Local dividend clienteles

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Abstract

We exploit variation in demographics to identify the effect of dividend demand on firm payout policy. Retail investors tend to hold local stocks and older investors prefer dividend-paying stocks. These tendencies generate geographically varying demand for dividends. Using a sample of U.S. listed firms, we show that, at locations where seniors constitute a large fraction of the population, firms are more likely to pay and to initiate dividends, and have higher dividend yield. The fraction of seniors is not correlated with repurchases, profitability, or investment, however, suggesting that the geographic variation in dividend payout is not driven by some unmeasured firm characteristic affecting the ability or willingness to pay. The effect of seniors is stronger for firms and in locations where local investors are more important as owners. Finally, ex-dividend day price drops are larger for firms in locations with many seniors, consistent with dividend demand being higher for those firms. We conclude that the preferences of a firm's investors help explain payout policy.

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This paper examines the dividend clientele hypothesis of through a geographic lens. Miller and Modigliani (1961) suggest that matching will take place in the stock market between investors who demand dividends and those firms which find it (relatively) cheap to pay them. Since retail stock ownership tends to be local (see e.g. Grinblatt and Keloharju 2001, Hong, Kubik and Stein 2005a and Ivković and Weisbenner 2005), matching may be local too. Variation in the local demand for dividends will then induce differential dividend policies across space. We test for this type of investor preference-driven dividend policy for listed US firms.

Our identification is based on the idea that seniors (65 years and up) have a relative preference for dividend paying stocks compared to younger age groups (see e.g. Graham and Kumar 2006).[1] Because of the substantial demographic variation across areas in the US, this provides a potentially powerful identification strategy (see e.g. Becker (2006)). According to our argument, demographic variation creates variation in dividend demand across firms located at different locations. Thus, we can identify (a component of) the dividend demand facing individual firms. We use this proxy to check whether dividend demand is a determinant of payout policy for US firms.

The predicted relationship between demographics and payout policy is apparent from the graphs of state averages presented in Figure one. The first graph plots the fraction of listed firms headquartered in a state that paid dividends in 2000 against the proportion of the state's population that was over 65 years old in 2000. The second graph is similar, but replaces dividend payment rates with the average residuals from a regression of a dividend payment dummy on firm level control variables. In both cases, the positive relationship is easily visible and statistically significant.[2]

We show that listed firms headquartered in counties with more seniors are more likely to pay dividends, more likely to initiate dividends if they are previously non-payers, and pay a higher dividend yield on average. Increasing seniors by one standard deviation (an increase by 3.2% of the population in the county) increases the probability of a local firm being a dividend payer by approximately 1.7%, the probability of initiating dividends by approximately 1.1% (annually) and the dividend yield by approximately 0.23% of assets.

Because the factors affecting payout policy are only partially understood, a concern with these results is that some omitted variable might be the true driver of dividend policy. If such a variable is correlated with seniors, our results are spurious. We address this concern in several ways. First, we

[1] We do not address whether seniors' demand for dividends is rationally motivated by e.g. taxes or "behavioral" as in Shefrin and Statman (1984). See Graham and Kumar (2006) for a discussion.

[2] Throughout our statistical analysis, we use counties as the geographical unit, and control for state fixed effects. The relationship between seniors and dividends holds both between and within states.

include state fixed effects in all regressions, so any variable that varies only by state is absorbed and cannot explain any of our regression findings. Second, we include a range of county- and firm-level control variables. Third, we examine the effect of seniors on repurchases, which is an alternative form of payouts with no expected link to seniors. We find no relation between repurchases and seniors. Similarly, we show that seniors does not predict higher profits or lower investment, factors that might be related to dividend payment status. Fourth, we test whether local dividend demand is more important for local firms when there are few firms around (similar to the "only-game-in-town" effect of Hong Kubik and Stein (2005b)).

Next, we compare our theory to the alternative story about supply more directly. If the seniors variable proxies for local demand for dividends, the effect should be stronger where for firms which face a stronger local bias of retail investors. For both a firm-based measure (firm size) and a county-based measure (the local bias in non-senior retail investor portfolios) we find that this is the case. If seniors were a measure of dividend supply, neither of these effects would be expected.

Finally, we compare ex-dividend day returns (the price drop from previous closing to the opening of trade on the ex-dividend day, as a fraction of dividend paid). Firms in locations with many seniors experience larger ex-dividend day drops in their share prices. This is consistent with higher demand for dividends facing these firms, forcing price drops to be higher in order to compensate ex-dividend buyers for missing out on dividends.

Our findings suggest that there are geographically varying dividend clienteles. In other words, firms face varying incentives to pay dividends depending on their location. The results suggest that there may be important geographical variation in the capital markets conditions facing firms in different locations. Finally, our findings show how the preferences of a firm's investors can be an important determinant of corporate policy.

The rest of the paper is organized as follows: the next section (1) discusses relevant literature. The following sections describe the data (2) and results (3). Section (4) concludes.

1. Related literature

The idea of dividend clienteles selecting into owning the stocks that offer dividends goes back to Miller and Modigliani (1961). If paying dividends is costly for firms, but variably so, an efficient equilibrium entails those firms paying dividends which find it least costly to do so. We add to this argument the idea that local investors vary in their demand for dividends and that this matters for payout policy because of portfolio patterns. In this, we lean on two empirical regularities: that seniors prefer dividend paying stocks relative to other age groups and that investors tend to hold local stocks.

The age-dependent preference for dividend stocks is demonstrated for US investors by Graham and Kumar's (2006). The tendency to hold local stocks is establish for retail investors in various countries by Grinblatt and Keloharju (2001), Hong, Kubik and Stein (2005a), Ivković and Weisbenner (2005) and Massa and Simonov (2006).[3]

This paper is indirectly related to research on the time series variation in the demand for dividends, e.g. Baker and Wurgler (2004a, b). Unlike the tests of Baker and Wurgler, our results do not bear directly on the question of stock market efficiency. However, like Baker and Wurgler, we conclude that dividend demand drives some part of the variation in payout policy (in our case, cross-sectional variation).

