Payout Policy and Real Estate Prices*

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Abstract

This paper studies the impact of real estate prices on payout policy. Firms use corporate real estate (CRE) assets as collateral to obtain debt. Through this collateral channel, positive shocks to the value of CRE assets allow firms to increase their leverage in order to finance not only investments but also payouts. We find that an increase in the value of CRE assets results in an increase in cash dividends and share repurchases. These effects are stronger in periods of increasing values of CRE, as well as for firms with few investment opportunities and low leverage.

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1 Introduction

Most firms need real estate assets to run their businesses and need to choose between owning or leasing these assets. Owning corporate real estate (CRE) is usually a big investment that has a large impact on the financial statements of the firms.[1] One of the most important characteristics of CRE assets is that they can be used as collateral to obtain debt. In a world without asymmetric information between firms' managers and lenders, the value of collaterizable assets would be irrelevant. However, in the presence of information frictions, these assets can be used as collateral to reduce lending costs. As a result, the value of CRE assets affects firms' borrowing capacity and their payout policy.

In this paper, we study how firms adapt their payout policies to changes in the value of their CRE assets. We use firm level data for 4,994 US firms from 1993 to 2013 to examine whether appreciation or depreciation in the value of firm's CRE assets has any effect on the payout policy of firms. Our main contributions can be summarized in four sets of results. First, we document the effects of real estate prices on the cash dividend payments of the firm. We show that a positive shock in real estate prices leads to an increase in the dividends paid to shareholders. We empirically find that a \$1 increase in the value of CRE assets results in a 0.26-0.44 cents increase in cash dividends. Second, we reveal the implications of real estate prices for share repurchases. Our empirical analysis shows that a \$1 increase in the value of CRE assets results in a 0.41-0.57 cents increase in share repurchases. Third, we show that shocks in CRE prices have a different effect on dividends and share repurchases. We find that increase in the value of CRE assets leads to more payout flexibility, which is defined as the ratio of share repurchases to total payout. Fourth, we reveal the effects of real estate prices on the firms' dividend smoothing. We show that a positive shock in the value of CRE assets leads to a higher level of dividend smoothing, or equivalently, that the measures of speed of adjustment (SOA) in Lintner (1956) and Leary and Michaely (2011) decrease.

What are the mechanisms that generate payout responses to real estate price movements? Increases in real estate prices affect the firms payout through four channels: (i) A negative "income"

[1] Zeckhauser and Silverman (1983) document that real estate assets represent between 25% and 41% of total corporate assets, depending on the industry. Veale (1989) reports that corporate real estate accounts for about 15% of firms operating expenses or, equivalently, 50% of net operating income. Chaney, Sraer, and Thesmar (2012) show that 59% of public firms in the United States reported at least some real estate ownership and among these firms, the market value of real estate accounted for 19% of the firms total market value in 1993.

effect emerges from the increase in implicit rents in the future. (ii) A positive "endowment" effect arises from the increase in the value of the firms current real estate assets. (iii) A positive "collateral" effect is driven by increases in real estate prices that relax the firms borrowing constraints. (iv) A positive "substitution" effect arises from the firm substituting away capital from real estate services in the future to current payout. Because the increase in the value of the firms real estate assets (i.e., increase in real estate wealth) offsets the increases in the cost of real estate services (i.e., the increase in implicit rents), the channels (i) and (ii) cancel out (e.g., Sinai and Souleles (2005) and Buiter (2010)). As a result, real estate prices affect the payout policy of the firm through the collateral and substitution channels. The rest of the economic intuition goes as follows. Firms use CRE assets as collateral to obtain debt. Through this collateral channel, positive shocks to the value of CRE assets allow firms to increase their leverage in order to finance an increase in investments.

As a result, firms can substitute part of the cash flows generated by their businesses from investments to payout.[2] If the collateral and substitution channels are in play, then we should expect a stronger effect of real estate prices on payout: (i) in periods of increasing real estate prices, (ii) in firms with few investment opportunities, and (iii) in firms with low leverage.

We empirically test these 3 conjectures. First, we find that a positive shock in the value of CRE assets has a highly significant and positive effect on dividends and share repurchases, while a negative shock in the value of CRE assets has a negative effect of smaller order of magnitude. Therefore, the effect is not symmetric for firms that experience increasing versus decreasing shocks in the value of their CRE assets. Second, we document that firms with few investment opportunities (i.e., firms with low Tobin's Q) increase their payout more when they experience a positive shock in the value of their CRE assets. Finally, we show that firms with low (high) leverage are unlikely (likely) to decrease their payout during the period of decrease in real estate prices.

Our goal is to identify the causal effect of real estate prices on the payout policies of firms. Therefore, we require an exogenous source of variation in the value of firms' real estate assets. There are two main sources of endogeneity that may potentially affect our empirical analysis. First, the variation in local real estate prices may be correlated with the firm's payout decisions.

[2]Because the "collateral" channel allows to increase investments using debt, managers can now shift part of the cash flows from investments to payout (i.e., the "substitution" effect) and, therefore, increase the dividends and share repurchases.

For example, an unobserved local economic shock could impact both real estate prices and the payout policy of the firm. This unobserved shock would perform the role of an omitted variable that could bias our estimates. Since a positive local economic shock would increase both real estate prices and the payout of the firm, this potential bias would be positive. To address this endogeneity issue, we adapt the instrumental variables (IV) approach developed in Himmelberg, Mayer, and Sinai (2005) and Mian and Sufi (2011) to our specific problem. Our goal is to isolate the variation in local real estate prices by making this variation orthogonal to the potential omitted variables. We instrument local real estate prices using the interaction between the elasticity of supply of the local real estate market and the long-term interest rates to pick up changes in housing demand.

The second main source of endogeneity is that the decision to own or rent (lease) real estate assets could be correlated with the payout policy of the firm. Because we do not have a suitable instrument to tackle this second endogeneity problem, we study the effects of the decision of owning CRE assets on the firm's payout. Specifically, we control for the observable determinants of CRE ownership decisions and we find that our estimates do not change when we implement these controls. There are other potential concerns that we undertake as robustness checks. First, we address the issue that the payout by large firms could increase local real estate prices. Second, we focus on the concern that firms may not be able to use their increased borrowing capacity immediately after the CRE value increase. Third, we run a robustness test to address the concern that firms that pay higher dividends may choose to locate in an area that experiences high growth in real estate prices. Fourth, we show that our results are not driven by agency costs derived from the asymmetric information between shareholders and firms' managers. Finally, we address the concern that the collateral channel could be used only to finance investments, but not payouts.

Our paper is located in the intersection of two lines of research. First, it is related to a growing body of literature that focuses on the analysis of the effects of CRE assets on corporate policies and stock prices. Tuzel (2010) studies the relationship between CRE holdings and the cross-section of stock returns. Chaney, Sraer, and Thesmar (2012) analyze how shocks in real estate prices affect corporate investment decisions. They show that a $1 increase in CRE assets increases corporate investment by $0.06. Cvijanovic (2014) analyzes the effect of real estate prices on the capital structure of the firm. Her paper shows that an increase in the value of the firms' pledgeable collateral leads to increase in its leverage ratio. Chen, Harford, and Lin (2014) document that change in firm's financing capacity as a result of change in real estate prices has important implications for its cash holdings and cash flow sensitivity.

Second, our paper is related to the literature on dividend policy that goes back to Miller and Modigliani (1961) and Black (1976). A large body of literature has focused on the analysis of the characteristics of dividends (e.g., Fama and French (2001); DeAngelo, DeAngelo, and Stulz (2006); and Von Eije and Megginson (2008)) and the dividend smoothing policies of firms (e.g., Fama and Babiak (1968); Brav et al. (2005); Aivazian, Booth, and Cleary (2006); and Leary and Michaely (2011).) The empirical fact that companies smooth dividends has been a subject of debate since Lintner (1956) documented it. However, there is no consensus about the economic drivers for dividend smoothing. Some papers argue that it is optimal for the firm to smooth dividends in the existence of asymmetric information. Other papers show that dividend smoothing is a result of the attempt to reduce the agency costs of free cash flows.[3] The current literature concludes that dividend smoothing is most common among financially unconstrained firms. We argue that positive shocks to real estate prices make firms less financially constrained and, therefore, these firms can smooth dividends more.

2 Theoretical Predictions

In the Modigliani–Miller (MM) model, the division of retained earnings between dividends and new investments does not have any influence in the value of the firm. This "dividend irrelevance" in the value of the firm arises because shareholders are indifferent between obtaining dividends and investing the retained earnings in new opportunities at the same level of risk. Among other assumptions, the MM model assumes that firms' managers and shareholders have access to free information and there is no asymmetric information among them. As a result, the value of collateralizable assets is irrelevant. Nevertheless, in the presence of information frictions, collateralizable assets can be pledged to lenders to reduce the costs derived from these frictions.

[3]The determinants of dividend smoothing have been widely studied. There is a stream of literature that shows that the use of dividends to signal private information about the future cash flows of the firm is one of the drivers of dividend smoothing (e.g., Kumar (1988); Kumar and Lee (2001); Guttman, Kadan, and Kandel (2010)). Other papers suggest that dividend smoothing is driven by the asymmetric information between firms' owners and managers (e.g., Fudenberg and Tirole (1995); De Marzo and Sannikov (2015)). Other studies show that costly external financing generates dividend smoothing since firms may not increase dividends after a positive shock in earnings for precuationary reasons (e.g., Almeida, Campello, and Weisbach (2004); Bates, Kahle, and Stulz (2009)).

Positive shocks to the value of CRE assets produce a negative "income" effect in the firm. Because firms that own real estate are effectively "paying rents to themselves", an increase in the value of real estate prices will efficiently increase their implicit rents. At the same time, firms that own real estate will experience a positive "endowment" effect. Standard economic theory (e.g., Sinai and Souleles (2005) and Buiter (2010)) shows that the income and endowment effects cancel out because the increase in real estate wealth (i.e., a positive endowment effect) offsets the increases in the cost of real estate services (i.e., a negative income effect). Moreover, positive shocks to real estate prices make firms' collateral more valuable. Cvijanovic (2014) shows that most firms increase their leverage whenever they experience a positive shock to the value of their CRE assets (i.e., the "collateral" effect). Chaney, Sraer, and Thesmar (2012) demonstrate that such firms use this extra debt to finance part of their investments. As a result, these firms can partly shift the allocation of their income from investment to payout. This is what we call the "substitution" effect. Therefore, the "collateral" and "substitution" effects provide a transmission mechanism from positive shocks in corporate real estate assets to the payout in terms of dividends and share repurchases. Hypotheses 1 and 2 summarize these basic predictions.

Hypothesis 1 *A positive shock in the value of corporate real estate (CRE) assets leads to an increase in the dividend paid out by the firms.*

Hypothesis 2 *A positive shock in the value of corporate real estate (CRE) assets leads to an increase in the shares repurchased by the firms.*

These two hypotheses bring up the question about which form of payout –dividends or share repurchases– is more affected by changes in real estate prices. Extant corporate finance literature documents that firms are much more reluctant to cut dividends than increase them (DeAngelo and DeAngelo (1990); Leary and Michaely (2011)). This is due to the fact that the negative reaction to a dividend decrease is stronger than the positive reaction to a dividend increase of the same magnitude (Ghosh and Woolridge (1988); Denis, Denis, and Sarin (1994); Yoon and Starks (1995)). This literature also finds that this reaction is weaker for share repurchases (Jagannathan, Stephens, and Weisbach (2000)). As a result, firms are more conservative when it comes to increase dividends than when it comes to increase share repurchases. Equivalently, repurchases provide managers with more discretion in terms of the amount and timing of payout. If the main portion of the positive shocks in real estate prices is temporary (i.e., not permanent), then we should expect higher increases in share repurchases rather than dividends. Hypothesis 3 formalizes this prediction. To test this hypothesis, we use the measure of "payout flexibility" defined in Bonaimé, Hankins, and Harford (2014) as the ratio of share repurchases to total payout.

