.400	0.413	0.415	0.429	0.430

Table 5: Spatial Impact of Corporate Headquarters Relocation on the Local Housing Market

This table presents the estimation results for model (III). The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. The independent variable of interest (*Relocation$_t$*) is an indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in year *t* and zero otherwise. *Relocation 5 Miles$_t$*, *Relocation 5-10 Miles$_t$*, *Relocation 10-15 Miles$_t$*, *Relocation 15-20 Miles$_t$*, and *Relocation 20-25 Miles$_t$* are indicator variables that equal one (zero otherwise) if there exists at least one corporate headquarters relocation event in nearby districts within the specific distance from the district. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
			Y: Δ*Log (Price$_t$)*			
Relocation$_t$	0.1968**	0.1946**	0.1634**	0.1642**	0.1630**	0.1636**
	(0.0778)	(0.0773)	(0.0763)	(0.0760)	(0.0765)	(0.0762)
Relocation 5 Miles$_t$	0.6954***	0.6884***	0.6022***	0.6042***	0.6024***	0.6047***
	(0.1020)	(0.1035)	(0.0952)	(0.0963)	(0.0954)	(0.0965)
Relocation 5-10 Miles$_t$			0.2023***	0.1916***	0.2058***	0.1984***
			(0.0529)	(0.0548)	(0.0527)	(0.0545)
Relocation 10-15 Miles$_t$			0.1281***	0.1041**	0.1372***	0.1208***
			(0.0440)	(0.0457)	(0.0427)	(0.0438)
Relocation 15-20 Miles$_t$					-0.0234	-0.0493
					(0.0444)	(0.0455)
Relocation 20-25 Miles$_t$					-0.0363	-0.0565
					(0.0460)	(0.0469)
Log (Personal Income$_t$)		7.1147***		7.0959***		7.1028***
		(0.8000)		(0.8011)		(0.8019)
Log (Population$_t$)		0.2739		0.2620		0.2664
		(0.2015)		(0.1945)		(0.1961)
Unemployment Rate$_t$		-0.2313***		-0.2293***		-0.2302***
		(0.0383)		(0.0381)		(0.0384)
Constant	3.4314***	-72.5453***	3.3553***	-72.3200***	3.3707***	-72.4005***
	(0.0154)	(8.3748)	(0.0179)	(8.3798)	(0.0266)	(8.3900)
Year Fixed Effect	Y	Y	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	288,241	285,336	288,241	285,336	288,241	285,336
R-squared	0.394	0.396	0.394	0.396	0.394	0.396

Table 6: Agglomeration Economies Impact of Corporate Headquarters Relocation on the Local Housing Market

This table presents the estimation results of models (IV) and (V). The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. The independent variable of interest in Columns (1) and (2) is the interaction term of $Relocation_t$ and $Existing\ HQ\ Same\ Industry_{t-1}$, that equals one (zero otherwise) if the relocated firm belongs to the same industry as one of the firms with existing headquarters in the same district. The independent variable of interest in Columns (3) and (4) is the interaction term of $Relocation_t$ and $Top\ 5\ Major\ Industry_{t-1}$, that equals one (zero otherwise) if the relocated firm belongs to the same industry as one of the top five major industries of the state. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)
		Y: $\Delta Log\ (Price_t)$		
$Relocation_t$	0.3409**	0.3280**	0.0424	0.0533
	(0.1494)	(0.1489)	(0.1545)	(0.1537)
$Existing\ HQ_{t-1}$	0.0700**	0.0581*		
	(0.0342)	(0.0344)		
$Relocation_t * Existing\ HQ_{t-1}$	-0.2256	-0.2086		
	(0.1892)	(0.1881)		
$Relocation_t * Existing\ HQ\ Same\ Industry_{t-1}$	0.3093*	0.3200*		
	(0.1684)	(0.1664)		
$Relocation_t * Top\ 5\ Major\ Industry_{t-1}$			0.3737**	0.3561*
			(0.1824)	(0.1828)
$Log\ (Personal\ Income_t)$		7.0930***		7.0615***
		(0.7875)		(0.8029)
$Log\ (Population_t)$		0.2716		0.2908
		(0.2092)		(0.2138)
$Unemployment\ Rate_t$		-0.2409***		-0.2349***
		(0.0383)		(0.0395)
Constant	3.5016***	-72.1642***	3.5243***	-72.0253***
	(0.0254)	(8.2409)	(0.0245)	(8.4018)
Year Fixed Effect	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y
Observations	286,447	283,522	288,449	285,523
R-squared	0.393	0.395	0.394	0.395