Finally, our findings confirm that there is geographical variation in the financial conditions facing firms. In the case of banks and credit, this has been shown in the Italian context by Guiso, Sapienza and Zingales (2004) and for the US by e.g. Jayaratne and Strahan (1996) and Becker (2006).[4]

2. Data

We compile a data set from a couple of sources. Starting from standard firm level data for listed firms, we add geographic data on seniors and firm populations and volatility calculated from share price data. This section describes the data sample in more detail.

2.1. Firm data

We use firm level data from the Compustat database. We construct three measures of dividend payments: a dummy for paying any dividends in a calendar year ("Dividend payer"), a dummy for paying dividends if none were paid last year ("Dividend initiation") and the total dividend amount paid normalized by end of year market value ("Dividend yield"). The two dummies are set to 100 if dividends are paid, zero otherwise, i.e. regressions can be thought of as being expressed in percentage terms. The yield variable is also scaled up by a hundred, and hence bounded between zero and one hundred.

We use a range of accounting ratios based on compustat data, all defined in standard ways and winsorized at the first and 99th percentiles.

[3] The cited papers consider individual stock holdings. See Coval and Moskowitz (1999, 2001) regarding the local preference in US mutual fund equity portfolios.

[4] Becker (2006) is also related in that geographical variation in seniors is exploited econometrically (seniors are an important driver of local variation in the supply of bank deposits).

We restrict our sample to the three annual cross-sections when seniors data is available (see next section). The same firm often appears in two or even all three cross-sections. It is important to identify such cases in order to estimate errors correctly. We use the variable SMBL to identify firms.

For firm location we use Compustat's data item headquarters, which indicates the county where headquarters are currently located. This obviously covers only part of many firms. We think it is appropriate for two reasons. First of all, headquarters is likely to be the place where a firm is best known, and have the longest history. Also, this corresponds to how previous studies have identified location of a firm. However, this is not an exact location. Also, because Compustat uses backfilling for headquarters, firms that have moved during the sample period will be assigned the wrong location. This may cause some misidentification in the location, causing measurement error in the seniors variable.

Volatility of the share price was calculated as the standard deviation of monthly log price changes over the two previous years for each stock, using price data from the Center for Research in Security Prices (CRSP).

2.2. Other data sources

We collect demographic data by county from the US Census. We define the seniors variable as the number of seniors living in a county (or state) divided by the total population of that county (or state). We use the last three censuses, covering 1980, 1990 and 2000. The seniors variable is slow-moving and consecutive cross-sections very similar (the correlation between the 1990 and 2000 cross-sections is 0.96).

To gauge the extent of local bias (an individual's disproportionate preference for stocks headquartered in the county in which the individual lives), we use a sample of household portfolios data on positions in common stocks traded on the NYSE, AMEX, and Nasdaq exchanges at the end of January 1991. This data is a subset of a large data set, obtained from a brokerage firm, of individuals' investments through the brokerage over a six-year period from 1991 to 1996.[5] The sample of households we use in this study is a subset of the entire collection of households for which there is information about the residential zip code (see Ivković and Weisbenner 2005).

2.3. Sample overview

Table 1 presents summary statistics for sample firms in the pooled cross-section covering 1980, 1990 and 2000. The left hand side variables that are binary (dummy) are coded as zero or one hundred

[5] For a detailed description of the data set, see Barber and Odean (2000).

to facilitate interpretation. Thus, the mean value of 39.6 for the variable Dividend Payer indicates that 39.6% of firms paid dividends in the following year. Similarly, 2.3% of firms not paying any dividends this year paid dividends next year (Dividend initiation). The average dividend yield across all firms (non-payers as well as payers) is 1.9% and the repurchase yield was 0.7%. Average investment is 7.4% of assets, and average profitability -12% of assets (the median is 3.2%).

Summary statistics for states and counties are presented in Table 2. The seniors variable, across all years, averages 0.121 for states and 0.116 for counties (the average is taken across firms, so the same state or county will appear multiples times if there is more than one firm located there). The range is wide, from 0.02 to 0.33 using county data (0.04 to 0.18 using state data). The standard deviation is 0.032. For counties, Table 2 also presents the inverse of the number of firms. Using county data, the average is 0.021, the range 0.002 to 1 (corresponding to 500 and one firm in the county, respectively).

3. Results

We propose that locations with more seniors produce stronger demand for corporate payout in the form of dividends. In this section, we first test the main hypothesis. The base line regressions address the relationship of dividend policy to the fraction of seniors in the population at the location of a firm's headquarters (Section 3.1). After the basic results, we aim to rule out alternative explanations for our findings. We therefore examine the possibility that seniors is capturing some firm characteristic that drives the supply of dividends. We run regressions explaining repurchases and corporate performance (Section 3.2). In both cases, the dividend demand story predicts no relationship. If our results were driven by omitted variables, a relationship would be natural. Second, we add county and firm level control variables to address omitted variables concerns (Section 3.3). Third, we examine sub-sample (Sections 3.4 and 3.5). Then we test if the dividend demand effect is stronger where there are few local firms (Section 3.6). Finally, we examine ex-dividend day returns (Section 3.7). These tests are now presented in turn.