Hypothesis 3 *A positive shock in the value of corporate real estate (CRE) assets leads to an increase in the payout flexibility of the firms.*

Dividend smoothing is one of the most well-documented phenomena in corporate finance. Lintner (1956) reported the existence of corporate dividend smoothing policies over 50 years ago. Managers strongly believe that market rewards firms with a stable dividend policy (see Black (1976)). As a result, dividend smoothing has steadily increased over the past 80 years (see Brav et al. (2005) and Leary and Michaely (2011).) In this section, we examine the effect of shocks in real estate prices to dividend smoothing. We study how positive (negative) shocks in real estate prices increase (decrease) the collateral value of corporate real estate that the firm owns. As a result, the firm's financing capacity increases (decreases) which increases (decreases) the stability of dividends payments.

Leary and Michaely (2011) examine several characteristics of firms to explain why they smooth dividends. They show that firms that are cash cows, with little growth prospects, weaker governance, and greater institutional holdings, smooth dividends more. On the other hand, younger firms, smaller firms, and firms with more volatile earnings and returns, tend to smooth dividends less. Moreover, dividend smoothing is found to be more common among firms which are not financially constrained. Balakrishnan, Core, and Verdi (2014) and Chaney, Sraer, and Thesmar (2012) show that positive shocks to the value of a firms CRE assets allow firms to increase their financing capacity and investments, respectively. Therefore, firms that experience positive shocks to the value of their CRE assets have more resources at their disposal to implement dividend smoothing policies. Our fourth hypothesis formalizes this conjecture:

Hypothesis 4 *Firms that experience positive shocks in the value of their CRE assets increase their dividend smoothing.*

However, is the magnitude of the increase in payout from increase in the value of CRE assets similar to the magnitude of the decrease in payout from a decrease in the value of CRE assets?

In other words, is this effect symmetric in the sign of real estate prices? Leary and Michaely (2011) show that firms are well aware of the penalties associated with dividend cuts. As a result, firms smooth their dividend payout. They are usually conservative when increasing their dividends during periods of increasing real estate prices, because they are reluctant to cut them when bad times come. On the other hand, the costs of decreasing share repurchases are lower and firms manage them in a more discretionary manner. Share repurchases are usually more volatile than dividends because firms increase their share repurchases during periods of increasing real estate prices and decrease share repurchases during periods of decreasing real estate prices. Therefore, we expect that positive and negative shocks in real estate prices will not have an opposite effect in the payout of the same magnitude. Hypothesis 5 outlines this prediction. In our empirical analysis, we use the recent period of increasing (2002-2007) and decreasing (2008-2011) real estate prices to test this effect.

Hypothesis 5 *The magnitude of the effect of negative shocks in the value of corporate real estate (CRE) assets on the firm's payout is lower than the magnitude of the equivalent positive shocks on the firm's payout.*

We have previously discussed that firms use collateralizable assets to borrow from lenders. The collateral channel is highly used during periods of increasing real estate prices. However, this channel is less powerful in periods of decreasing real estate prices.[4] In these periods, highly leveraged firms find it difficult to increase their debt to finance their payouts. For these firms, the collateral channel is out of work because real estate prices decreased. As a consequence, we expect these firms to cut their dividends and share repurchases. On the other hand, low leveraged firms can use cash or raise debt to finance part of their dividend payout. Hence, we expect low leveraged firms to maintain their dividend payments in order to avoid the penalties associated to dividend cuts. Since the costs associated to decreasing share repurchases are lower, we expect a smaller effect than the one that we observe for cash dividends. Our sixth hypothesis summarizes these predictions. We make use of recent bust in real estate prices (2008-2011) to test this effect.

Hypothesis 6 *During periods of decreasing real estate prices, highly leveraged firms decrease their payout in response to decrease in real estate prices compared to low leveraged firms.*

[4] Farre-Mensa, Michaely, and Schmalz (2015) document that many firms raise debt in order to directly finance their dividend payments.

Finally, one may argue that upon positive shocks to the value of CRE assets, firms should invest all the extra capital that can be borrowed using CRE assets as collateral in positive NPV projects instead of increasing their payout. If the firm has enough projects to invest in, then this would be true. Therefore, firms with very few investment opportunities should use the collateral channel to increase their payouts upon an increase in the value of their CRE assets. Hypothesis 7 formalizes this conjecture.

Hypothesis 7 *The increase in payout due to an increase in the value of CRE assets is higher for firms with low investment opportunities.*

Figure 1 provides motivational evidence of our testable hypotheses. In Figure 1.A, we compare the average Tobin's Q of firms that experienced the highest positive shocks in the value of their CRE assets to the average Tobin's Q of firms that experience the lowest or negative shocks.[5] We use Tobin's Q as a proxy of the level of profitable (or positive NPV) investments available to each firm. We categorize the firms (top vs bottom half) in terms of change in market value of their CRE assets. Over the sample period, we observe that the firms in the top half group have consistently low Tobin's Q compared to the firms in the bottom half one. A T-test shows that the mean of the Tobin's Q is significantly different for both groups (t = 6.1305).

Moreover, we compare the average debt of firms in the top versus the bottom half in terms of change in value of their CRE assets (see Figure 1.B). We find that firms which experienced higher growth in the value of their CRE assets (top half) exhibit a higher level of debt and, therefore, a higher use of the "collateral channel when compared to the firms with lower growth in the value of their CRE assets (bottom half). We also compare the dividend paid and shares repurchased for firms in the top and bottom half groups (see Figures 1.C and 1.D). Similarly, firms in the top half group present a higher annual mean in dividends paid and shares repurchased. Notice that these gaps broaden during the periods of increasing real estate prices. In summary, these pieces of evidence suggest that firms utilize the positive shocks in real estate prices to increase their debt through the collateral channel. As a result, because firms that experienced a larger growth in the value of their CRE assets present less profitable investment opportunities (i.e., low Tobin's Q),

[5] Tobin's Q is defined as the ratio of the market value of a firm to book value of its total assets (Compustat item 6) where the market value of the firm equals the market value of common equity (item 199 [share price at the end of the fiscal year] times item 25 [common shares outstanding]) plus the book value of preferred stock (items 56, 10, 130) plus the book value of total debt (the sum of total short-term debt [item 9] and total long-term debt [item 34]).

they tend to pay out a higher part of their net income to their shareholders either in the form of dividends or by repurchasing shares.

[Insert figure 1 around here]

3 Data

Our sample contains firm level observations for 21 years from 1993 to 2013. We use all the active Compustat firms in 1993 with non-missing total assets. This provides us with a sample of 10,215 firms and a total of 116,044 firm-year observations over the period 1993-2013. We omit the firms not headquarterd in the U.S. as well as firms not present for at least three consecutive years in the sample. As it is standard practice in the literature, we also omit the firms that belong to the finance, insurance, real estate, nonprofit, government organizations, construction or mining industries. This reduces our sample to 4,994 firms and 67,836 firm-year observations. Table 1 displays the summary statistics for the variables that we use in our empirical analysis.

[Insert table 1 around here]

3.1 Accounting data

3.1.1 Corporate real estate assets

We follow the methodology in Chaney, Sraer, and Thesmar (2012) to calculate the market value of corporate real estate assets. The accumulated depreciation on buildings (COMPUSTAT item No. 253) is not reported in Compustat after 1993. This is the reason why we restrict our sample to firms active in 1993 when measuring the market value of real estate assets.

To measure the market value of a firm's real estate collateral, we define the firm's real estate assets as the sum of the three major categories of property, plant, and equipment (PPE): PPE land and improvement at cost (COMPUSTAT item No. 260), PPE buildings at cost (COMPUSTAT item No. 263), and PPE construction-in-progress at cost (COMPUSTAT item No. 266). Because these assets are valued at historical cost rather than marked-to-market, we recover their Compustat market value by calculating the average age of the assets and estimating their current market value using market prices. The detailed steps to recover the market value of a firm's real estate assets are as follows.

First, we calculate the ratio of the accumulated depreciation of buildings (COMPUSTAT item No. 253) to the historic cost of buildings (COMPUSTAT item No. 263) and multiply it by the assumed mean depreciable life of 40 years (see Nelson, Potter, and Wilde (2000)). This calculation approximates the age or the acquisition year of the firm's real estate assets. Second, to adjust real estate prices, we retrieve the state-level real estate price index from the Office of Federal Housing Finance Agency (FHFA) for the period starting in 1975, when the FHFA real estate price index becomes available. We use the consumer price index (CPI) for the period prior to 1975. We use the mapping table between zip codes and Metropolitan Statistical Area (MSA) codes provided by the U.S. Department of Labor's Office of Workers Compensation Programs (OWCP) as well as the zip codes for each firm from Compustat. Then, we use the zip code as an identifier to match the MSA code and the MSA-level real estate price index with accounting data for each firm from Compustat. As a result, we obtain the yearly adjusted real estate price index. Finally, we estimate the market value of each firm's real estate assets for each year in the sample period (1993 to 2013) by multiplying the book value of the assets at acquisition (COMPUSTAT item No. 260 + 263 + 266) times the real estate price index for the given year.

3.1.2 Dividends and share repurchases

We use the ratio of dividends (COMPUSTAT item No. 21) to the previous year Property Plant and Equipment (PPE, lagged item No. 8) as our main measure of dividends. Similarly, we calculate the ratio of share repurchases (COMPUSTAT item No. 115) to previous year Property Plant and Equipment (PPE) and use it as the main measure of repurchases. Normalizing both dividends and share repurchases by PPE makes it easier to interpret the regression coefficients since our independent variable (market value of CRE assets) is also normalized by PPE.[6] In the corporate finance literature, the dividend payout ratio (i.e., dividends/net income) and the dividend yield (i.e., dividend per share/stock price) are the most used measures of dividend payments. We do not use these measures in our study because changes in the market value of CRE assets may also

[6]This normalization by PPE is standard in the literature (see, e.g., Kaplan and Zingales (1997) or Almeida, Campello, and Weisbach (2004)). An alternative specification is to normalize all variables by lagged asset value (item No. 6), as in Rauh (2006) for instance, which delivers notably lower ratios.

affect share prices and net income and it makes it complicate to identify the channel that we are interested in. Finally, we use the ratio of share repurchases to total payout (cash dividend + share repurchases) as the measure of payout flexibility.

3.1.3 Other accounting data

We employ a set of commonly used variables in the corporate finance literature as part of our analysis. Retained earnings to total assets are computed as the ratio of retained earnings (COMPUSTAT item No. 36) to book value of assets (item No. 6). Leverage is defined as the sum of short-term (item No. 34) and long-term (item No. 9) debt divided by the book value of assets. The asset growth ratio is computed as the difference of the current and lagged book value of assets divided by lagged book value of assets. Firm size is defined as the book value of total assets (item No. 6). Following Leary and Michaely (2011), we compute the market-to-book ratio as the market value of equity (product of item Nos. 24 and 25) plus the book value of assets minus the book value of equity, all divided by the book value of assets. Book value of equity is computed as book value of assets minus book value of liabilities (item No. 181) minus preferred stock plus deferred taxes (item No. 35). Sales growth ratio is defined as the difference in current and lagged value of sales divided by lagged value of sales (item No. 12). ROA is computed as operating income before depreciation minus depreciation and amortization normalized by total assets (item No. 13 minus item No. 14, all divided by item No. 6). Cash holding is defined as the cash and short term securities which can readily be converted into cash (item No. 1). Firm age is computed as the number of years since the firm first appeared in the Compustat database. As a measure of long-term interest rates, we use the "contract rate on 30-year, fixed rate conventional home mortgage commitments" from the Federal Reserve website.

Following Chaney, Sraer, and Thesmar (2012), we use initial characteristics of firms to control for the potential heterogeneity among our sample firms. These controls, measured in 1993, are the return on assets (operating income before depreciation (COMPUSTAT item No. 13) minus depreciation (COMPUSTAT item No. 14) divided by assets (COMPUSTAT item No. 6)), age measured as number of years since IPO, two-digit SIC codes and state in which the headquarters are located.

Finally, to ensure that our results are robust to the definition of the main payout and real estate variables, we windsorize all the variables defined as ratios by using as thresholds the median plus/minus five times the interquartile range. Table 1 also reports the summary statistics of these accounting variables that we use in the empirical analysis.