Table 7: Robustness Analysis

Panel A. Propensity Score Matching Estimation Results

This table presents estimation results using the subsamples with matched propensity scores for the relocation event. In Column (1), we present the first-stage estimation results of the propensity score for the relocation event. The dependent variable is the indicator variable, $Relocation_t$, that equals one if there exists at least one corporate headquarters relocation event in the district in year t and zero otherwise. We estimate a district's propensity score of having a relocation event using probit regression with the macroeconomic factors and CBSA and year fixed effects. Following Chow et al. (2018) and Heider and Ljungqvist (2015), we also include two dummy variables, $Tax\ Cut_{t-1}$ and $Tax\ Raise_{t-1}$, to indicate whether there is a corporate income tax cut or tax rise in the state in the previous year. We report the marginal effect at mean values. In Columns (2) and (3), we present estimation results for model (I) using the matched subsamples. The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. The independent variable of interest is an indicator variable, $Relocation_t$, that equals one if there exists at least one corporate headquarters relocation event in the district in year *t* and zero otherwise. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1) 1st Stage $Relocation_t$	(2) 2nd Stage $\Delta Log\ (Price_t)$	(3) 2nd Stage $\Delta Log\ (Price_t)$
$Relocation_t$		0.2188***	0.2189***
		(0.0775)	(0.0739)
$Log\ (Personal\ Income_t)$	0.0065		4.7099**
	(0.0089)		(2.3280)
$Log\ (Population_t)$	0.0108***		1.7957***
	(0.0015)		(0.4462)
$Unemployment\ Rate_t$	-0.0015***		-0.0510
	(0.0004)		(0.1426)
$Tax\ Cut_{t-1}$	-0.0027		
	(0.0018)		
$Tax\ Raise_{t-1}$	-0.0016		
	(0.0026)		
Year Fixed Effect	Y	N	Y
CBSA Fixed Effect	Y	N	Y
Observations	265,342	152,914	152,914
R-Squared	0.112	0.515	0.517

Panel B. IV Estimation Results

This table presents estimation results using IV regressions. In Columns (1) and (2), we present the first-stage estimation results using IV regressions. We use the Bartik shift-share predictor of the number of relocated firms in the first stage as an instrument to obtain the fitted values of the independent variables of interest for the second stage. The dependent variable is the indicator variable, $Relocation_t$, that equals one if there exists at least one corporate headquarters relocation event in the district in year *t* and zero otherwise. The independent variable, *Predicted* $Relocation\ Number_t$, is the Bartik shift-share predictor of the number of relocated firms. In Columns (3) and (4), we report the corresponding second-stage results of the IV estimation. The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. The independent variable of interest is an indicator variable, $Relocation_t$, that equals one if there exists at least one corporate headquarters relocation event in the district in year *t* and zero otherwise. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1) 1st Stage $Relocation_t$	(2) 1st Stage $Relocation_t$	(1) 2nd Stage $\Delta Log(Price_t)$	(2) 2nd Stage $\Delta Log(Price_t)$
$Predicted\ Relocation\ Number_t$	0.3488***	0.3487***		
	(0.0233)	(0.0233)		
$Relocation_t$			1.3944***	1.3854***
			(0.2810)	(0.2810)
$Log(Personal\ Income_t)$		-0.0089		7.0738***
		(0.0095)		(0.8015)
$Log(Population_t)$		0.0002		0.2828
		(0.0017)		(0.2126)
$Unemployment\ Rate_t$		-0.0010***		-0.2340***
		(0.0003)		(0.0393)
Year Fixed Effect	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y
First-Stage F Statistics	207.30	207.60		
R-squared			0.394	0.399
Observations	288,464	285,538	288,464	285,538