3.1. Base line results

We now set out to test the hypothesis that there are of local dividend clienteles determined by demographics and that this drives payout policy of local firms. The most direct test of our hypothesis is whether firms located in an area where there are many seniors pay more dividends than firms located in areas with few seniors. We test this in a pooled cross-section of Compustat firms covering 1980, 1990 and 2000, using three measures of dividends: a dummy for paying dividends, a dummy for paying dividends conditionally on having not paid the previous year, and the dividend yield. We test this in a linear regression framework.[6]

The results are presented in Table 3. In Column one, the dividend payer dummy is regressed on firm level controls (net income, cash balance, Q-ratio, debt, share price volatility, lagged stock return, market value, assets, and asset growth), firm age group dummies (1-5, 6-10, 11-15 and 16- years since stock market listing), industry dummies (for 2-digit SIC codes) and state-year interaction dummies (i.e. separate dummies for each state in 1980, 1990 and 2000).[7] The state dummies are particularly important since they absorb all variation in dividend behavior between states. This implies that none of our results are driven by e.g. the Florida-Utah difference, and that rather all our results are identified using county-to-county variation within states.[8] Overall, the estimated coefficients line up with expectations and previous studies: firm level volatility, asset growth and leverage all reduce the probability of paying dividends. The coefficient on seniors is positive and highly significant (p-value < 0.01). This coefficient implies that increasing seniors by ten percentage points (0.10 is a large change, considering that a standard deviation is 0.032) predicts an increase in the probability of being a dividend payer by 5.9%. An increase of one standard deviation in seniors predicts an increase in the probability of paying dividends of 1.74%. For comparison, the mean of the dependent variable is 39.6%. The inclusion of the seniors variable increase the raw R-squared of the regression by approximately 0.5% (after all control variables).

In the next Column we examine dividend initiations. The sample is smaller, since only last year's non-dividend payers are included. The coefficient on seniors is large and significant, implying that the probability of initiating dividends is much higher for firms located in counties with many seniors. Using the coefficient estimate in Column four, an increase of one standard deviation in seniors (0.032) predicts an increase in the probability of dividend initiation for non-payers by 1.07%, which can be compared to the mean rate of initiation of 2.4%. It is noTable that the R-squared is lower

[6] With a binary dependent variable, such as our Dividend payer and Dividend initiation dummies, OLS regressions are misspecified. To verify that our results do not depend on this, we have rerun all relevant regressions using logit and probit regressions with very similar results.

[7] We have used 4-digit level industries in all regressions with virtually identical results, and we have experimented with various ways of controlling for age, with no noticeable effect on the coefficient estimates for seniors.

[8] The advantage of throwing out between-state variation is that we can rule out alternative explanations of our findings that rely on broad geographical patterns such as east-west differences or broad climate-related effects. As can be seen in Figure 1, a significant and positive relationship between seniors and payout policy holds at the state level as well.

in this regression than in the previous, reflecting the fact that dividend initiations are harder to predict than whether a firm pays a dividend.

In Column three, we use the dividend yield, i.e. total dividend payout divided by market value at the end of the previous year, as dependent variable. Seniors has a positive and significant effect here as well. Increasing seniors by one standard deviation predicts an increase in the dividend yield by 0.72%, which can be compared with the sample mean yield of 1.85%.[9]

These regressions provide evidence for an effect of local seniors on dividend policy. The estimated coefficients suggest an economically important effect of local dividend demand on firm payout behavior. Furthermore, the effect of seniors on dividends is found using a range of measures of payout policy. We next go on to consider alternative explanations for this finding.

3.2. Substitution and corporate performance

A concern with our results is that firms in counties with more seniors are somehow different not in the demand for dividends (our theory), but in some other way affecting the propensity to pay dividends. This might be the case if, for example, firms in high seniors counties have higher profitability or fewer investment opportunities. One way of addressing this concern is to test directly for an effect of seniors on repurchases. Since seniors is expected to affect local demand for dividends, but not repurchases, the clientele theory predicts no effect of local seniors on repurchases. If, however, seniors proxy for some unobserved characteristic of local firms (low investment opportunities), seniors is probably correlated with high repurchases as well as high dividends. This would predict a positive coefficient for seniors.[10]

In fact, as the results in column one and two of Table 4 make clear, there is no significant effect on repurchases.[11] Column uses the repurchase yield (repurchases divided by year-end market value) as dependent variable in a regression similar to those in Table 3. The effect of seniors is insignificant. Since repurchases are very volatile, our regressions may contain more noise than those for dividends, making identification harder. We therefore construct a forward-looking three-year average of the

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[9] We also used a book value-based measure of the dividend yield, dividends divided by end of year book value of assets plus dividends paid. Seniors has a significant positive effect on this measure as well.

[10] On the other hand, if the dividend clientele story is right, firms facing higher demand for dividends might compensate by repurchasing less. This would predict a negative sign on the seniors coefficient for repurchases. If only part of the compensation is in terms of reduced repurchases, this effect might be too small to discern.

[11] From this point on, most tests are reported only for the dividend payer dummy as dependent variable in order to save space.

repurchase yield, for which regression results are reported in column two. There is no significant effect of seniors. Seniors have no effect on repurchases by local firms. This suggests that seniors is not a proxy for some unidentified preference for large payouts of firms in headquartered in counties with many seniors. [12]

We next address a related concern: that the seniors variable proxies for cash flow (profitability) or investment opportunities. We control for these factors as well as possible with firm level variables in Table 3, but the concern remains that something slipped by. We therefore test directly for a correlation between seniors and observable components of profitability and capital expenditure. If seniors proxies for some firm characteristic related to profit or investment need among local firms, we expect it to enter significantly for investment (negative coefficient) and profits (positive coefficient). We test this by regressing these two variables on seniors and the same set of controls we include in the dividend regressions. The results are presented in column three and four. In Column three, capital expenditure, normalized by assets, is regressed on the full set of lagged explanatory variables, including seniors. The coefficients are sensible: firms with high past returns, market value and debt invest more, whereas firms with much cash are found to invest less. Seniors does not enter significantly. In column four, the dependent variable is net income normalized by assets. Again, seniors has no significant effect. Taken together, these results suggest that seniors is not proxying for investment need or profitability or some generic propensity to pay out cash.