3.2 Real estate data

3.2.1 Real estate prices

We use both commercial and residential real estate prices in our empirical analysis. We obtain residential real estate indices from the Federal Housing Finance Association (FHFA) both at the state and Metropolitan Statistical Area (MSA) levels. The FHFA provides a Home Price Index (HPI), which measures the dynamics of single-family home prices in the United States. The HPI is available at the state level since 1975. It is also available for most Metropolitan Statistical Areas (MSAs), with a starting date between 1977 and 1987 depending on the considered MSA. We match the state level HPI to our accounting data using the state identifier from Compustat. To match the MSA level HPI to our accounting data, we assign MSA codes to all the Compustat items using a MSA-zip code lookup file. Then, we use the MSA code of each firm to merge the MSA level HPI information with the Compustat firm level data.

Moreover, we use the Moody's/RCA Commercial Property Price Indices (CPPI) that has been provided by Real Capital Analytics (RCA). City level CPPI are available from 2001 until 2013. They are weighted, repeat-sales indices, which are computed using contemporaneous transaction-price-based data on private deals. The CPPI data is available at a monthly frequency for the aggregate US housing market and for different property types and at the quarterly frequency for the main US MSAs. Since CPPI is not available from the starting year of our sample time period, we use the state level residential price index from 1993 until 2000 to calculate the market value of real estate assets. From 2001 onwards, we use the city level commercial price index to estimate the market value of CRE assets.

3.2.2 Measures of land supply

To control the potential endogeneity problem of local real estate prices, we follow Himmelberg, Mayer, and Sinai (2005) and Mian and Sufi (2011) and instrument local real estate prices using the interaction of long-term interest rates and local housing supply elasticity. We use the local housing supply elasticities provided in Saiz (2010) and Glaeser, Gyourko, and Saiz (2008). These measures capture the amount of developable land in each MSA and are estimated by processing satellite-generated data on elevation and presence of water bodies.

4 Empirical Strategy

4.1 Dividend and share repurchase

Our empirical strategy adapts the analyses in Chaney, Sraer, and Thesmar (2012) and Cvijanovic (2014) for the study of corporate investments and capital structure, respectively, to our analysis of the firms' payout policies. Consequently, we run the following specification for the payout of firm i with headquarters located in the area l at year t, $Payout_{it}^{l}$:

$$Payout_{it}^{l} = \alpha_i + \delta_t + \beta \cdot REValue_{it}^{l} + \gamma \cdot P_t^l + Controls_{it} + \epsilon_{it} \tag{1}$$

where $Payout_{it}^{l}$ represents 2 different dependent variables: the ratio of dividend to lagged PPE, and the ratio of share repurchase to lagged PPE. Let $REValue_{it}^{l}$ denote the ratio of the market value of the corporate real estate assets that firm i owns in location l in year t to the lagged PPE and P_t^l controls for the level of prices in location l (state, MSA, or city) in year t.

$Controls_{it}$ denote a set of firm level controls. Following the existing literature on payout policy, we control for (1) earned/contributed capital mix (ratio of retained earnings to total assets); (2) leverage; (3) asset growth rate (AGR); (4) firm size; (5) market-to-book ratio; (6) sales growth ratio; (7) return on assets (ROA); (8) cash holdings; and (9) age of the firm. We also control for firm-fixed effects, α_i, as well as year-fixed effects, δ_t. Errors, ϵ_{it}, are clustered at the state, MSA, and city level, depending on the regression.

In the above specification, there are two possible sources of endogeneity. First, real estate prices could be correlated with the payout policy of the firm. Second, the decision to hold real estate may not be random and could be related to the payout policy of the firm. We adapt the empirical strategy in Himmelberg, Mayer, and Sinai (2005) and Mian and Sufi (2011) to address the first endogeneity problem. Specifically, we instrument local real estate prices as the interaction between the elasticity of supply of the local real estate market and the long-term interest rates to capture the changes in real estate demand.[7] We estimate the following first-stage regression to predict real estate prices, P_t^l, for location l at time t:

$$P_t^l = \alpha^l + \delta_t + \gamma \cdot Elasticity^l \cdot IR + u_t^l \tag{2}$$

where $Elasticity^l$ measures constraints on land supply at the MSA or city level, IR is the nationwide real interest rate at which banks refinance their home loans, α^l is a location (MSA or city) fixed effect, and δ_t captures macroeconomic fluctuations in real estate prices, from which we want to abstract. The results of this first-stage regression are presented in table 2. Very constrained land supply MSAs and cities present low values of local real estate supply elasticity (i.e., real estate prices in these areas are inelastic.) Therefore, we expect that a decline in interest rates will produce a higher increase in real estate prices in MSAs with lower elasticity of supply. As expected, the interaction between the measure of local real estate supply elasticity and interest rates is positive and significant at the 1% level. The specification in column [4] shows that a 1% decrease in the mortgage rate significantly increases the commercial price index by 3.6% more in supply constrained cities (top quartile) than in unconstrained cities (bottom quartile).

[Insert table 2 around here]

To address the second endogeneity problem, we control for initial characteristics of firms interacted with the real estate prices. If these controls identify characteristics that make firm i more likely to own real estate, and if these characteristics also make firm i more sensitive to fluctuations in real estate prices, then controlling for the interaction between these controls and the contemporaneous real estate prices allows to separately identify the channels that we are interested in. Controls that might play an important role in the ownership decision are age, assets, and return on assets, as well as 2-digit industry dummies and state dummies. We perform two different analyses. First, we run cross-sectional OLS regressions of a dummy equals 1 when the firm owns real estate, $REOwner$, on the initial characteristics mentioned above. Second, we run the same regression

[7] Davidoff (2016) mentions that this instrument is likely to be invalid, as it reflects both supply and demand factors. However, Mian and Sufi (2016), mention that the strongest test in Davidoff (2016) is showing that the first stage coefficient of house price movements on our instrument (Saiz (2010) measure) is not robust to the inclusion of state fixed effects. This concern should not affect our results since we use firm level fixed effects in our main specification.

using dependent variable as the market value of the firm's real estate assets. Column [1] and [2] of table 3 show the results of these analyses. Both analyses show that larger, more profitable, and older firms are more likely to be owners of real estate assets. Controlling for these characterstics interacted with the real estate prices allows to mitigate our concerns about the second endogeneity problem.

[Insert table 3 around here]

Throughout our empirical analyses, we estimate the following IV specification while controlling for the observed determinants of real estate ownership. We do this to ensure that any interaction between CRE value changes and the payout policy of the firm comes only from shocks to the values of the firm collateral.

$$Payout_{it}^{l} = \alpha_i + \delta_t + \beta \cdot REValue_{it}^{l} + \gamma \cdot P_t^l + \sum_k \kappa_k X_k^i \cdot P_t^l + Controls_{it} + \epsilon_{it}. \tag{3}$$

In equation (3), X_k^i denotes the controls that might play an important role in the decision of owning real estate assets. Real estate prices, P_t^l, are obtained from the first−stage regression.

Finally, to test the effect of change in the value of CRE assets on payout flexibility, we replace the dependent variable in equation (3) with payout flexibility which, is defined as the ratio of share repurchases to total payout.

4.2 Dividend smoothing

We use 2 measures of dividend smoothing throughout the empirical analysis that studies the effect of changes in the value of CRE assets on the firm's dividend smoothing. First, we consider the speed of adjustment (SOA) from the partial adjustment model of Lintner (1956). This is the most common measure of smoothing used in the dividend policy literature (see, for example, Dewenter and Warther (1998); Brav et al. (2005); and Skinner (2008)). The SOA can be estimated as the coefficient -$\hat{\beta}_1$ from the following regression:

$$\Delta D_{it} = \alpha + \beta_1 \cdot D_{it-1} + \beta_2 \cdot E_{it} + \epsilon_{it}. \tag{4}$$

where D_{it} denotes the dividends paid by firm i at time t and E_{it} denotes earnings. A high value of SOA is interpreted as the firm smoothing less.

The above measure of dividend smoothing presents some limitations. The methodology in Lintner (1956) assumes that firms follow a particular form of payout policy. That is, firms have a target payout ratio and the actual payout ratio reverts continuously towards this target.[8] However, survey evidence in Brav et al. (2005) shows that the payout ratio is a less relevant target today than it was in the 1950s. For example, only 28% of CFOs claim to target the payout ratio, while almost 40% claim to target the level of dividends per share (DPS). As a result, the model in equation (4) does not fully apply to modern payout policies and the estimated SOA may not provide a reliable measure of dividend smoothing.

We also consider the measure of dividend smoothing developed in Leary and Michaely (2011). They set up the following two-step procedure to estimate the SOA:

$$\Delta D_{it} = \alpha + \beta \cdot dev_{it} + \epsilon_{it} \tag{5}$$

$$dev_{it} = TPR_i * E_{it} - D_{it-1} \tag{6}$$

where the target payout ratio (TPR_i) is the firm median payout ratio over the sample period. Using that estimated TPR_i, an explicit deviation from target, dev_{it}, is constructed for each period. Finally, dividend smoothing is estimated as the coefficient β from the above regression.

Our empirical strategy to analyze the effect of shocks in the value of real estate assets on the firm's dividend smoothing is equivalent to the previous analyses for cash dividends and share repurchases. Hence, we replace our measures of cash dividends and share repurchases for the measures of dividend smoothing detailed above as the dependent variable in equation (3). In particular, we run different specifications of the following equation for the two measures of dividend smoothing of firm i with headquarters located in location l at year t, $Div\_smoothing^l_{it}$:

$$Div\_smoothing^l_{it} = \alpha_i + \delta_i + \beta \cdot REValue^l_{it} + \gamma \cdot P^l_t + \sum_k \kappa_k X^i_k \cdot P^l_t + Controls_{it} + \epsilon_{it} \tag{7}$$

[8] The payout ratio refers to the common dividend paid over the net income.

5 Main Results

In this section, we use the firm level data described in Section 3 and the empirical strategy developed in the previous section to test the 7 theoretical predictions that we stated in Section 2. The following 7 subsections show the results of the tests of each of these predictions.

5.1 The effect of real estate prices on dividends

In this subsection, we present the empirical analysis of the impact of real estate prices on the firms' dividends. Table 4 exhibits the results of the test of hypothesis 1. It reports the estimates of different specifications of our baseline equation (3). Columns [1] to [3] use residential price indices at state level for computing the real estate value, columns [4] and [5] use residential price indices at the MSA level, and columns [6] and [7] use commercial price indices at the city level. In support of hypothesis 1, we find positive and significant $REValue$ coefficients in all the 7 specifications.

[Insert table 4 around here]

Column [1] displays the simplest specification of equation (3) without any additional controls. The $REValue$ coefficient is 0.0030, which is significant at the 1% confidence level. This result indicates that a 1 dollar increase in real estate value increases cash dividend by 0.30 cents. Column [2] includes initial controls interacted with real estate prices which accounts for observed heterogeneity in ownership decisions. The REValue coefficient is 0.0032 and significant at the 1% confidence level. In column [3], we also add the set of firm level controls typically used in the payout literature that we described in Section 3. The $REValue$ cofficient is 0.0033 which is comparable and significant at the 1% confidence level. Column [4] displays similar results than column [3] except that the real estate value is calculated using MSA level residential indices. We obtain a coefficient of 0.0034, which suggests that for each dollar increase in the value of real estate, the cash dividend increases by 0.34 cents. Columns [5] and [7] implement the instrument variable (IV) strategy where real estate prices are instrumented using the interaction of interest rates and local constraints on land supply. The value of the $REValue$ coefficient is 0.0044 (see column [5].) It remains significant at the 1% confidence level and presents the same order of magnitude than the one obtained from the OLS regressions.

Finally, we present the results that we obtain when we estimate the market value of corporate real estate assets using commercial price indices at the city level instead of residential price indices. Columns [6] and [7] exhibits these results. As expected, the $REValue$ coefficients obtained in both specifications are positive and significant. Coefficient 0.0026 in column [6] suggests than there is an increase in cash dividends by 0.26 cents for every $1 increase in the value of real estate assets.

Overall, these results prove that the an increase in real estate prices leads to an increase in cash dividend. These results can be quantitatively important in the aggregate because real estate represents a sizable fraction of the tangible assets that firms hold on their balance sheets. In 1993, the value of real estate holdings among land-owning firms represented the 19% of the shareholder's value.