Table 8: Additional Analysis

Panel A. Heterogeneity on Employees and Economic Bases of Relocated Firms

This table presents the estimation results for models (VI) and (VII). The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. The independent variables of interest are *Log (Relocated Employee$_t$)*, *Log (Relocated TA$_t$)*, and *Log (Relocated MV$_t$)*, which equal the log sum of the number of employees of the relocated firms in the district in year *t*, log sum of total assets of the relocated firms, and log sum of market values of the relocated firms, respectively. The numbers are set to zero if there is no corporate headquarters relocation event in a district. All other independent variables are described in the Variables Definitions. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
			Y: Δ*Log (Price$_t$)*			
Log (Relocated Employee$_t$)	0.0322***	0.0312***				
	(0.0075)	(0.0075)				
Log (Relocated TA$_t$)			0.0210***	0.0203***		
			(0.0050)	(0.0050)		
Log (Relocated MV$_t$)					0.0247***	0.0235***
					(0.0052)	(0.0052)
Log (Personal Income$_t$)		7.1073***		7.1102***		7.1403***
		(0.7799)		(0.7805)		(0.7790)
Log (Population$_t$)		0.2665		0.2678		0.2678
		(0.2085)		(0.2085)		(0.2081)
Unemployment Rate$_t$		-0.2437***		-0.2439***		-0.2431***
		(0.0380)		(0.0380)		(0.0380)
Constant	3.9571***	-71.8103***	3.8045***	-71.9999***	3.8524***	-72.2811***
	(0.1086)	(8.1736)	(0.0747)	(8.1734)	(0.0760)	(8.1545)
Year Fixed Effect	Y	Y	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	283,795	280,873	284,144	281,221	283,416	280,495
R-squared	0.392	0.394	0.392	0.394	0.392	0.394

Panel B. Heterogeneity on Relocation Distance

This table presents the estimation results for model (VIII). The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. The independent variables of interest are a series of indicator variables, *Relocation State$_t$*, *Relocation City$_t$*, and *Relocation District$_t$*, that equal one (zero otherwise) if there exists at least one corporate headquarters relocation event in which the relocating firm moves into the district from another state, from another city in the same state, and from another district in the same state and city, respectively. *Relocation Number State$_t$*, *Relocation Number City$_t$*, and *Relocation Number District$_t$*, are the corresponding number of headquarters relocation events across states, cities, or districts, respectively. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)
	Y: Δ*Log (Price$_t$)*			
Relocation State$_t$	0.3498***	0.3603***		
	(0.1279)	(0.1286)		
Relocation City$_t$	0.1821*	0.1802*		
	(0.0999)	(0.1004)		
Relocation District$_t$	0.4467*	0.4198		
	(0.2616)	(0.2631)		
Relocation Numbers State$_t$			0.2170**	0.2218**
			(0.0946)	(0.0964)
Relocation Number City$_t$			0.1424*	0.1385*
			(0.0788)	(0.0798)
Relocation Number District$_t$			0.2437	0.2364
			(0.1606)	(0.1615)
Log (Personal Income$_t$)		7.0603***		7.0619***
		(0.8037)		(0.8036)
Log (Population$_t$)		0.2900		0.2892
		(0.2130)		(0.2123)
Unemployment Rate$_t$		-0.2351***		-0.2353***
		(0.0394)		(0.0393)
Constant	3.5248***	-72.0045***	3.5274***	-72.0101***
	(0.0242)	(8.4089)	(0.0243)	(8.4112)
Year Fixed Effect	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y
Observations	288,464	285,538	288,464	285,538
R-squared	0.394	0.395	0.394	0.395

Panel C. Impact of Headquarters Moving Out

This table presents estimation results for model (IX). The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. The independent variables of interest are a series of indicator variables, from year *t-3* to *t+3*, that equal one if there exists at least one corporate headquarters moving-in (*Relocation*) or moving-out (*Move Out*) event in the district and zero otherwise. We include an additional dummy control variable (*Existing HQ* $_{t-1}$), which denotes whether the district has existing headquarters in year *t-1*. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)
	Y: $\Delta Log\ (Price_t)$	
$Relocation_t$	0.2531***	0.2560***
	(0.0875)	(0.0878)
$Relocation_{t+1}$	0.2808***	0.2835***
	(0.0906)	(0.0910)
$Relocation_{t+2}$	0.0255	0.0260
	(0.0955)	(0.0956)
$Relocation_{t+3}$	0.1255	0.1173
	(0.1038)	(0.1039)
$Relocation_{t-1}$	0.2630***	0.2580***
	(0.0918)	(0.0923)
$Relocation_{t-2}$	0.1471	0.1461
	(0.0950)	(0.0945)
$Relocation_{t-3}$	0.0885	0.0794
	(0.1112)	(0.1114)
$Move\ Out_t$	0.1511	0.1488
	(0.1150)	(0.1147)
$Move\ Out_{t+1}$	0.0332	0.0302
	(0.1051)	(0.1056)
$Move\ Out_{t+2}$	-0.1825*	-0.1883*
	(0.1059)	(0.1065)
$Move\ Out_{t+3}$	-0.0474	-0.0538
	(0.1036)	(0.1039)
$Move\ Out_{t-1}$	0.1491	0.1407
	(0.0925)	(0.0922)
$Move\ Out_{t-2}$	0.0346	0.0459
	(0.0875)	(0.0875)
$Move\ Out_{t-3}$	-0.1208	-0.1025
	(0.0933)	(0.0939)
$Existing\ HQ_{t-1}$	0.0113	0.0107
	(0.0092)	(0.0094)
$Log\ (Personal\ Income_t)$		9.3085***
		(1.0491)
$Log\ (Population_t)$		0.1308
		(0.2039)
$Unemployment\ Rate_t$		-0.1972***
		(0.0525)
Year Fixed Effect	Y	Y
CBSA Fixed Effect	Y	Y
Observations	218,929	216,706
R-squared	0.429	0.430