3.3. Further control variables

A further concern with our findings is that seniors is related to other demographic variables of a county, and that this could generate a spurious correlation with payout policy. In its most general form, this concern is impossible to address, since the number of possible demographic factors is large. Specifically, however, we wish to consider the possibility that seniors live in communities where local firms differ from their peers elsewhere (e.g. rural, declining areas with "old economy" firms).

In the regressions reported in Table 5, we attempt to control more explicitly for the corporate environment in the county where a firm is located. We do this by adding two sets of further controls, which can be thought off as economic and demographic. The economic controls are, first, the average of each of the firm level variables across sample firms located in the county (for single-firm counties, the county average variables coincide with firm-level variables). Second, we include a set of variables

[12] We have tried other measures of repurchases as dependent variables as well. These alternatives are: a repurchase dummy, a dummy for repurchasing by a firm which did not repurchase the previous year (i.e., initiation), repurchase yield based on market value. Without exception, the coefficient on seniors is insignificant.

measuring the fraction of assets that are in each industry (2 digit SIC). These variables are intended to control for aspects of the area's economic environment. The demographic controls are the log of county population, the log of median house prices, the fraction of population having finished high school and the fraction having finished college. Like the economic controls, these variables are intended to capture whether an area is stagnating or growing, whether the local economy is likely to offer firms growth opportunities.

Columns one, three and five of Table 5 report the basic specification from Table 3 for comparison purposes. The results in Column two, for and six include the new controls. The coefficients are very similar and highly significant, suggesting that our previous result are not likely due to seniors proxying for declining areas where local firms lack growth opportunities.

3.4. Stagnating vs. growing areas

We now address more directly the concern that local seniors proxy for local economic decline. If younger people have left in search of better labor market opportunities (e.g. towns in the industrial Northeast of the US), declining areas would have a high proportion of seniors. In such declining cities, there may be few growth opportunities for local firms, and, as a result, firms may pay more dividends, i.e. dividend supply is higher. If our finding of a positive relation between seniors and dividends were due to this supply effect, seniors should affect dividends much less in non-stagnating areas. To test this, we identify the growth rate of people in the 0-39 years age group. A city where this population is growing, it is less likely that a high senior fraction represent economic decline.

We therefore check whether seniors has a positive effect on dividends *even in the sample of counties with positive growth in the population of young people*. If seniors drive demand for dividends, we expect to find that a high fraction of seniors is correlated with high dividends regardless of whether the local young population is increasing or not.

To test this, we split the sample based on the growth in the number of local people aged 0-39 over the previous decade (i.e. since the most recent census) in the county where a firm is located. There are approximately twice as many firms headquartered in counties with positive growth of young people as with negative. Columns one and two of Table 6 present the regression results for the two sub-samples. Notably, the effect of seniors is positive and highly significant for the sub-sample of firms located in counties with positive growth in young people. Seniors has a positive effect in stagnating counties as well, and the point estimate for the coefficient is higher, but the precision of the estimate is low. Since seniors has a positive effect on dividends even in counties with a growing population of young people, we can conclude that the effect is likely a reflection of dividend demand, not supply.

3.5. The strength of local ownership biases

The impact of seniors on dividend demand should be stronger for firms which have a more locally concentrated ownership, weaker for firms which face less local bias. This provides a further test of our theory, and a nice comparison with the main alternative explanation (that seniors proxy for declining firms which supply more dividends). The supply theory implies no effect of the extent local ownership bias.

To implement this test, however, we need to identify a measure of the local bias a firm faces, and this measure must be exogenous to the payout policy of the firm (since we wish to use it as an independent variable). We use two variables: firm size (based on the hypothesis that local retail investors are more important for small than for large firms) and the actual local portfolio bias of non-seniors (since the bias of seniors may reflect payout policy choices of local firms).

Because retail investors are more important for small firms (recall that the locality bias is mainly a phenomenon of retail portfolios), they should be more affected by local dividend preferences. Furthermore, it is possible that the propensity to hold a stock falls more rapidly with distance for small firms, so that the local bias in retail portfolios is stronger for small than for large firms. This would also tend to make local preferences more important for small firms.

For each year, we split the sample in half by firm size measured as market value of equity plus book value of debt. Since we lose observation to missing data, the actual number of small and large firms is not identical (perhaps small firms are slightly more apt to be missing data for some control variables). Columns three and four of Table 6 report regression results for the small and large sub-samples, using the dividend payer dummy as dependent variable.[13] As predicted, the effect is larger and more significant for smaller firms. The difference between the coefficients for the small and large firm samples is significant at the 1% level.

We next split the sample by the actual bias toward local stock of investors residing in the county where a firm is headquartered. We define local bias in a county as the difference between the portfolio share of local stocks and the fraction of the aggregate market capitalization located in the county. To avoid endogeneity (local bias being strong in those locations where firms policy

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[13] All tests regressions presented in Table 6 have also been performed using alternative dependent variables (not reported), with very similar results, except where the number of dividend initiations is low in a sub-sample and identification therefore is weak.

corresponds to local preferences), we use the local bias of non-senior households only. This is based on a sample data from a brokerage firm (see data section above). The identifying assumption is that this local bias of non-seniors captures some aspect of the environment that affects the local bias of seniors as well, such as being an isolated location. We predict that seniors should exert a stronger influence in the sub-sample of firms facing a strong local bias, and split the sample in half based on the average local bias of all household in the county.

In columns five and six of Table 6 present regression results for the two sub-samples. As predicted, local seniors have a much stronger effect on local firms' dividend policy when the bias of local investors is strong. The effect of seniors is insignificantly different from zero in the low local bias sample. The difference between the two columns is significant at the 1% level.