5.2 The effect of real estate prices on share repurchases

Table 5 presents the results of the test of hypothesis 2. The regression specification is the same as the one used in table 4 except for the dependent variable that becomes share repurchases over lagged PPE for this test. We keep the same control variables to be able to compare the magnitude of the estimates in both sets of tests. In support of hypothesis 2, we find that increase in real estate value results in increase in share repurchases. Columns [1] $-$ [3] use state residential index, [4] and [5] use MSA residential index, and [6] $-$ [7] use city level commercial price index to calculate market value of real estate assets. All the 7 specifications provide positive and significant coefficients for the variable $REValue$. Specifically, the $REValue$ coefficients of 0.0041 and 0.0057 in columns [5] and [7], respectively, which are significant at the 1% confidence level, suggest that a $1 increase in collateral value results in 0.41–0.57 cents increase in share repurchases.

[Insert table 5 around here]

5.3 Payout flexibility: dividends vs. share repurchases

We also analyze the relative magnitude of the effect of real estate prices on dividends as compared to share repurchases. Table 6 shows the results of this comparison as stated in hypothesis 3. We obtain a positive and significant coefficient for $REValue$ using different specifications. Because payout flexibility is measured as the ratio of share repurchases to total payout, a positive $REValue$

coefficient means that the effect of the value of CRE assets is higher for share repurchases than for dividends.

[Insert table 6 around here]

These results are consistent with the payout policy literature which documents that markets impose higher penalties to dividend cuts than to the equivalent decreases in share repurchases (e.g., Denis, Denis, and Sarin (1994), and Yoon and Starks (1995)) and, therefore, managers are reluctant to decrease dividends (DeAngelo and DeAngelo (1990); Leary and Michaely (2011)). Guay and Harford (2000) show that firms choose dividend increases to distribute relatively permanent cash-flow shocks and repurchases to distribute more transient shocks. Because a substantial part of the shocks to real estate prices is not permanent (i.e., real estate prices are expected to decrease in the near future), then managers have the incentives to allocate a higher amount of the increases in CRE value to share repurchases than to dividends.

5.4 The effect of real estate prices on dividend smoothing

Table 7 exhibits the results of the tests of hypothesis 4. It reports various specifications of equation (7). We find that all the β coefficients in columns [1] to [6] are negative and significant, which supports our fourth hypothesis. A firm with lower speed of dividend adjustment smooths its dividend payments more compared to a firm with higher speed of dividend adjustment. Columns [1] to [3] report the results of the test that we obtain using the dividend smoothing measure from the partial adjustment model of Lintner (1956). Columns [4] to [6] report analogous results using the dividend smoothing measure in Leary and Michaely (2011).

Column [1] shows the estimates for equation (7) in its OLS specification where the state residential price index is used to calculate the market value of CRE assets. Column [2] is similar to [1] except that the real estate value is calculated using the MSA level residential price index. The coefficient for $REValue$ in column [2], -0.0380, is significant at the 1% confidence level and suggests that for every 1% increase in the value of CRE assets, SOA decreases by 3.80%. Column [3] reports the equivalent results for the IV estimation of equation (7). In all these 3 specifications, the $REValue$ coefficient is negative, significant, and present a similar magnitude. These estimates validate hypothesis 4.

[Insert table 7 around here]

Columns [4], [5] are [6] report the estimates of the same specifications of equation (7) than columns [1], [2], and [3], respectively, for the second measure of dividend smoothing. We find that the estimated coefficients for $REValue$ in all the three columns are negative and significant. Specifically, the $REValue$ coefficient in column [5] can be interpreted as a \$1 increase in the real estate value results in a decrease in the speed of dividend adjustment of 0.0436. Notice that a decrease in the speed of dividend adjustment is equivalent to an increase in dividend smoothing.

5.5 Asymmetric effect during periods of increasing vs decreasing real estate prices

In our sample period, the US economy experienced a period of increasing real estate prices during $2002 - 2007$ and a period of decreasing real estate prices during $2008 - 2011$. This allows us to test how real estate prices affected dividend payout and share repurchases during the periods of increasing versus decreasing real estate prices. During the boom period, real estate assets experienced a large positive shock and, hence, we expect that firms should have utilized this increase in the value of real estate assets to pay more dividends to shareholders. In contrast, during bust period there was a large drop in real estate prices and hence we expect firms to pay less dividend. Since we are aware that firms are reluctant to decrease the existing dividend level, we expect that during the bust period, decrease in real estate prices either negatively or insignificantly affected the dividend payout (hypothesis 5).

Panel A in table 8 exhibits the results for dividends in the period of increasing and decreasing real estate prices using 10 different specifications. The dependent variable is cash dividends over lagged PPE. Columns $[1] - [5]$ present results of our main specification during the period of increase in real estate prices (i.e., $2002 - 2007$) and columns $[6] - [10]$ present the results during the period of decrease in real estate prices (i.e., $2008 - 2011$). As expected, during the period of increase in real estate prices, we obtain an increase in the $REValue$ coefficients when compared to coefficients obtained for the full sample reported in table 4. The coefficients are higher for all the specifications. On the other hand, $REvalue$ coefficients become insignificant with negative sign during the period of decrease in real estate prices. This confirms our hypothesis 5 for dividends that firms leverage more on the "substitution channel" during the time of increase in real estate prices but are reluctant to cut the dividend when there is a decrease in real estate prices.

[Insert table 8 around here]

Panel B in table 8 presents results for share repurchases for the period of increasing (i.e., $2002 - 2007$) and decreasing (i.e., $2008 - 2011$) in real estate prices. During the period of increase in real estate prices (columns $[1]-[5]$), we see a significant increase in the REValue coefficients across all columns when compared to the estimates in table 5. This increase is higher than the increase that we obtained for cash dividends, which is consistent with the volatile nature of share repurchases. During the period of decreasing real estate prices, REValue coefficients are not significant.

5.6 Leverage effect during periods of decreasing real estate prices

Next, we test the effects of real estate prices on payout for firms with very high and very low leverage during the periods in which the "collateral channel" is weak, that is, during the periods of decrease in real estate prices (hypothesis 6). Firms with very high leverage do not have much flexibility to increase their debt in order to finance dividends. During the period of decrease in real estate prices, collateral channel is also unavailable which may lead highly leveraged firms to cut their dividend. On the other hand, firms with low leverage are still capable of raising debt from capital markets even when collateral channel can not be used. Hence, such firms are unlikely to decrease their dividend during the period of decrease in real estate prices.

Panel A in table 9 shows the results of this test for dividends. Throughout this test, we consider only firms with high and low leverage during the period in which the collateral channel weakened (i.e., the bust period in real estate prices, $2008 - 2011$). High (low) leveraged firms are defined as the firms in the top (bottom) 3 deciles of leverage. The dependent variable is cash dividends over lagged PPE. Columns $[1] - [5]$ present the results of our main specification for high leveraged firms and columns $[6] - [10]$ present the results for low leveraged firms. In line with hypothesis 6 for dividends, the coefficient of $REValue$ for high leveraged firms is positive across all 5 regressions. These results suggest that these firms cut their dividend during the period of decrease in real estate prices, that is, the period when the collateral channel was shut down for them. On the other hand, the $REValue$ coefficients in columns $[6]-[10]$ are negative which shows that firms with low leverage did not cut their dividend during the same years.

[Insert table 9 around here]

Panel B in table 9 exhibits the results for share repurchases for very high and very low leveraged firms during the period of bust in real estate prices $(2008-2011)$. High and low leverage firms are defined in the same manner as in panel A. The dependent variable is share repurchases over lagged PPE. Columns $[1]-[5]$ present the results of our main specification for high leveraged firms and columns $[6]-[10]$ present the results for low leveraged firms. We find that the $REValue$ coefficient is positive for high leveraged firms and negative for low leveraged firms. As opposed to the estimates for dividends in panel A, estimates for share repurchases are not significant. Looking at the sign of coefficients we can conclude that high leveraged firms decrease their share repurchases during the periods of decrease in real estate prices. On the other hand low leveraged firms did not decrease their share repurchases during this period. These results validate hypothesis 6.

5.7 Availability of Investment Opportunities

In this subsection, we examine why firms use the collateral channel to fund not only their investments, but also their payouts (hypothesis 7). Figure 1 provides an exploratory answer to this question. Its panel A shows that firms that experienced the highest positive changes in the value of their CRE assets, consistently face low investment opportunities (proxied by Tobin's Q) as compared to the firms that experienced the lowest increase (or highest decrease) in the value of their CRE assets. We empirically test this phenomena by categorizing firms depending upon the availability of investment opportunities. Firms with availability of most (least) investment opportunities are defined as the firms in top (bottom) 3 deciles of the Tobins Q. Table 10 presents the results of this analysis. Panel A examines the effect of real estate prices on dividend paid and panel B examines the effect on shares repurchased. Columns $[1]-[5]$ show the specifications for the firms with less investment opportunities and columns $[6]-[10]$ exhibits the specifications for the firms with more investment opportunities available.

We find that RE Value coefficients in columns $[1]-[5]$ are consistently higher as compared to the coefficients in columns $[6]-[10]$. This result shows that firms pay higher dividends when they have less access to the investment opportunities. This result supports the existing literature that documents that firms prefer investment over payout. However, when firms do not have enough positive NPV projects available to invest in, they pay out to shareholders, which potentially reduces the agency problems derived from holding cash.

Similarly, panel B presents the results for share repurchases. The RE coefficients in columns $[1]-[5]$ are consistently higher than their counterparts in columns $[6]-[10]$. This result suggests that firms with less investment opportunities repurchase their share more, as compared to firms with access to more investment opportunities. Interestingly, the RE coefficients in columns $[6]-[10]$ are negative. This shows that, in the presence of enough investment projects, firms either do not repurchase shares or even decrease the number of shares repurchased.

6 Robustness Tests

In this section, we provide five robustness tests of the main results in Section 5. First, we address the concern that the dividends and share repurchases of large firms could increase real estate prices in their MSAs. Second, we analyze the issue that firms may not be able to use their increased borrowing capacity immediately after the CRE value increase. Third, we address the matter that firms that pay higher dividends may choose to locate in areas that experience high growth in real estate prices. Fourth, we study whether our results are driven by agency costs derived from the asymmetric information between shareholders and firms' managers instead of by the collateral channel. Finally, we address the concern that the collateral channel could be used only to finance investments, but not payouts.

6.1 Large vs. small firms

First, we address the concern that payout by large firms may increase local real estate prices. We split firms between small and big according to their asset size and MSAs between small and large according to their population. Specifically, we consider small firms as the ones in the lowest three quartiles of size and large MSAs as the top 20 populated MSAs. Columns [1] and [3] on table 11 report the estimates of equation (3) on a subsample of small firms in large MSAs for the dependent variables cash dividends and share repurchases.[9] We find that $REValue$ coefficients are positive and significant at the 1% confidence level, which shows that our results are robust when only considering small firms and large MSAs in our sample.

[Insert table 11 around here]

6.2 Payout over subsequent 3 years

In a second robustness test, we address the concern that firms may not be able to use their increased borrowing capacity immediately after the appreciation in real estate value. Renegotiation of debt contracts may take time and firm could benefit from their increase borrowing capacity in the following years. Columns [2] and [4] of table 11 display the estimates of equation (3) when considering cash dividends and shares repurchases over the subsequent three years as the dependent variables. Consistently with our previous results, the $REValue$ coefficients remain positive and significant.

6.3 Choice of firm location

We run a third robustness test to address the concern that firms paying higher dividends may choose to locate in a state or MSAs that experiences high growth in real estate prices. To address this possible endogeneity problem, we follow Almazan et al. (2010) and present regressions that replicate our main results on a sample of firms that have been public for at least 10 years. We argue that, to the extent that unobserved characteristics that may influence a firm's location choice become less important over time, the observed effect on payout decisions of older firms that chose locations many years ago is unlikely to arise because of a location selection effect. For the same reason, we run our main specification for older firms to test the robustness of our results.

Table 12 displays the results of this third robustness test. The dependent variable in columns [1] – [3] is cash dividends over lagged PPE and in columns [4] – [6] is share repurchase over lagged PPE. Columns [1] – [3] in panel A exhibit that an increase in real estate value results in increase in dividend payout also for older firms. These coefficients are similar in magnitude to the baseline results presented in table 4. Column 1 uses real estate value calculated using state-level residential prices. In column 2, real estate prices are calculated using MSA-level residential prices. Column 3

[9] The baseline specification is denoted by column [4] of tables 4 and 5 for cash dividend and share repurchases, respectively.

presents the results of IV estimation. Panel B reports results from similar regressions but using the ratio of share repurchases to lagged PPE as the dependent variable. As expected, the coefficients for share repurchases displayed in panel B present the same magnitude than the ones in our baseline results (see table 5.)