Appendix: Variable Definition

Variable	Definition
$Price_t$	Local residential house price (in millions) by district (at Zip Code level) in year *t*.
$\Delta Log\ (Price_t)$	Annual change in housing price in logarithmic form by district in year *t*, as a percentage.
$Relocation_t$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in year *t* and zero otherwise.
$Relocation\ Number_t$	Number of corporate headquarters relocating into the district in year *t*.
$Personal\ Income_t$	Personal income per capita (in thousands) at the CBSA level.
$Population_t$	Population (in millions) at the state level.
$Unemployment\ Rate_t$	Unemployment rate at the state level.
$Relocation_{t+1}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in the *next* year and zero otherwise.
$Relocation_{t-1}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in the *past* year and zero otherwise.
$Relocation_{t+2}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in *2* years and zero otherwise.
$Relocation_{t-2}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district *2* years *before* and zero otherwise.
$Relocation_{t+3}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in *3* years and zero otherwise.
$Relocation_{t-3}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district *3* years *before* and zero otherwise.
$Relocation\ 5\ Miles_t$	An indicator variable that equals one for districts if there exists at least one corporate headquarters relocation in nearby districts within 5 miles in year *t* and zero otherwise.
$Relocation\ 5\text{-}10\ Miles_t$	An indicator variable that equals one for districts if there exists at least one corporate headquarters relocation in nearby districts within 5-10 miles in year *t* and zero otherwise.
$Relocation\ 10\text{-}15\ Miles_t$	An indicator variable that equals one for districts if there exists at least one corporate headquarters relocation in nearby districts within 10-15 miles in year *t* and zero otherwise.

Relocation 15-20 Miles$_t$	An indicator variable that equals one for districts if there exists at least one corporate headquarters relocation in nearby districts within 15-20 miles in year *t* and zero otherwise.
Relocation 20-25 Miles$_t$	An indicator variable that equals one for districts if there exists at least one corporate headquarters relocation in nearby districts within 20-25 miles in year *t* and zero otherwise.
Existing HQ$_{t-1}$	An indicator variable that equals one if the district has an existing corporate headquarters in year *t*-1 and zero otherwise.
Existing HQ Same Industry$_{t-1}$	An indicator variable that equals one if the district has a relocated firm and at least one existing firm in the same industry in year *t*-1 and zero otherwise. Firm industries are classified into life sciences, energy and transportation, real estate and construction, manufacturing, technology, trade and services, finance, and structured finance according to guidance from the SEC (https://www.sec.gov/info/edgar/siccodes.htm).
Top 5 Major Industry$_{t-1}$	An indicator variable that equals one if the district has a relocated firm in the top five major industries of the state. The top five major industries in the state are ranked by the share of headquarters in an industry as a percentage of the national aggregate, calculated on yearly bases.
Tax Cut$_{t-1}$	An indicator variable that equals one if there is a corporate income tax cut in the state in year *t-1*, as summarized by Heider and Ljungqvist (2015).
Tax Raise$_{t-1}$	An indicator variable that equals one if there is a corporate income tax increase in the state in year *t-1*, as summarized by Heider and Ljungqvist (2015).
Share (Energy & Transportation)	Number of headquarters that belong to the energy & transportation industry in the district divided by the total number of firms in that industry.
Share (Finance)	Number of headquarters that belong to the finance industry in the district divided by the total number of firms in that industry.
Share (Life Sciences)	Number of headquarters that belong to the life science industry in the district divided by the total number of firms in that industry.
Share (Manufacturing)	Number of headquarters that belong to the manufacturing industry in the district divided by the total number of firms in that industry.
Share (Real Estate & Construction)	Number of headquarters that belong to the real estate & construction industry in the district divided by the total number of firms in that industry.
Share (Structured Finance)	Number of headquarters that belong to the structured finance industry in the district divided by the total number of firms in that industry.
Share (Technology)	Number of headquarters that belong to the technology industry in the district divided by the total number of firms in that industry.