The sample splits indicate that demographics exert a particularly strong influence on dividend policy for small firms and for firms headquartered in counties where investors exhibit a strong bias for local firms. This is not predicted by the dividend supply theory (seniors proxying for declining local firms). However, this finding is precisely what the dividend clientele theory predicts: the preferences of locals exert a strong influence on those firms that are more exposed to those investors. Furthermore, we have the same finding whether the sample is split by a firm characteristic (size) or a county characteristic (local bias).

3.6. Only game in town effects

We now turn to a further second-order prediction of the geographic dividend clientele theory: that effect of seniors on payout behavior should be stronger where there are fewer firms. Hong et al (2005b) point out that when investors have few local alternatives, a geographical preference for local stocks leads to higher prices, what they call the "only game in town effect". By a similar argument, we predict that seniors will have a larger influence on share prices in locations where the density of firms is low. When few firms are around for dividend-loving investors to chose from, the pressure to pay dividends would then be all the more intense for those few firms.

We test this hypothesis by interacting seniors with a measure of firm density. We expect higher density to result in a lower coefficient on seniors. As a measure of density, we use the inverse of the number of Compustat firms headquartered in that county. We predict a positive coefficient on the interaction (when the variable is high, there are few firms, so we expect a strong effect of seniors).

Regression results are presented intable 7, for the three independent variables dividend payer (dummy), dividend initiation (dummy) and dividend yield, with and without county controls included. The interaction is uniformly positive and significant, indicating that the impact of seniors on dividends is strongest for firms located in counties with few other firms. The coefficient for the dividend payer dummy is large relative to the average coefficient reported in Table 3 (e.g. 59.3 in Column one of Table 3). Using the coefficient in Column one, increasing the inverse of the number of firms by one standard deviation (0.215, e.g. approximately going from eight to three firms in the county), increases the coefficient on seniors by 22.4. This is nearly half the average coefficient, implying that being located in a county with fewer firms dramatically increases the effect of local demographics. The impact is similar for the other dependent variables. We interpret these results to mean that firms that face a local investor audience with few alternative listed shares in which to invest experience a more pronounced effect of local investor preferences.

3.7. Ex-dividend day returns

Our final set of tests relates local seniors to ex-dividend day returns, a methodology used previously to infer marginal tax rates (see, e.g., Graham and Kumar (2006), and Elton and Gruber (1970)). The logic of these tax studies is that, by an arbitrage argument, a firm whose owners face a lower dividend tax rate (or a higher tax rate on capital gains) should see a bigger drop in the share price when the stock goes ex-dividend. Other wise, investors would find it profitable to buy shares on the last cum-dividend day and sell them on the ex-dividend day, and receiving the dividend. We make a similar prediction for firms facing investors with a dividend preference: the ex-dividend day price drop, as a fraction of the dividend amount, should be large when demand for dividends is high, for otherwise investors would prefer to buy the stock temporarily in order to receive dividends. Using the same identification idea as previously, we use local seniors to proxy for dividend demand. It is worth stating that alternative explanations for our findings on payout policy (more seniors leading to higher dividend payments by local firms), are not likely to predict such a relationship between ex-dividend day price behavior and seniors.

Our empirical procedure is as follows. We restrict ourselves to the three census years 1980, 1990 and 2000 and use the same CRSP-Compustat dataset as before. For each sample firm paying a dividend in a given year, we compute the ex-dividend day return of each stock as $[P_t - P_{t+1}]/Div_t$ where $t+1$ is the ex-dividend date and P_s the share price at date s and Div_s is the dividend for owners of the stock on date s.[14] Because different firms pay dividends at different frequency (e.g., once, twice or four times per year), and since we do not wish to put more weight on the behavior of firms with

[14] This return is what Graham and Kumar 92006) call the ex-dividend premium.

more frequent payouts, we take the annual average of this return for each firm to form our dependent variable. Finally, we winsorize the observations at 5% to avoid large outliers influencing the results.

We regress the ex-dividend return on firm book-to-market and log market value, as well as year fixed effects and the fraction of seniors in the county where a firm has its headquarters. The results are reported in Table 8, with and without industry dummies (Column one and two, respectively). The effect of seniors is significant at the 10% level in both cases, and with the predicted sign. A one standard deviation increase in seniors is predicted to increase the ex dividend day price drop by 1.8% of dividends (using the estimated coefficient in Column one), while a 10% increase is predicted to increase the price drop by 9% of the dividend. These numbers can be compared to the sample average of the ex-dividend day return, which is 49%.

The ex-dividend results are consistent with stronger demand for dividends facing firms in locations with many seniors, and such demand forcing stock prices to experience larger drops on ex-dividend days for this reason. While consistent with a demand explanation for the effect of seniors on dividend policy, this result seems less consistent with alternatives involving the supply of dividends. They therefore lend some additional support to our interpretation of the earlier results.

3.8. The time series of dividends

Can demographics of the US population explain recent time-series behavior of dividends (see e.g. Baker and Wurgler 2004a, b)? We have not tested this, but it might be argued that recent increases in dividends coincide with an increase in the average and median age of the US population. Nevertheless, we consider it unlikely that demographics will explain much of the time series variation, at least on its own. First of all, dividends move substantially from year to year or decade to decade whereas changes in demographics are slow and persistent. As a matter of statistical power, a slow-moving time series such as seniors cannot explain much of the changes in a variable that changes with high frequency such as dividends. Second, in absolute terms, there is no reason to assume that seniors' demand for dividends is constant through time. Insofar as it is caused by taxes (see e.g. Graham and Kumar 2006), it is quite certainly not constant. This issue must be left for future research.