[Insert table 12 around here]

6.4 Geography and agency costs

John, Knyazeva, and Knyazeva (2011) show that remotely located firms pay higher dividend because of the higher cost of shareholder oversight of managerial investment decisions. One concern arises that results in our paper might be derived from agency costs derived from the asymmetric information between shareholders and managers of firms rather than shocks to the corporate real estate value. We mitigate this concern by testing our main specification while controlling for a central location dummy and the interaction of central location dummy with real estate value. Following John, Knyazeva, and Knyazeva (2011), firms are classified as centrally located if they are headquartered in one of the ten largest consolidated metropolitan statistical areas based on population size reported in the 2000 Census: New York City, Los Angeles, Chicago, Washington-Baltimore, San Francisco, Philadelphia, Boston, Detroit, Dallas, and Houston, and their suburbs. Central location dummy equals to one if the firm is located in a top ten metropolitan area, and zero otherwise.

Table 13 exhibits the results of our main specification while controlling for the location effect. The dependent variable is cash dividends over lagged PPE. $REValue$ coefficients remain positive and significant. Similar to John, Knyazeva, and Knyazeva (2011), location dummy is negative and mostly significant which shows that firms located in big MSAs which we call central locations pay less dividend compared to the firms located outside of big MSAs.

[Insert table 13 around here]

6.5 Investments

In a fifth robustness test, we address the concern that the collateral channel could be used only to increase the investments, but not to increase the payout or dividend smoothing. Hence, we run the regressions defined by equation (3) while controlling for the investments. The control variable is capital expenditure (COMPUSTAT item No. 128 normalized by lagged PPE, item No. 8).

Table 14 exhibits the results of these empirical analysis for dividends and share repurchases. The dependent variable in columns [1] – [3] is cash dividends over lagged PPE and in columns [4] – [6] is share repurchased over lagged PPE. The regressions used in columns [1] – [3] are same as the ones presented in columns [3], [4], and [5] of table 4 with the additional variable that accounts for investments. Similarly, the regressions used in columns [4] – [6] are the same as the ones presented in columns [3], [4], and [5] of table 5 with the same additional variable. Columns [1], [2], [4], and [5] present results of an OLS regression while columns [3] and [6] implement the IV strategy. As expected, we find a positive and significant value of the coefficient $REValue$ for both dividends and share repurchases even after controlling for $Investment$. The coefficients for $REValue$ in the different specifications are close in magnitude to the coefficients obtained in tables 4 and 5. They are also significant at the 1% confidence level. These results show that it is the appreciation in the collateral value –not the investments– what explains the higher payouts and prove that our results are robust to the inclusion of the investments variable.

[Insert table 14 around here]

Similarly, we address the concern that dividend smoothing is carried out by increases in investments rather than shocks in real estate prices. To confirm that increase in collateral value has direct and significant effect on the dividend smoothing, we run the regression specified in equation (7) while controlling for investments. As discussed before, capital expenditure normalized by lagged PPE is used as the measure of investments.

Table 15 reports the results of this robustness test. Columns [1] to [3] show the estimates when using the first measure of dividend smoothness described above. Columns [4] to [6] display the results using the same specifications, but the second measure. The real estate value, $REValue$, is calculated using the residential real estate indices in columns [1] and [4], while it is calculated using MSA level residential indices in columns [2], [3], [5], and [6]. Columns [1], [2], [4], and [5] present results of an OLS regression while columns [3] and [6] implement the IV strategy described above. As we expected, the $REValue$ coefficients are negative and statistically significant at the 5% and 1% levels when using state and MSA real estate indices, respectively. Moreover, estimated coefficients present a similar magnitude than the ones obtained in table 7. This findings confirm that our results are robust and an increase in the value of CRE assets results in a decrease in speed of adjustment, or in other words, an increase in dividend smoothing.

[Insert table 15 around here]

7 Conclusions

Corporate real estate (CRE) assets usually represent an important portion of the total assets of firms that own real estate. Therefore, a change in the value of CRE assets has an important effect on the decisions of the firm's managers, in particular, on the decisions related to payout. This paper examines the impact of real estate prices on the payout policy of firms. We document that an appreciation in the collateral value of CRE assets leads to an increase in cash dividends and share repurchases. The magnitude of this effect is higher for share repurchases than for cash dividends. Our empirical analysis shows that a $1 increase in the value of CRE assets results in a 0.26-0.44 cents increase in cash dividends and a 0.41-0.57 cents increase in share repurchases.

The average effect of real estate prices looks similar on dividends as well as share repurchases because firms do not decrease their dividends during the periods of decrease in real estate prices. On the other hand, share repurchases are pro−cyclical and are managed more frequently. We empirically find that positive shocks in real estate prices leads to increase in firms payout flexibility.

The effect of changes in the value of CRE assets on the firms' payout is not symmetric between periods of increase and decrease in real estate prices. Firms can increase their dividends when the value of their CRE assets increases (e.g., during real estate "booms"). However, firms are reluctant to decrease their dividend payout, hence the decrease in dividends when the value of their CRE assets decreases (e.g., during real estate "busts") is either small or insignificant. On the other hand, firms significantly increase their share repurchases during the "boom" period and decrease it during the "bust" period. During the "bust" period, we find that high (low) leveraged firms decrease (do not decrease) their dividends and share repurchases in response to decrease in real estate prices. We also document that the effects of real estate prices on the dividend and share repurchases policies are stronger for firms with few investment opportunities.

Moreover, we find that dividend smoothing increases, or equivalently, that the speed of adjustment (SOA) decreases, in firms that experience positive shocks to the value of their CRE assets. We empirically find that a 1% increase in the value of CRE assets decreases the average SOA of dividends by 3.80% –when using the measure of dividend smoothing in Lintner (1956)– and 4.36% –when using the measure in Leary and Michaely (2011).

Our analysis is focused on the microeconomic impact of real estate prices on the payout policies at the firm level. Extending these results to the analysis of the macroeconomic implications of corporate real estate shocks on the aggregate firms' payout is an interesting direction for future research in the interest of both policy makers and portfolio managers.

References

Aivazian, Varouj, Laurence Booth, and Sean Cleary. 2006. "Dividend smoothing and debt ratings." *Journal of Financial and Quantitative Analysis* 41 (02): 439–453.

Almazan, Andres, Adolfo De Motta, Sheridan Titman, and Vahap Uysal. 2010. "Financial structure, acquisition opportunities, and firm locations." *The Journal of Finance* 65 (2): 529–563.

Almeida, Heitor, Murillo Campello, and Michael Weisbach. 2004. "The cash flow sensitivity of cash." *Journal of Finance* 59 (4): 1777–1804.

Balakrishnan, Karthik, John Core, and Rodrigo Verdi. 2014. "The relation between reporting quality and financing and investment: Evidence from changes in financing capacity." *Journal of Accounting Research* 52 (1): 1–36.

Bates, Thomas, Kathleen Kahle, and René Stulz. 2009. "Why do US firms hold so much more cash than they used to?" *The Journal of Finance* 64 (5): 1985–2021.

Black, Fischer. 1976. "The dividend puzzle." *Journal of Portfolio Management* 2 (2): 5–8.

Bonaimé, Alice, Kristine Hankins, and Jarrad Harford. 2014. "Financial flexibility, risk management, and payout choice." *Review of Financial Studies* 27 (4): 1074–1101.

Brav, Alon, John Graham, Campbell Harvey, and Roni Michaely. 2005. "Payout policy in the 21st century." *Journal of Financial Economics* 77 (3): 483–527.

Buiter, Willem. 2010. "Housing wealth isn't wealth." *Economics-The Open-Access, Open-Assessment E-Journal* 4 (22): 1–29.

Chaney, Thomas, David Sraer, and David Thesmar. 2012. "The collateral channel: How real estate shocks affect corporate investment." *American Economic Review* 102:2381–2409.

Chen, Tao, Jarrad Harford, and Chen Lin. 2014. "Financial flexibility and corporate cash policy." *University of Hong Kong Working Paper.*

Cvijanovic, Dragana. 2014. "Real estate prices and firm capital structure." *Review of Financial Studies* 27 (9): 2690–2735.

Davidoff, Thomas. 2016. "Supply Constraints Are Not Valid Instrumental Variables for Home Prices Because They Are Correlated With Many Demand Factors." *Critical Finance Review*, vol. 6.

DeAngelo, Harry, and Linda DeAngelo. 1990. "Dividend policy and financial distress: An empirical investigation of troubled NYSE firms." *The Journal of Finance* 45 (5): 1415–1431.

DeAngelo, Harry, Linda DeAngelo, and René Stulz. 2006. "Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory." *Journal of Financial Economics* 81 (2): 227–254.

De Marzo, Peter, and Yuliy Sannikov. 2015. "Learning, termination, and payout policy in dynamic incentive contracts." *Stanford GSB Working Paper*, no. 3432.

Denis, David, Diane Denis, and Atulya Sarin. 1994. "The information content of dividend changes: Cash flow signaling, overinvestment, and dividend clienteles." *Journal of Financial and Quantitative Analysis* 29 (04): 567–587.

Dewenter, Kathryn, and Vincent Warther. 1998. "Dividends, asymmetric information, and agency conflicts: Evidence from a comparison of the dividend policies of Japanese and US firms." *Journal of Finance* 53 (3): 879–904.

Fama, Eugene, and Harvey Babiak. 1968. "Dividend policy: An empirical analysis." *Journal of the American Statistical Association* 63 (324): 1132–1161.

Fama, Eugene, and Kenneth French. 2001. "Disappearing dividends: changing firm characteristics or lower propensity to pay?" *Journal of Financial Economics* 60 (1): 3–43.

Farre-Mensa, Joan, Roni Michaely, and Martin Schmalz. 2015. "Financing payouts." *Ross School of Business Paper*, no. 1263.

Fudenberg, Drew, and Jean Tirole. 1995. "A theory of income and dividend smoothing based on incumbency rents." *Journal of Political Economy* 103 (1): 75–93.

Ghosh, Chinmoy, and Randall Woolridge. 1988. "An analysis of shareholder reaction to dividend cuts and omissions." *Journal of Financial Research* 11 (4): 281–294.

Glaeser, Edward, Joseph Gyourko, and Albert Saiz. 2008. "Housing supply and housing bubbles." *Journal of Urban Economics* 64 (2): 198–217.

Guay, Wayne, and Jarrad Harford. 2000. "The cash-flow permanence and information content of dividend increases versus repurchases." *Journal of Financial Economics* 57 (3): 385–415.

Guttman, Ilan, Ohad Kadan, and Eugene Kandel. 2010. "Dividend stickiness and strategic pooling." *Review of Financial Studies* 23 (12): 4455–4495.

Himmelberg, Charles, Christopher Mayer, and Todd Sinai. 2005. "Assessing high house prices: Bubbles, fundamentals and misperceptions." *Journal of Economic Perspectives* 19 (4): 67–92.

Jagannathan, Murali, Clifford Stephens, and Michael Weisbach. 2000. "Financial flexibility and the choice between dividends and stock repurchases." *Journal of financial Economics* 57 (3): 355–384.

John, Kose, Anzhela Knyazeva, and Diana Knyazeva. 2011. "Does geography matter? Firm location and corporate payout policy." *Journal of Financial Economics* 101 (3): 533–551.

Kaplan, Steven, and Luigi Zingales. 1997. "Do investment-cash flow sensitivities provide useful measures of financing constraints?" *Quarterly Journal of Economics* 112 (1): 169–215.

Kumar, Praveen. 1988. "Shareholder-manager conflict and the information content of dividends." *Review of Financial Studies* 1 (2): 111–136.

Kumar, Praveen, and Bong-Soo Lee. 2001. "Discrete dividend policy with permanent earnings." *Financial Management* 30 (3): 55–76.

Leary, Mark, and Roni Michaely. 2011. "Determinants of dividend smoothing: Empirical evidence." *Review of Financial Studies* 24 (10): 3197–3249.

Lintner, John. 1956. "Distribution of incomes of corporations among dividends, retained earnings, and taxes." *American Economic Review* 46 (2): 97–113.