Share (Trade & Services)	Number of headquarters that belong to the trade & services industry in the district divided by the total number of firms in that industry.
Industry Concentration	The HHI of industry types in the district.
Predicted Relocation Number$_t$	The predicted number of headquarters relocating into a district in year *t* using the shift-share approach by Bartik (1991).
Population Density$_t$	Population divided by area at the state level.
Urbanization Rate$_t$	Proportion of population that resides in urban areas from the U.S. Census Bureau.
Relocated Employee$_t$	Sum of the number of employees of the relocated firms (in thousands) in the district in year *t*.
Relocated TA$_t$	Sum of the total assets of the relocated firms (in billions) in the district in year *t*.
Relocated MV$_t$	Sum of the market values of equity of the relocated firms (in billions) in the district in year *t*.
Relocation State$_t$	An indicator variable that equals one if a firm has relocated headquarters into the district from a different state in year *t* and zero otherwise.
Relocation City$_t$	An indicator variable that equals one if a firm has relocated headquarters into the district from a different city in the same state in year *t* and zero otherwise.
Relocation District$_t$	An indicator variable that equals one if a firm has relocated headquarters into the district from a different district (Zip Code) in the same state and city in year *t* and zero otherwise.
Relocation Number State$_t$	The number of corporate headquarters relocating into the district from a different state in year *t*.
Relocation Number City$_t$	The number of corporate headquarters relocating into the district from a different city in the same state in year *t*.
Relocated Number District$_t$	The number of corporate headquarters relocating into the district from a different district (Zip Code) in the same state and city in year *t*.
Move Out$_t$	An indicator variable that equals one if there exists at least one corporate headquarters relocation out of the district in year *t* and zero otherwise.
Move Out$_{t+1}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation out of the district in the *next* year and zero otherwise.
Move Out$_{t-1}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation out of the district in the *past* year and zero otherwise.
Move Out$_{t+2}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation out of the district in *2* years and zero otherwise.

Move Out$_{t-2}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district *2* years *before* and zero otherwise.
Move Out$_{t+3}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in *3* years and zero otherwise.
Move Out$_{t-3}$	An indicator variable that equals one if there exists at least one corporate headquarters relocation into the district *3* years *before* and zero otherwise.

Online Appendix Table IA1: Sample Selection Process

This table presents the step-by-step sample selection process and the number of observations in each step.

Augmented 10-X Header Data	
Total filings (1994-2017)	1,285,447
Less: incorrect address identified by data vendor	(82,986)
Less: incorrect abbreviation of state names	(8,303)
Filings with valid headquarters addresses	1,194,158
Less: additional filings after first filing of the year	(947,110)
First filings by firm-years	247,048
Less: filings of nonconsecutive years	(2,340)
Less: filings of last year	(40,335)
Final sample: firm-years with headquarters information (1994-2017)	204,373
Zillow Home Value Index (ZHVI) of All Homes	
Year-end housing prices at district (zip-code) level (1996-2017)	347,446
Less: first year	(32,309)
Final sample: annual housing price changes (1997-2017)	315,137

Online Appendix Table IA2: Additional Validity Analysis on IV

This table presents estimation results on industry share and industry concentration. The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. In Column (1), the independent variables of interest are the variables of industry share, measured by the number of headquarters in an industry in that district divided by the country's total number of firms in that industry. In Column (2), the independent variable is industry concentration, the HHI of industry types in that district. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)
	Y: $\Delta Log\ (Price_t)$	
Share (Energy & Transportation)	-0.1225	
	(0.2846)	
Share (Finance)	-0.2520	
	(0.4548)	
Share (Life Sciences)	0.5223	
	(0.4134)	
Share (Manufacturing)	-0.3971	
	(0.7657)	
Share (Real Estate & Construction)	-0.1786	
	(0.2744)	
Share (Structured Finance)	0.0820	
	(0.1018)	
Share (Technology)	0.0559	
	(0.5509)	
Share (Trade & Services)	-0.0146	
	(0.7004)	
Industry Concentration		0.0002
		(0.0019)
$Log\ (Personal\ Income_t)$	0.0791***	0.0656***
	(0.0078)	(0.0187)
$Log\ (Population_t)$	0.1426***	0.1942***
	(0.0098)	(0.0252)
$Unemployment\ Rate_t$	-0.0042***	-0.0020*
	(0.0004)	(0.0011)
Constant	-2.0649***	-2.4262***
	(0.1323)	(0.3518)
Year Fixed Effect	Y	Y
District Fixed Effect	Y	Y
Observations	285,538	52,778
R-squared	0.414	0.528