4. Conclusions

We test the effect of dividend demand on payout policy in a sample of US listed firms spanning two decades. The tendency of older investors to hold dividend-paying stocks in combination with retail investors' inclination to hold local stocks result in stronger dividend demand for firms located in areas with many seniors. This creates dividend clienteles in the sense of Miller and Modigliani (1961). Demographics thus provides an empirical proxy for dividend demand.

As predicted, we find a significant positive effect of the population fraction of seniors in the county where a firm is located on it's propensity to pay dividends, it's propensity to initiate dividends if it did not pay them the previous year, and on it's dividend yield. There is no effect on repurchases, consistent with the dividend demand hypothesis but inconsistent with many alternatives (e.g. the seniors variable is correlated with some characteristic of local firms which drives payout). Similarly, seniors seem to have no effect on profits or investment, suggesting that this is not proxying for investment opportunities or surplus internal resources. Other robustness tests point the same way. For example, firms in locations with many seniors experience larger ex-dividend day drops in their share prices, consistent with higher demand for dividends.

The main conclusion of these findings is that there are dividend clienteles that vary geographically. Geographical frictions seem to put a limit on the extent to which firms and investors can match on dividend preferences in the stock market, as predicted by Miller and Modigliani. This is likely to increase the cost of providing dividends (due to taxes, deadweight costs of signaling etc.). It also provides a possible explanation for why dividend policy is so slow moving – it is responding to slow movements in the demand for dividends.

Since demographics is only a rough proxy for demand, our results in some sense put a lower bound on the impact of clienteles on payout policy. If there are other, unidentified components of demand, the effect may be larger.

Our results suggest a new explanation of what Lintner's (1956) result of dividend smoothing. If the demand for dividends faced by a firm is slow moving (as might be expected if demographics is a determinant of demand), it is only natural that firms set their dividend policy in a stable manner. We have not tested this directly.

Finally, our findings confirm that there is important geographical variation in the financial conditions facing firms as argued by e.g. Jayaratne and Strahan (1996), Guiso, Sapienza and Zingales (2004) and Becker (2006).

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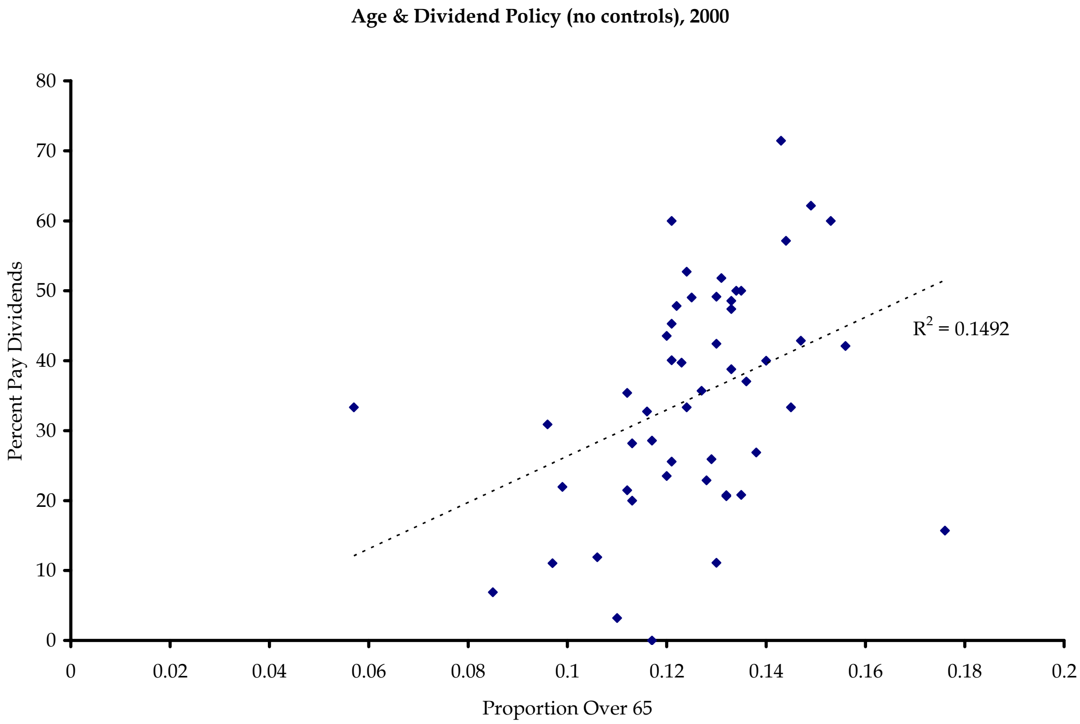
Figure 1 – State correlations

These graphs plot the fraction of Compustat firms headquartered in a state paying dividends and the proportion of the state's population that is over 65 year sold. The first graph plots raw data, the second graph uses instead the state average of the residual in a regression of a dividend dummy on firm level control variables.