Mian, Atif, and Amir Sufi. 2011. "House prices, home equity–based borrowing, and the US household leverage crisis." *The American Economic Review* 101 (5): 2132–2156.

———. 2016. "Who Bears the Cost of Recessions? The Role of House Prices and Household Debt." Technical Report, National Bureau of Economic Research.

Miller, Merton, and Franco Modigliani. 1961. "Dividend policy, growth, and the valuation of shares." *Journal of Business* 34 (4): 411–433.

Nelson, Theron, Thomas Potter, and Harold Wilde. 2000. “Real estate assets on corporate balance sheets.” *Journal of Corporate Real Estate* 2 (1): 29–40.

Rauh, Joshua. 2006. “Investment and financing constraints: Evidence from the funding of corporate pension plans.” *Journal of Finance* 61 (1): 33–71.

Saiz, Albert. 2010. “The geographic determinants of housing supply.” *Quarterly Journal of Economics* 125 (3): 1253–1296.

Sinai, Todd, and Nicholas Souleles. 2005. “Owner-occupied housing as a hedge against rent risk.” *The Quarterly Journal of Economics* 120 (2): 763–789.

Skinner, Douglas. 2008. “The evolving relation between earnings, dividends, and stock repurchases.” *Journal of Financial Economics* 87 (3): 582–609.

Tuzel, Selale. 2010. “Corporate real estate holdings and the cross-section of stock returns.” *Review of Financial Studies* 23 (6): 2268–2302.

Veale, Peter. 1989. “Managing corporate real estate assets: Current executive attitudes and prospects for an emergent management discipline.” *Journal of Real Estate Research* 4 (3): 1–22.

Von Eije, Henk, and William Megginson. 2008. “Dividends and share repurchases in the European Union.” *Journal of Financial Economics* 89 (2): 347–374.

Yoon, Pyung Sig, and Laura Starks. 1995. “Signaling, investment opportunities, and dividend announcements.” *Review of Financial Studies* 8 (4): 995–1018.

Zeckhauser, Sally, and Robert Silverman. 1983. “Rediscover your company’s real estate.” *Harvard Business Review* 61 (1): 111–117.

Figure 1: **Trends in firms segregated by change in the market value of their CRE assets.** Panel A shows the average Tobin's Q for firms which experienced the highest positive change in the value of their corporate real estate (CRE) assets (top half) as compared to firms which experienced the lowest or negative change in the value of their CRE assets (bottom half). Equivalently, panels B, C, and D exhibit the time series in average debt, average dividend paid, and average shares repurchased by these two groups of firms.

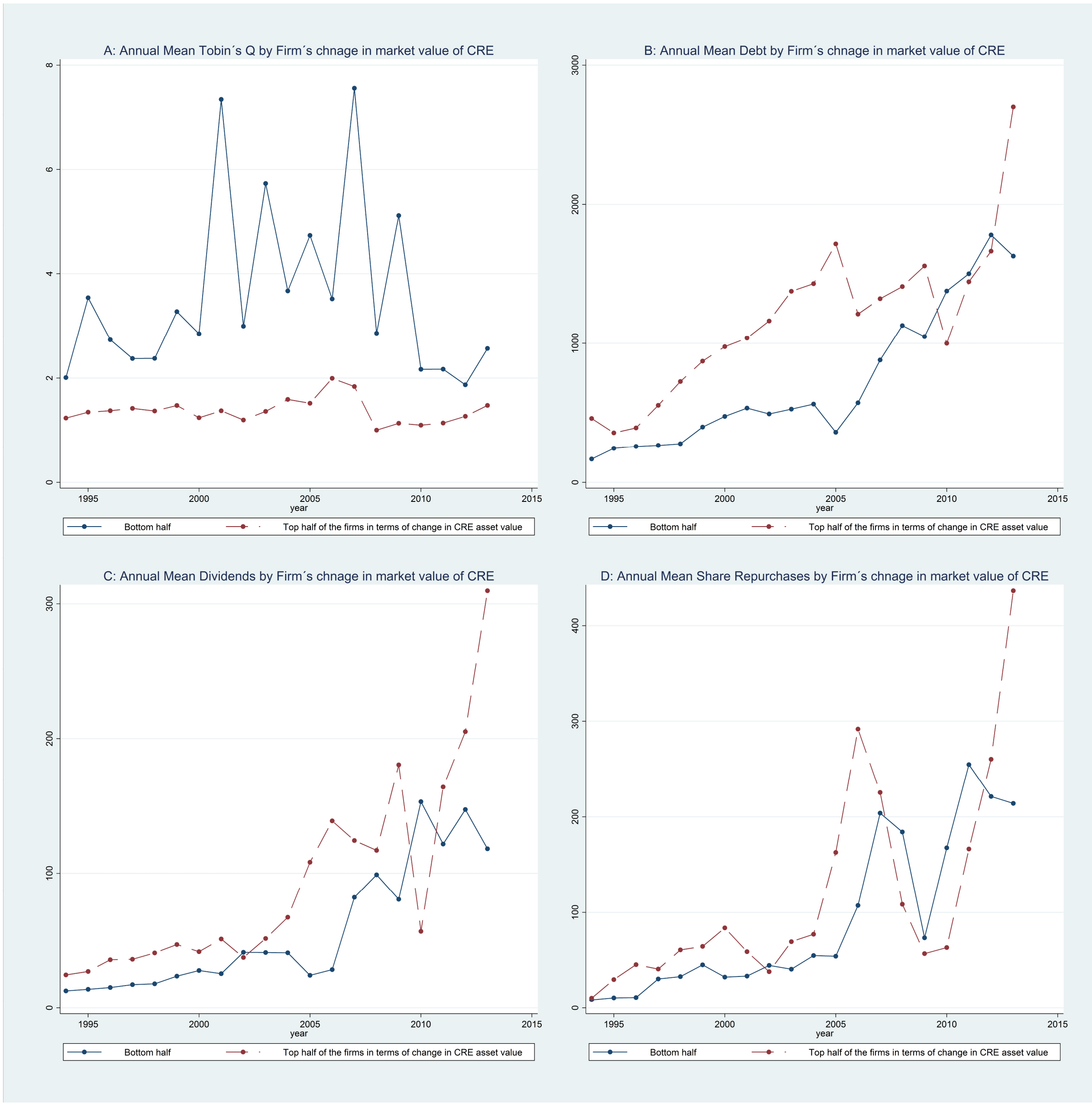

Table 1: **Summary statistics.** This table provides the summary statistics for the main variables that we use in the paper. δ_{Div} is a dummy variable that takes the value of one if the firm pays cash dividend and zero otherwise. δ_{Rep} and δ_{Payout} are dummy variables that take the value of one if the firm repurchases shares and pays out (through dividends or share repurchases), respectively. Dividend/lagged PPE is the ratio of cash dividend to previous year property, plant and equipment (PPE). Share Repurchases/lagged PPE is the ratio of shares repurchased to previous year PPE. RETA is the ratio of retained earnings to book value of assets. Leverage is the sum of short-term and long-term debt normalized by book value of assets. Asset growth ratio is the difference in current and lagged book value of assets divided by lagged book value of assets. Firm size is defined as the book value of total assets. Market to book ratio is the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets. Sales growth ratio is the difference in current and lagged value of sales divided by lagged value of sales. ROA is the operating income before depreciation minus depreciation and amortization, all divided by book value of assets. Cash holding is the cash and short term securities. Age is the number of years since the firm first appeared in the compustat database. RE Value is the ratio of market value of real estate normalized by previous year PPE. Residential real estate prices are the FHFA HPI and commercial real estate prices are the Real Capital Analytics CPPI. Local housing supply elasticity comes from Saiz (2010).

	Mean	Median	Std. Dev.	p25	p75	Obs.
δ_{Div}, firms paying dividends	0.350	0.000	0.477	0.000	1.000	26,643
δ_{Rep}, firms repurchasing shares	0.417	0.000	0.493	0.000	1.000	26,643
δ_{Payout}, firms paying dividends or repurchasing shares	0.558	1.000	0.497	0.000	1.000	26,643
Dividend on Common Equity (All firms)	46.516	0.000	285.770	0.000	3.547	26,504
Div. on common equity (only δ_{Div}=1 firms)	134.140	11.140	473.020	3.066	57.223	9,191
dividend/lagged PPE	0.025	0.000	0.046	0.000	0.030	26,504
dividend/lagged PPE (only δ_{Div}=1 firms)	0.073	0.060	0.052	0.027	0.125	9,191
Share Repurchase	66.704	0.000	497.660	0.000	1.388	25,002
Share Repurchase (only δ_{Div}=1)	167.120	0.559	805.570	0.000	30.950	9,012
Share Repurchase (only δ_{Rep}=1)	175.960	5.450	796.320	0.583	49.430	9,478
Share Repurchase/lagged ppe	0.027	0.000	0.048	0.000	0.027	25,002
Share Repurchase/lagged ppe (only δ_{Div}=1)	0.041	0.005	0.054	0.000	0.088	9,012
Share Repurchase/lagged ppe (only δ_{Rep}=1)	0.071	0.064	0.054	0.014	0.133	9,478
RETA (Retained Earnings/Total Assets)	-0.331	0.113	1.204	-0.374	0.359	26,339
Leverage	0.272	0.209	0.318	0.047	0.373	26,518
Asset Growth Ratio	0.096	0.046	0.334	-0.054	0.174	23,939
Firm Size	2232.900	143.950	11531.000	26.640	801.220	26,587
Market-to-book ratio	2.046	1.486	1.567	1.101	2.289	23,790
Sales Growth Ratio	0.239	0.068	3.380	-0.032	0.191	23,648
ROA	0.001	0.069	0.245	-0.013	0.122	26,496
Cash Holding	191.320	9.581	1199.000	1.417	52.382	26,582
Age of the firm (years)	20.303	17.000	13.311	9.000	30.000	26,643
RE Value (State level - Residential)	0.864	0.364	1.329	0.000	1.105	26,643
RE Value (MSA level - Residential)	0.787	0.318	1.145	0.000	1.060	23,198
RE Value (City level - Commercial)	0.728	0.255	1.092	0.000	0.976	4,694
State Residential Price Index	0.735	0.677	0.218	0.564	0.922	26,643
MSA Residential Price Index	0.767	0.708	0.240	0.560	0.954	23,209
City Commercial Price Index	0.683	0.647	0.263	0.492	0.842	4,694
Local Housing Supply Elasticity	1.284	1.100	0.708	0.650	1.940	20,277

Table 2: **First-stage regression. The impact of local housing supply elasticity on housing prices.** This table provides the results of the first stage regression. It studies the effect of local housing supply elasticity on real estate prices at the MSA and city level. All regressions control for year and firm fixed effects and standard errors clustered at the MSA/city level. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	MSA Residential Prices		City Commercial Prices	
	[1]	[2]	[3]	[4]
Local housing supply elasticity × Mortgage rate	0.025***		0.027***	
	(5.7)		(5.4)	
First quartile of elasticity × Mortgage rate		−0.056***		−0.036***
		(-7.3)		(-6.3)
Second quartile of elasticity × Mortgage rate		−0.038***		−0.026***
		(-4.6)		(-2.3)
Third quartile of elasticity × Mortgage rate		-0.010		0.003
		(-1.6)		(0.6)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	1,953	1,953	4,41	4,41
R^2	0.814	0.815	0.872	0.872

Table 3: **Determinants of the real estate ownership decision.** This table provides the characteristics that determine real estate ownership decision in 1993. The dependent variable in column [1] is a dummy that indicates whether the firm reports any real estate asset on its balance sheet in 1993 labeled as *REOwner*. The dependent variable in column [2] is the market value of the firm real estate assets in 1993 labeled as *REValue*. These 2 columns show the results of the cross-sectional regressions in 1993 controlled by the 5 quantiles of assets, ROA, age, as well as industry and state fixed effects(FE). T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	REOwner [1]	*REValue* [2]
2^{nd} quintile of assets	0.179***	0.125*
	(7.20)	(1.70)
3^{rd} quintile of assets	0.383***	0.203***
	(14.41)	(2.58)
4^{th} quintile of assets	0.533***	0.253***
	(18.8)	(3.01)
5^{th} quintile of assets	0.538***	0.125
	(17.1)	(1.34)
2^{nd} quintile of ROA	0.118***	0.295***
	(4.41)	(3.81)
3^{rd} quintile of ROA	0.154***	0.172***
	(5.71)	(2.15)
4^{th} quintile of ROA	0.158***	0.219***
	(5.80)	(2.71)
5^{th} quintile of ROA	0.130***	0.191**
	(4.90)	(2.43)
2^{nd} quintile of age	0.064**	0.018
	(2.27)	(0.22)
3^{rd} quintile of age	0.120***	0.057
	(4.50)	(0.72)
4^{th} quintile of age	0.217***	0.368***
	(8.38)	(4.80)
5^{th} quintile of age	0.261***	0.741***
	(9.29)	(8.90)
Industry FE	Yes	Yes
State FE	Yes	Yes
Observations	2,163	2,163
R^2	0.538	0.267