Online Appendix Table IA3: Robustness Analysis of Pre-Relocation and Post-Relocation Effect—Propensity Score Matching Estimation Results and IV Regression Results

This table presents estimation results using subsamples with matched propensity scores for the relocation event (Panel A) and estimation results using IV regressions (Panel B). In Panel A, the dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. In Columns (1) and (2), we first estimate a district's propensity score of having a relocation event in year *t+1* using probit regression with the macroeconomic factors, state-level corporate income tax changes, and CBSA and year fixed effects. Then we estimate the pre-relocation effect on these matched subsamples. The independent variable of interest is an indicator variable, $Relocation_{t+1}$, that equals one if there exists at least one corporate headquarters relocation event in the district in year *t+1*. In Columns (3) and (4), we first estimate a district's propensity score of having a relocation event in year *t-1* using probit regression with the macroeconomic factors, state-level corporate income tax changes, and CBSA and year fixed effects. Then we estimate the post-relocation effect on these matched subsamples. The independent variable of interest is an indicator variable, $Relocation_{t-1}$, that equals one if there exists at least one corporate headquarters relocation event in the district in year *t-1*. Panel B presents the second-stage IV estimation results of the pre-relocation and post-relocation effects. The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. In the first stage, we use the Bartik shift-share predictor of the number of relocated firms as an instrument to obtain the fitted values of the independent variables of interest for the second stage. In Columns (1) and (2), the independent variable of interest is an indicator variable, $Relocation_{t+1}$, that equals one if there exists at least one corporate headquarters relocation event in the district in year *t+1*. In Columns (3) and (4), the independent variable of interest is an indicator variable, $Relocation_{t-1}$, that equals one if there exists at least one corporate headquarters relocation event in the district in year *t-1*. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A. Propensity Score Matching Estimation Results

	(1)	(2)	(3)	(4)
	Y: Δ*Log* $(Price_t)$			
$Relocation_{t+1}$	0.3677***	0.3677***		
	(0.0890)	(0.0847)		
$Relocation_{t-1}$			0.2582***	0.2581***
			(0.0727)	(0.0697)
Log $(Personal\ Income_t)$		2.7530		2.0938
		(2.3700)		(2.3220)
Log $(Population_t)$		1.7613***		1.7624***
		(0.4713)		(0.3916)
$Unemployment\ Rate_t$		-0.0527		-0.0676
		(0.1141)		(0.1302)
Year Fixed Effect	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y
Observations	144,591	144,591	153,477	153,477
R-squared	0.525	0.527	0.516	0.518

Panel B. IV Estimation Results

	(1)	(2)	(3)	(4)
		Y: Δ*Log (Price$_t$)*		
Relocation$_{t+1}$	1.2315***	1.2328***		
	(0.2827)	(0.2809)		
Relocation$_{t-1}$			1.2806***	1.2504***
			(0.2717)	(0.2722)
Log (Personal Income$_t$)		7.8392***		7.0485***
		(0.7982)		(0.8048)
Log (Population$_t$)		0.3187		0.2838
		(0.2260)		(0.2127)
Unemployment Rate$_t$		-0.2470***		-0.2339***
		(0.0439)		(0.0394)
Year Fixed Effect	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y
First-stage F Statistics	226.33	226.48	224.78	225.08
Observations	274,143	271,360	288,464	285,538
R-squared	0.398	0.404	0.394	0.399

Online Appendix Table IA4: Robustness Analysis—Alternative Fixed Effects

This table presents estimation results for model (I), but with state-level fixed effects (Panel A) or state times year fixed effects (Panel B). The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. In Columns (1) and (2) of both panels, the independent variable of interest is an indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in year *t* and zero otherwise. In Columns (3) and (4) of both panels, the independent variable is the number of headquarters relocating into the district in year *t*. In Panel B, the control variables for unemployment and population are at the state level, so they are omitted in the model with state times year fixed effects. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A. State Fixed Effects