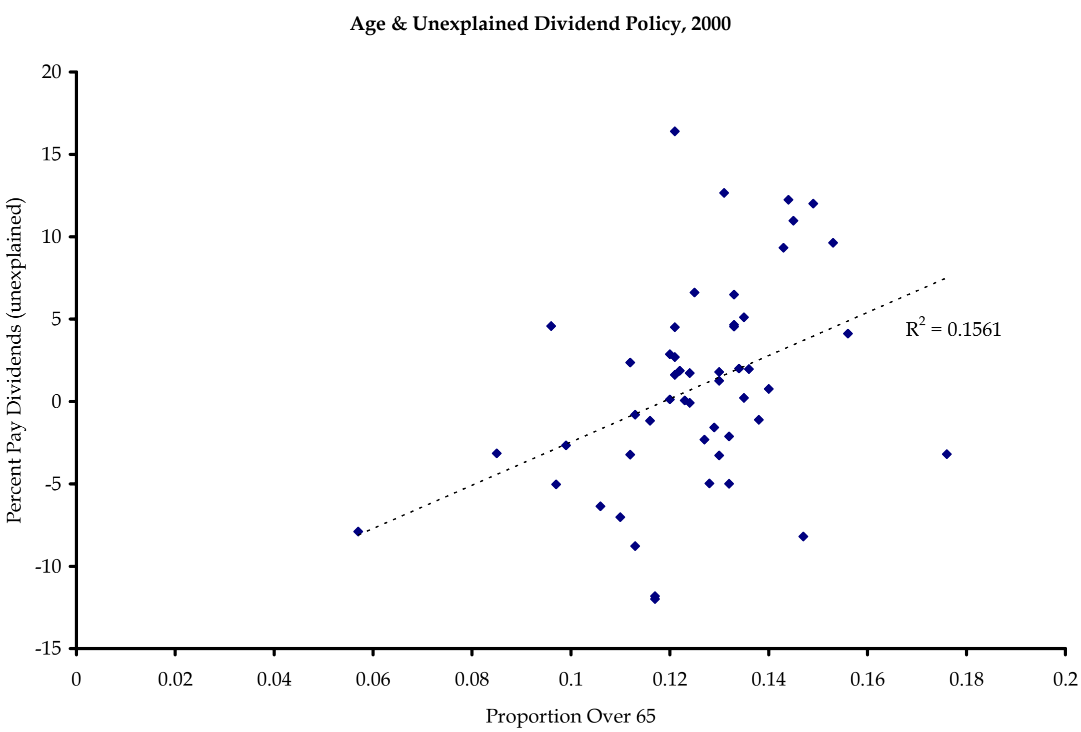


Table 1 – Summary statistics firm level variables

Summary statistics for key firm level variables. The sample is a pooled cross-section for 1980, 1990 and 2000. Dividend payer is a dummy variable taking on the value 0 or 100. Dividend initiation is equal to zero for non-payers at time *t* who remain non-payers at time *t+1*, and 100 for non-payers at time *t* who pay a dividend at time *t+1*. Dividend yield is the dollar amount of dividends divided by the year-end equity market value. Repurchase yield is defined the same way for repurchases in year *t+1*, and total yield for the sum of dividends and repurchases in year *t+1*. Investment and net income refer to one hundred times capital expenditure in year *t+1*, normalized by assets at the end of year *t+1*, and one hundred times net income in year *t+1*, normalized by assets at the end of year *t+1*.

Variable	Observations	Mean	25th percentile	Median	75th percentile	Standard deviation
Dividend payer (t+1)	18,011	39.63	0	0	100	48.91
Dividend initiation (t+1)	10,635	2.26	0	0	100	14.85
Dividend yield, MV (t+1)	17,998	1.85	0	0	2.37	3.78
Repurchase yield (t+1)	15,758	0.73	0	0	0.1	3.22
Investment (t+1)	15,715	7.43	0	0.06	1.90	4.59
Net Income (t+1)	16,358	-12.32	-1.90	3.18	7.12	0.43
Ex-dividend day premium	5,909	0.487	-0.241	0.601	1.44	1.06

Table 2 – Summary statistics county and state level variables

Summary statistics for key geographical variables. The sample is a pooled cross-section for 1980, 1990 and 2000. Firms refers to Compustat firms with their headquarter ("company location") in that county or state. Firms per capita is multiplied by one thousand.

Variable	Observations	Mean	Minimum	25% percentile	Median	75% percentile	Maximum	Standard deviation
State								
Seniors	17,893	0.121	0.040	0.105	0.121	0.131	0.182	0.020
County								
Seniors	17,591	0.116	0.022	0.096	0.114	0.13	0.333	0.032
Inverse of number of firms in county	19,519	0.097	0.002	0.007	0.021	0.059	1	0.215

Table 3 – Seniors and dividend behavior

This table presents regression results for pooled regressions for the 1980, 1990 and 2000 cross-sections. All dependent variables refer to the year after that of the independent variables. Dividend payer is zero for a firm paying no dividends and 100 otherwise, Dividend initiation is equal to Dividend payer, but set to missing for all firms paying dividends the previous year. Dividend yield (Market value) is the dollar amount of dividends divided by the year-end equity market value. Net income, cash and debt are normalized by assets. Q is the ratio of debt plus the market value of equity to debt plus the book value of debt. Volatility refers to the standard deviation of monthly returns for the last two years. Two year lagged return is the stock price change over the two previous years. Asset growth is the log of assets minus the log of assets two years ago. Age group dummies are for firms listed 1-5, 6-10, 11-15 and 16- years ago. Industry year dummies refer to fixed effects for 2-digit level SIC industries interacted with year. Robust standard errors clustered by firm are reported under each coefficient. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	(1)	(2)	(3)
	Dividend payer	Dividend initiation	Dividend yield
Seniors	**59.3****	**32.9****	**7.41****
	(16.4)	(8.80)	(2.67)
Net income	**-1.08**	**0.04**	**-0.14**
	(1.34)	(0.49)	(0.28)
Cash	**-9.72****	**3.73****	**0.89+**
	(2.48)	(1.29)	(0.47)
Q	**-2.48****	**-0.40****	**-0.066***
	(0.27)	(0.07)	(0.027)
Debt	**-16.8****	**-2.62****	**-1.07****
	(2.11)	(0.84)	(0.26)
Volatility	**-131.4****	**-6.35****	**-6.34****
	(5.02)	(1.96)	(0.52)
Two-year lagged return	**-0.05**	**0.32+**	**-0.04**
	(0.44)	(0.18)	(0.04)
Log of market value	**9.25****	**0.44***	**0.04**
	(0.49)	(0.19)	(0.05)
Log of assets	**-2.97****	**-0.04**	**0.10***
	(0.53)	(0.18)	(0.050)
Asset growth	**-4.19****	**-0.54**	**-0.35**
	(1.16)	(0.57)	(0.23)
Age group Dummies	Yes	Yes	Yes