Table 4: **Real estate prices and dividends.** This table reports the results of the OLS and IV estimates of the specifications in equations (1) – (3). The dependent variable is cash dividends over lagged PPE. Columns [1] – [4] and [6] show the results of the OLS specification. Columns [5] and [7] show the results of IV estimation. For the IV specification, the instrument in the first stage is the land supply elasticity interacted with the nationwide real interest rate. Columns [2] – [7] control for initial firm level characterstics interacted with real estate prices. All the regressions except for columns [1] & [2], control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, and cash holdings. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	OLS [1]	OLS [2]	OLS [3]	OLS [4]	IV [5]	OLS [6]	IV [7]
RE Value (State resid. prices)	0.0030***	0.0032***	0.0033***				
	(11.20)	(11.59)	(10.38)				
RE Value (MSA resid. prices)				0.0034***	0.0044***		
				(8.49)	(9.57)		
RE Value (City comm. prices)						0.0026***	0.0026***
						(2.68)	(2.79)
State resid. prices	0.0043*	0.3320***	0.3445***				
	(1.67)	(8.37)	(7.59)				
MSA resid. prices				0.0061	0.0242		
				(0.02)	(0.05)		
City comm. prices						0.0743	–
						(0.05)	
Firm level controls	No	No	Yes	Yes	Yes	Yes	Yes
Initial Controls * State resid. prices	No	Yes	Yes	No	No	No	Yes
Initial Controls * MSA resid. prices	No	No	No	Yes	Yes	No	No
Initial Controls * City Ccomm. prices	No	No	No	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,504	25,921	20,808	18,336	15,986	3,604	3,604
R^2	0.739	0.751	0.780	0.784	0.781	0.777	0.779

Table 5: **Real estate prices and share repurchases.** This table reports the results of the OLS and IV estimates of the specifications in equations (1)-(3). The dependent variable is share repurchases over lagged PPE. Column [1] – [4] and [6] show the results of the OLS specification, while columns [5] and [7] show the results of IV estimation. For the IV specification, the instrument in the first stage is the land supply elasticity interacted with the nationwide interest rate. Columns [2] – [7] control for initial firm level characterstics interacted with real estate prices. All the regressions except for columns [1] & [2], control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, and cash holdings. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	OLS [1]	OLS [2]	OLS [3]	OLS [4]	IV [5]	OLS [6]	IV [7]
RE Value (State resid. prices)	0.0009**	0.0008*	0.0029***				
	(1.99)	(1.73)	(5.23)				
RE Value (MSA resid. prices)				0.0033***	0.0041***		
				(4.50)	(5.02)		
RE Value (City comm. prices)						0.0056***	0.0057***
						(3.45)	(3.54)
State resid. prices	−0.0080*	0.0354	0.1187				
	(-1.88)	(0.53)	(1.41)				
MSA resid. prices				−0.2652	−0.3612		
				(-0.41)	(-0.40)		
City comm. prices						−0.4582	–
						(-0.17)	
Firm level controls	No	No	Yes	Yes	Yes	Yes	Yes
Initial Controls * State resid. prices	No	Yes	Yes	No	No	No	Yes
Initial Controls * MSA resid. prices	No	No	No	Yes	Yes	No	No
Initial Controls * City Ccomm. prices	No	No	No	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,002	24,496	19,627	17,242	15,042	3,373	3,373
R^2	0.397	0.411	0.444	0.449	0.455	0.487	0.487

Table 6: **Real estate prices and payout flexibility.** This table reports the results of the OLS and IV estimates of the specifications in equations (1)-(3). The dependent variable is payout flexibility. Column [1] – [4] show the results of the OLS specification, while columns [5] shows the results of IV estimation. For the IV specification, the instrument in the first stage is the land supply elasticity interacted with the nationwide interest rate. Columns [2] – [5] control for initial firm level characterstics interacted with real estate prices. All the regressions except for columns [1] & [2], control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, and cash holdings. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	OLS [1]	OLS [2]	OLS [3]	OLS [4]	IV [5]
RE Value (State resid. prices)	0.0164***	0.0118**	0.0296***		
	(3.40)	(2.33)	(5.19)		
RE Value (MSA resid. prices)				0.0315***	0.0358***
				(4.26)	(4.29)
State resid. prices	−0.0699*	−0.8943	−0.6937		
	(1.69)	(-1.50)	(-1.00)		
MSA resid. prices				1.3753	−0.2310
				(0.11)	(-0.17)
Firm level controls	No	No	Yes	Yes	Yes
Intial Controls * State resid. prices	No	Yes	Yes	No	No
Intial Controls * MSA resid. prices	No	No	No	Yes	Yes
Intial Controls * City Ccomm. prices	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	13,187	13,065	11,101	9,599	8,284
R^2	0.646	0.66	0.664	0.656	0.657

Table 7: **Real estate prices and dividend smoothing.** This table tests the effect of real estate prices on the dividend smoothness. Columns [1] – [3] use the measure of dividend smoothing in Lintner (1956) as the dependent variable, while columns [4] – [6] use the dividend smoothing measure in Leary and Michaely (2011) as the dependent variable. MSA and state level residential real estate prices are obtained from the website of Federal Housing Finance Association (FHFA). Column [1], [2], [4] and [5] show the results of the OLS specification, while columns [3] and [6] show the results of IV estimation. For the IV specification, the instrument in the first stage is the land supply elasticity interacted with the nationwide interest rate. All the regressions control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, cash holdings. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Panel A: Dividend Smoothing (1st measure)			Panel B: Dividend Smoothing (2nd measure)		
	OLS	OLS	IV	OLS	OLS	IV
	[1]	[2]	[3]	[4]	[5]	[6]
RE Value (State resid. prices)	-0.0187^{**}			-0.0124^{**}		
	(-2.26)			(-2.13)		
RE Value (MSA resid. prices)		-0.0380^{***}	-0.0292^{***}		-0.0436^{***}	-0.0431^{***}
		(-4.70)	(-3.14)		(-5.68)	(-4.75)
State resid. prices	0.0918			-0.0225		
	(0.04)			(-0.01)		
MSA resid. prices		-0.4425	0.0663		-0.2718	0.7411
		(-0.02)	(0.00)		(-0.01)	(0.05)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Initial Controls * State resid. prices	Yes	No	No	Yes	No	No
Initial Controls * MSA resid. prices	No	Yes	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,709	18,232	15,891	20,709	18,232	15,891
R^2	0.069	0.100	0.116	0.096	0.106	0.102