	(1)	(2)	(3)	(4)
	Y: $\Delta Log\ (Price_t)$			
Relocation$_t$	0.6177***	0.4053***		
	(0.1112)	(0.0948)		
Relocation Number$_t$			0.3226***	0.2244***
			(0.0725)	(0.0642)
Log (Personal Income$_t$*)*		2.1540***		2.1611***
		(0.1894)		(0.1862)
Log (Population$_t$*)*		13.7970***		13.7988***
		(1.0103)		(1.0098)
Unemployment Rate$_t$		-0.4284***		-0.4283***
		(0.0407)		(0.0407)
Constant	3.4876***	-141.6811***	3.4929***	-141.7687***
	(0.0283)	(9.7040)	(0.0285)	(9.6928)
Year Fixed Effect	Y	Y	Y	Y
State Fixed Effect	Y	Y	Y	Y
Observations	315,137	285,538	315,137	285,538
R-squared	0.375	0.394	0.375	0.394

Panel B. State Times Year Fixed Effects

	(1)	(2)	(3)	(4)
	Y: $\Delta Log\ (Price_t)$			
Relocation$_t$	0.5193***	0.3206***		
	(0.1007)	(0.0809)		
Relocation Number$_t$			0.2732***	0.1800***
			(0.0725)	(0.0649)
Log (Personal Income$_t$*)*		1.9101***		1.9154***
		(0.2028)		(0.1989)
Constant	3.4906***	-16.5604***	3.4950***	-16.6138***
	(0.0283)	(2.1116)	(0.0284)	(2.0713)
State*Year Fixed Effect	Y	Y	Y	Y
Observations	315,137	285,538	315,137	285,538
R-squared	0.579	0.595	0.579	0.595

Online Appendix Table IA5: Robustness Analysis—Additional Control Variables

This table presents estimation results for model (I) with additional control variables. The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. In Columns (1) to (3), the independent variable of interest is an indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in year *t* and zero otherwise. In Columns (4) to (6), the independent variable is the number of corporate headquarters relocating into the district in year *t*. $\Delta Log\ (Price_{t-1})$ is the annual change in housing price in logarithmic form by district in the previous year. $Population\ Density_t$ is measured as population divided by area of the state, and $Urbanization\ Rate_t$ is the proportion of population residing in urban areas. We obtain state area and urbanization rates from the U.S. Census, and we interpolate urbanization rate for non-census years with the previous census year. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Y: $\Delta Log\ (Price_t)$					
$Relocation_t$	0.2025***	0.2013***	0.2047***			
	(0.0689)	(0.0683)	(0.0680)			
$Relocation\ Number_t$				0.1170**	0.1155**	0.1157**
				(0.0529)	(0.0521)	(0.0510)
$\Delta Log\ (Price_{t-1})$	0.0036***	0.0036***	0.0036***	0.0036***	0.0036***	0.0036***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$Log\ (Personal\ Income_t)$		-0.3817	-0.4809		-0.3817	-0.4806
		(0.7434)	(0.7472)		(0.7434)	(0.7471)
$Log\ (Population_t)$		0.1566	0.4245***		0.1558	0.4231***
		(0.1293)	(0.1277)		(0.1284)	(0.1265)
$Unemployment\ Rate_t$		-0.0585**	-0.0804***		-0.0586**	-0.0805***
		(0.0250)	(0.0232)		(0.0249)	(0.0232)
$Population\ Density_t$			0.6695***			0.6684***
			(0.1787)			(0.1781)
$Urbanization\ Rate_t$			-0.0276***			-0.0275***
			(0.0061)			(0.0061)
Constant	2.2808***	5.2197	6.0665	2.2822***	5.2301	6.0730
	(0.0271)	(7.8300)	(7.8446)	(0.0264)	(7.8320)	(7.8463)
Year Fixed Effect	Y	Y	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	274,146	271,363	271,363	274,146	271,363	271,363
R-squared	0.482	0.482	0.482	0.482	0.482	0.482

Online Appendix Table IA6: Robustness Analysis—Alternative Identifications of Relocation Year