Table 8: **Real Estate Prices, Dividends, and Share Repurchases: Increasing (2002-2007) vs decreasing (2008-2011) real estate prices.** This table tests the effect of real estate prices on the dividends and share repurchases during boom and bust period. The dependent variable in panel A of this table is cash dividend over lagged PPE and in panel B is share repurchase over lagged PPE. The regressions used in panel A and panel B are same as the ones presented in columns [1] – [5] of table 4 (for panel A) and of table 5 (for panel B). All the regressions except for columns [1], [2], [6], & [7] control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, and cash holdings. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Boom Period (2002-2007)					Bust Period (2008-2011)				
	OLS	OLS	OLS	OLS	IV	OLS	OLS	OLS	OLS	IV
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Panel A: Dependent Variable - Dividend Paid										
RE Value (State resid. prices)	0.0036***	0.0033***	0.0037***			−0.0013	−0.0009	−0.0015		
	(4.93)	(4.42)	(4.72)			(-0.73)	(-0.5)	(-0.77)		
RE Value (MSA resid. prices)				0.0038***	0.0069***				−0.0002	−0.0016
				(3.82)	(6.14)				(-0.09)	(-0.59)
State resid. Prices	0.0045	0.2885***	0.2553**			0.0173	0.2367	0.1793		
	(1.04)	(2.73)	(2.45)			(1.51)	(0.50)	(0.38)		
MSA resid. Prices				−0.0454	−0.0802				0.3879	−0.0113
				(-0.06)	(-0.24)				(0.60)	(-0.05)
Observations	5,905	5,841	5,243	4,584	4,031	2,713	2,697	2,505	2,196	1,922
R^2	0.863	0.877	0.891	0.896	0.897	0.883	0.890	0.898	0.898	0.893
Panel B: Dependent Variable - Shares Repurchased										
RE Value (State resid. prices)	0.0041***	0.0026*	0.0049***			0.0033	0.0031	0.0051		
	(3.10)	(1.86)	(3.16)			(1.10)	(0.97)	(1.51)		
RE Value (MSA resid. prices)				0.0060***	0.0090***				0.0069	0.0056
				(2.94)	(3.86)				(1.58)	(1.18)
State resid. Prices	−0.0141*	0.2858	0.2162**			−0.0334*	−0.3466	−0.5993		
	(-1.75)	(1.03)	(0.75)			(-1.73)	(-0.44)	(-0.73)		
MSA resid. Prices				−2.0413	−1.1455*				1.4966	−0.7364*
				(-1.41)	(-1.67)				(1.31)	(-1.72)
Observations	5,501	5,451	4,899	4,263	3,757	2,602	2,589	2,403	2,100	1,842
R^2	0.607	0.629	0.639	0.649	0.658	0.667	0.687	0.686	0.691	0.685
Firm level controls	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Intial Controls * State resid. Prices	No	Yes	Yes	No	No	No	Yes	Yes	No	No
Intial Controls * MSA resid. Prices	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 9: **Real Estate Prices, Dividends, and Share Repurchase: Leverage effect during bust period (2008-2011).** This table tests the effect of real estate prices on the dividends and share repurchases for very high and very low leveraged firms during the bust period. The dependent variable in panel A of this table is cash dividend over lagged PPE and in panel B is share repurchase over lagged PPE. The regressions used in panel A and panel B are same as the ones presented in columns [1] – [5] of table 4 (for panel A) and of table 5 (for panel B). All the regressions except for columns [1], [2], [6], & [7] in both the panels, control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, and cash holdings. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	High leveraged firms					Low leveraged firms				
	OLS	OLS	OLS	OLS	IV	OLS	OLS	OLS	OLS	IV
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Panel A: Dependent Variable - Dividend Paid										
RE Value (State resid. prices)	0.0036	0.0057	0.0058*			-0.0166^{***}	-0.0129^{**}	-0.0136^{**}		
	(1.20)	(1.63)	(1.94)			(-3.92)	(-2.55)	(-2.47)		
RE Value (MSA resid. prices)				0.0065*	0.0054				-0.0193^{***}	-0.0270^{***}
				(1.76)	(1.19)				(-2.59)	(-3.14)
State resid. Prices	0.0112	-1.0777	-1.0163			0.0689**	0.1401	-0.0561		
	(0.61)	(-1.42)	(-1.23)			(2.36)	(0.00)	(-0.00)		
MSA resid. Prices				0.4253	-0.1801				-6.8753	3.6221
				(0.41)	(-0.54)				(-1.41)	(0.18)
Observations	815	809	713	611	532	808	807	761	661	583
R^2	0.921	0.933	0.962	0.961	0.955	0.848	0.882	0.887	0.881	0.882
Panel B: Dependent Variable - Shares Repurchased										
RE Value (State resid. prices)	0.0025	0.0028	0.0034			-0.0020	-0.0107	-0.0072		
	(0.50)	(0.49)	(0.52)			(-0.32)	(-1.34)	(-0.82)		
RE Value (MSA resid. prices)				0.0069	0.0083				-0.1060	-0.0097
				(0.90)	(0.93)				(-0.85)	(-0.68)
State resid. Prices	-0.0167	0.3427	0.4490			-0.0200	-6.0272	-4.4154		
	(-0.54)	(0.28)	(0.25)			(-0.45)	(-1.14)	(-0.66)		
MSA resid. Prices				-0.5357	-0.5313				3.5702	5.9283
				(-0.22)	(-0.80)				(0.44)	(0.19)
Observations	782	778	683	587	508	769	768	710	624	550
R^2	0.767	0.811	0.824	0.841	0.835	0.663	0.714	0.716	0.708	0.770
Firm level controls	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Intial Controls * State resid. Prices	No	Yes	Yes	No	No	No	Yes	Yes	No	No
Intial Controls * MSA resid. Prices	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 10: **Real Estate Prices, Dividends, and Share Repurchase: Availability of Investment Opportunities.** This table tests the effect of real estate prices on the dividends and share repurchases conditioned on the availability of investment opportunities. Firms in bottom 3 deciles of Tobins Q are defined to proxy for less investment opportunities. Similarly, firms in top 3 deciles of Tobins Q are defined to proxy for high investment opportunities. The dependent variable in panel A of this table is cash dividend over lagged PPE and in panel B is share repurchase over lagged PPE. The regressions used in panel A and panel B are same as the ones presented in columns [1] – [5] of table 4 (for panel A) and of table 5 (for panel B). All the regressions except for columns [1], [2], [6], & [7] in both the panels, control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, and cash holdings. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Firms with less investment opportunities available					Firms with more investment opportunities available				
	OLS	OLS	OLS	OLS	IV	OLS	OLS	OLS	OLS	IV
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
	Panel A: Dependent Variable - Dividend Paid									
RE Value (State resid. prices)	0.0021***	0.0026***	0.0020***			0.0011***	0.0016***	0.0003		
	(4.95)	(5.88)	(4.05)			(2.17)	(3.00)	(0.52)		
RE Value (MSA resid. prices)				0.0016***	0.0021***				0.0007	0.0011
				(2.47)	(2.85)				(0.82)	(1.14)
State resid. Prices	0.0110**	0.0260	0.0131			−0.0029	0.4956$*{*}{*}$	0.5847***		
	(2.50)	(0.21)	(0.05)			(-0.62)	(6.61)	(7.10)		
MSA resid. Prices				0.0461	0.2835				−0.0007	−0.1951
				(0.07)	(0.41)				(-0.00)	(-0.45)
Observations	7,588	7,486	6,354	5,494	4,697	8,813	8,526	6,043	5,494	4,835
R^2	0.705	0.722	0.746	0.747	0.736	0.847	0.863	0.901	0.903	0.905
	Panel B: Dependent Variable - Shares Repurchased									
RE Value (State resid. prices)	0.0026***	0.0029***	0.0043***			−0.0021**	−0.0020**	−0.0007		
	(3.77)	(4.06)	(5.07)			(-2.32)	(-2.15)	(-0.49)		
RE Value (MSA resid. prices)				0.0042***	0.0051***				−0.0005	−0.0008
				(3.71)	(3.94)				(-0.26)	(-0.40)
State resid. Prices	−0.0085	−0.0839	−0.1798			−0.0082	0.1597	−0.2275		
	(-1.21)	(-0.42)	(-0.42)			(-0.98)	(0.84)	(-0.59)		
MSA resid. Prices				−0.1653	0.0060				−0.1953	−0.1780
				(-0.14)	(0.01)				(-0.44)	(-0.13)
Observations	7,283	7,192	6,120	5,273	4,494	8,161	7,921	5,544	5,027	4,450
R^2	0.419	0.438	0.480	0.488	0.49	0.567	0.591	0.619	0.626	0.635
Firm level controls	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Intial Controls * State resid. Prices	No	Yes	Yes	No	No	No	Yes	Yes	No	No
Intial Controls * MSA resid. Prices	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 11: **Real estate prices and payout: Robustness tests 1 and 2.** This table tests the robustness of the effect of real estate prices on the payout policy of the firm. The baseline regression is the specification in column [4] of Table 4. Dependent variables in columns [1] and [3] are the ratio of cash dividend to lagged property, plant and equipment (PPE) and share repurchase to lagged PPE, respectively in lower 3 quartile of firm size and in the largest 20 MSAs. Dependent variables in columns [2] and [4] are the average dividend over the next 3 years normalized by lagged PPE, and average share repurchase over next 3 years normalized by lagged PPE. MSA level esidential real estate prices are obtained from the website of Federal Housing Finance Association (FHFA). All regressions use MSA-level residential prices, year and firm fixed effect, control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, cash holdings, and initial controls interacted with MSA-level residential prices. Standard errors are clustered at the MSA-year level. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Dividend/lagged PPE		Share Repurchases/lagged PPE	
	Large MSAs & small firms	3-year mean dividend	Large MSAs & small firms	3-year mean repurchase
	[1]	[2]	[3]	[4]
RE Value (MSA resid. prices)	0.0054***	0.0068***	0.0035***	0.0117***
	(8.09)	(12.09)	(2.95)	(6.24)
MSA resid. prices	−0.2469	0.0653	−0.4036	0.0979
	(-0.40)	(0.07)	(-0.38)	(0.03)
Firm level controls	Yes	Yes	Yes	Yes
Initial Controls * MSA resid. prices	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	7,890	14,933	7,401	13,260
R^2	0.778	0.784	0.457	0.579

Table 12: **Real estate prices and payout: Robustness test 3.** In this table, we test the robustness of the effect of real estate prices on the payout policy of the firm for older firms to mitigate the endogeneity problem associated with choice of being located in a particular state or MSA. The dependent variable in columns [1] – [3] is cash dividend over lagged PPE and in columns [4] – [6] is share repurchased over lagged PPE. The regressions used in columns [1] – [3] are same as the ones presented in columns [3], [4], and [5] of table 4 but run on the sample of firms which have been public for at least 10 years. Similarly, regressions used in columns [4] – [6] are same as the ones presented in columns [3], [4], and [5] of table 5 but run on the sample of older firms. All the regressions control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, cash holdings. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Panel A Dividend/lagged PPE			Panel B Share Repurchase/lagged PPE		
	OLS	OLS	IV	OLS	OLS	IV
	[1]	[2]	[3]	[4]	[5]	[6]
RE Value (State resid. prices)	0.0031^{***}			0.0029^{***}		
	(8.65)			(4.88)		
RE Value (MSA resid. prices)		0.0036^{***}	0.0046^{***}		0.0031^{***}	0.0038^{***}
		(7.86)	(8.84)		(4.01)	(4.33)
State resid. Prices	0.1743^{**}			0.0212		
	(2.12)			(0.15)		
MSA resid. Prices		0.2026	0.0646		-0.4336	-0.4534^{*}
		(0.89)	(0.46)		(-1.15)	(-1.94)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Initial Controls * State resid. Prices	Yes	No	No	Yes	No	No
Initial Controls * MSA resid. Prices	No	Yes	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,419	14,467	12,590	15,603	13,703	11,926
R^2	0.792	0.794	0.792	0.475	0.478	0.483

Table 13: **Real estate prices and dividend payout: Robustness test 4.** This table tests the effect of real estate prices on the dividend payout accounting for location of firms. The dependent variable is cash dividend over lagged PPE. The regressions used are same as the ones presented in columns [1] – [5] of table 4 with addition of location dummy and interation of real estate value with location dummy. All the regressions except in column [1] and [2] control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, cash holdings. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	OLS [1]	OLS [2]	OLS [3]	OLS [4]	IV [5]
RE Value (State Residential Prices)	0.0026***	0.0019***	0.0016***		
	(7.82)	(5.71)	(4.23)		
RE Value (MSA Reidential Prices)				0.0025***	0.0035***
				(5.32)	(6.26)
Central Location	−0.0010	−0.0041*	−0.0061***	−0.0047**	−0.0049*
	(-0.68)	(1.93)	(-2.91)	(-2.17)	(-1.82)
Central Location*RE Value	0.0011**	0.0009*	0.0013**	0.0018*	0.0001
	(2.21)	(1.81)	(2.49)	(1.76)	(0.15)
State Residential Prices	0.0081***	0.1379***	0.1236***		
	(3.20)	(3.83)	(3.00)		
MSA Reidential Prices				−0.0070	−0.0064
				(-0.08)	(-0.10)
Firm level controls	No	No	Yes	Yes	Yes
Initial Controls * State Res. Prices	No	Yes	Yes	No	No
Initial Controls * MSA Res. Prices	No	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	24,155	23,632	19,217	18,336	15,986
R2	0.057	0.350	0.417	0.419	0.422

Table 14: **Real estate prices and payout: Robustness test 5a.** This table tests the robutness of the effect of real estate prices on the payout policy of the firm while controlling for the investment. The dependent variable in columns [1] – [3] is cash dividend over lagged PPE and in columns [4] – [6] is share repurchased over lagged PPE. The regressions used in columns [1] – [3] are same as the ones presented in columns [3], [4], and [5] of table 4 with an additional control of investment. Similarly, regressions used in columns [4] – [6] are same as the ones presented in columns [3], [4], and [5] of table 5 with an additional contol of investment. Investment variable is defined as capital expenditure normalized by lagged PPE. All the regressions control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, cash holdings, and initial firm level characterstics interacted with real estate prices. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Dividend/lagged PPE			Share Repurchase/lagged PPE		
	OLS	OLS	IV	OLS	OLS	IV
	[1]	[2]	[3]	[4]	[5]	[6]
RE Value (State resid. prices)	0.0030***			0.0026***		
	(9.35)			(4.65)		
RE Value (MSA resid. prices)		0.0034***	0.0044***		0.0030***	0.0039***
		(8.34)	(9.40)		(4.11)	(4.75)
State resid. Prices	0.3445***			0.1187		
	(7.59)			(1.41)		
MSA resid. Prices		0.0103	0.0272		−0.2607	−0.3606
		(0.03)	(0.05)		(-0.40)	(-0.40)
Investment	0.0011	0.0008	0.0006	0.0040***	0.0036***	0.0032**
	(1.59)	(0.14)	(0.80)	(3.35)	(2.81)	(2.36)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Initial Controls * State resid. Prices	Yes	No	No	Yes	No	No
Initial Controls * MSA resid. Prices	No	Yes	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,631	18,194	15,857	19,460	17,106	14,919
R^2	0.781	0.783	0.779	0.445	0.450	0.456

Table 15: **Real estate prices and dividend smoothing: Robustness test 5b.** This table tests the effect of real estate prices on the dividend smoothness while controlling for the investment. The baseline regression is the specification in column [1], [2], and [3] of table 7. Columns [1] – [3] use traditional used measure of dividend smoothing as dependent variable, while columns [4] – [6] use dividend smoothing measure as used in Leary and Michaely (2011) as the dependent variable.The regressions used are same as the ones presented table 7 with an additional control of investment. Investment variable is defined as capital expenditure normalized by lagged PPE. All the regressions control for ratio of retained earning to total assets, leverage, asset growth ratio, firm size, market to book ratio, firm age, sales growth ratio, ROA, cash holdings, and initial firm level characterstics interacted with real estate prices. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Dividend Smoothing (1st measure)			Dividend Smoothing (2nd measure)		
	OLS	OLS	IV	OLS	OLS	IV
	[1]	[2]	[3]	[4]	[5]	[6]
RE Value (State resid. prices)	-0.0181^{**}			-0.0125^{**}		
	(-2.17)			(-2.11)		
RE Value (MSA resid. prices)		-0.0374^{***}	-0.0283^{***}		-0.0440^{***}	-0.0437^{***}
		(-4.60)	(-3.02)		(-5.68)	(-4.78)
State resid. prices	0.0670			-0.0513		
	(0.03)			(-0.03)		
MSA resid. prices		-0.3876	-0.1153		-0.2012	0.5103
		(-0.02)	(-0.01)		(-0.01)	(0.03)
Investment	0.0431	0.0245	0.0309	0.0332	0.0367	0.0429
	(1.28)	(0.89)	(1.02)	(1.40)	(1.39)	(1.45)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Initial Controls * State resid. prices	Yes	No	No	Yes	No	No
Initial Controls * MSA resid. prices	No	Yes	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,532	18,090	15,762	20,532	18,090	15,762
R^2	0.069	0.101	0.116	0.097	0.107	0.103