This panel presents the estimation results of model (I) with alternative identifications of relocation year. We first compare the first and last filings of each company in year *t*. If the address in the last filing of year *t* differs from that of the first filing, we confirm the relocation occur in year *t*. If the address remains unchanged in all filings in year *t* but is changed from the last filing in year *t* to the first filing in year *t+1*, we either consider the relocation as having occurred in year *t+1* (Panel A), or we exclude these relocation events from our sample (Panel B). The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. In Columns (1) and (2) of both panels, the independent variable of interest is an indicator variable that equals one if there exists at least one corporate headquarters relocation into the district in year *t* and zero otherwise. In Columns (3) and (4) of both panels, the independent variable is the number of corporate headquarters relocating into the district in year *t*. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A. Consider Relocation as Having Occurred in Year *t+1* if Firm Address Changes from the Last Filing in Year *t* to the First Filing in Year *t+1*

	(1)	(2)	(3)	(4)
	Y: Δ*Log (Price$_t$)*			
Relocation$_t$	0.3095***	0.3016***		
	(0.0824)	(0.0818)		
Relocation Number$_t$			0.1904***	0.1883***
			(0.0604)	(0.0607)
Log (Personal Income$_t$)		7.0617***		7.0610***
		(0.8029)		(0.8030)
Log (Population$_t$)		0.2911		0.2892
		(0.2139)		(0.2125)
Unemployment Rate$_t$		-0.2349***		-0.2353***
		(0.0395)		(0.0394)
Constant	3.5252***	-72.0296***	3.5266***	-72.0026***
	(0.0249)	(8.4009)	(0.0241)	(8.4048)
Year Fixed Effect	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y
Observations	288,464	285,538	288,464	285,538
R-squared	0.394	0.395	0.394	0.395

Panel B. Exclude Samples if Firm Address Changes from the Last Filing in Year *t* to the First Filing in Year *t+1*

	(1)	(2)	(3)	(4)
	Y: Δ*Log (Price$_t$)*			
Relocation$_t$	0.2972***	0.2913***		
	(0.1008)	(0.1006)		
Relocation Number$_t$			0.2030**	0.2013**
			(0.0832)	(0.0834)
Log (Personal Income$_t$)		7.0612***		7.0610***
		(0.8030)		(0.8031)
Log (Population$_t$)		0.2916		0.2907
		(0.2139)		(0.2131)
Unemployment Rate$_t$		-0.2351***		-0.2353***
		(0.0395)		(0.0394)
Constant	3.5292***	-72.0238***	3.5302***	-72.0123***
	(0.0251)	(8.4016)	(0.0245)	(8.4047)
Year Fixed Effect	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y
Observations	288,464	285,538	288,464	285,538
R-squared	0.394	0.395	0.394	0.395

Online Appendix Table IA7: Robustness Analysis—Alternative Measurements of Employees and Economic Bases

This table presents the estimation results for models (VI) and (VII) with alternative measurement of the key variables of interest. The dependent variable is the annual change in housing price in logarithmic form by district (at Zip Code level) in year *t*. The independent variables of interest are *Log (Relocated Employee$_t$)*, *Log (Relocated TA$_t$)*, and *Log (Relocated MV$_t$)*, which equal the log sum of the number of employees of the relocated firms in the district in year *t* scaled by population, log sum of total assets of the relocated firms scaled by local GDP, and log sum of market values of the relocated firms scaled by GDP, respectively. The numbers are set to zero if there is no corporate headquarters relocation event in a district. All other independent variables are described in the Variables Definitions table. Standard errors are clustered at the city level. Robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
			Y: Δ*Log (Price$_t$)*			
Log (Relocated Employee$_t$)	0.0260***	0.0243***				
	(0.0082)	(0.0082)				
Log (Relocated TA$_t$)			0.0097*	0.0107*		
			(0.0056)	(0.0056)		
Log (Relocated MV$_t$)					0.0114*	0.0125**
					(0.0061)	(0.0060)
Log (Personal Income$_t$)		7.0938***		6.9130***		6.9362***
		(0.7828)		(1.0416)		(1.0389)
Unemployment Rate$_t$		-0.2406***		-0.1483***		-0.1486***
		(0.0394)		(0.0412)		(0.0412)
Constant	4.1065***	-69.1467***	3.2370***	-68.9906***	3.2918***	-69.1782***
	(0.1832)	(8.2296)	(0.1754)	(11.0389)	(0.1870)	(11.0102)
Year Fixed Effect	Y	Y	Y	Y	Y	Y
CBSA Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	283,795	280,873	229,261	229,261	229,004	229,004
R-squared	0.392	0.394	0.412	0.413	0.412	0.414