State-Year interaction Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
N	12,107	6,200	12,107
Adjusted R-squared	0.520	0.055	0.283

Table 4 – Seniors and payout behavior/corporate performance

This table presents regression results for pooled regressions for the 1980, 1990 and 2000 cross-sections. All dependent variables refer to the year after that of the independent variables. Repurchase yield is the dollar amount of repurchases divided by the year-end market value of equity. Investment refers to capital expenditure divided by end of year assets. Net income refers to net income divided by end of year assets. See Table 3 for a description of other variables. Robust standard errors clustered by firm are reported under each coefficient. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	(1)	(2)	(3)	(4)
	Repurchase yield	Repurchase yield (three year mean)	Investment	Net income
Seniors	**2.17**	**0.57**	**-1.30**	**-6.56**
	(1.70)	(1.09)	(2.49)	(11.1)
Net income	**0.39****	**0.39***	**-0.03**	
	(0.20)	(0.23)	(0.28)	
Cash	**2.23****	**1.46****	**-2.74****	**-4.90**
	(0.39)	(0.23)	(0.44)	(3.06)
Q	**-0.04**	**-0.01**	**-0.18****	**-2.03****
	(0.03)	(0.02)	(0.05)	(0.44)
Debt	**-0.39**	**-0.41***	**1.24****	**2.21**
	(0.26)	(0.18)	(0.38)	(2.21)
Volatility	**-1.31***	**-0.71**	**0.02**	**-115.8****
	(0.74)	(0.50)	(0.97)	(6.89)
Two-year lagged return	**0.12***	**0.066***	**0.60****	**5.72****
	(0.05)	(0.033)	(0.09)	(0.47)
Log of market value	**-0.30****	**-0.20****	**1.21****	**1.77****
	(0.08)	(0.05)	(0.08)	(0.55)
Log of assets	**0.32****	**0.30****	**-1.10****	**-0.71**
	(0.08)	(0.05)	(0.09)	(0.59)
Asset growth	**-0.38***	**-0.42****	**1.26****	**0.76**
	(0.21)	(0.16)	(0.26)	(2.29)
Age group dummies	Yes	Yes	Yes	Yes
State-Year interaction Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
N	10,513	9,020	10,924	12,115
Adjusted R-squared	0.021	0.036	0.367	0.243

Table 5 – Economic and demographic controls

This table presents regression results for pooled regressions for the 1980, 1990 and 2000 cross-sections. All dependent variables refer to the year after that of the independent variables. Firm controls are the variables the variables Net income, Cash, Q, Debt, Volatility, Two-year lagged return, log of market value, Log of assets and Asset growth. Demographic controls are log of county population, fraction of population having finished high school and fraction having finished college, as well as log of median house prices. Economic controls are the average of each of the firm level variables across all firms located in the county as well as fraction of assets that are in each industry (2 digit SIC). See Table 3 for a description of other variables, including dependent variables. Robust standard errors clustered by firm are reported under each coefficient. Columns (1), (3) and (5) replicate Columns (1), (2) and (3) of Table 3. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dividend payer	Dividend payer	Dividend initiation	Dividend initiation	Dividend yield	Dividend yield
Seniors	**59.3****	**35.6****	**32.9****	**36.1****	**7.41****	**7.15****
	(16.4)	(18.3)	(8.80)	(9.50)	(2.67)	(3.04)
Demographic controls	No	Yes	No	Yes	No	Yes
Economic controls	No	Yes	No	Yes	No	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Age group dummies	Yes	Yes	Yes	Yes	Yes	Yes
State-Year interaction dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	12,107	12,103	6,200	6,197	12,107	12,103
Adjusted R-squared	0.520	0.525	0.055	0.061	0.283	0.290

Table 6 – Subsamples

This table presents regression results for pooled regressions for the 1980, 1990 and 2000 cross-sections using different sub-samples. All dependent variables refer to the year after that of the independent variables. Firm controls are the variables the variables Net income, Cash, Q, Debt, Volatility, Two-year lagged return, log of market value, Log of assets and Asset growth. Small and large firms are those above and below the median of market value of equity plus book value of debt. Growing and stagnating counties are defined by whether the population of young people (under 40) has increased or decreased over the previous decade. See Table 3 for a description of other variables, including dependent variables. Robust standard errors clustered by firm are reported under each coefficient. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dividend payer	Dividend payer	Dividend payer	Dividend payer	Dividend payer	Dividend payer
	Growing county	Stagnating county	Small firms	Large firms	Local bias high	Local bias low
Seniors	**59.1****	**70.0**+	**88.5****	**24.8**	**142.9****	**24.3**
	(21.0)	(38.9)	(21.6)	(23.1)	(41.3)	(22.4)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Age group dummies	Yes	Yes	Yes	Yes	Yes	Yes
State-Year interaction dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	7,899	3,934	5,270	6,837	5,829	5,607
Adjusted R-squared	0.512	0.526	0.417	0.506	0.524	0.514

Table 7 – Seniors and dividends: only game in town effects

This table presents regression results for pooled regressions for the 1980, 1990 and 2000 cross-sections. All dependent variables refer to the year after that of the independent variables. Firm controls are the variables Net income, Cash, Q, Debt, Volatility, Two-year lagged return, Log of market value, Log of assets, Asset growth. See Table 3 for a description of independent variables Table 3 for a description of other variables, including dependent variables. Robust standard errors clustered by firm are reported under each coefficient. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	(1)	(2)	(3)
	Dividend payer	Dividend initiation	Dividend yield
Seniors	**11.9**	**13.48**	**1.89**
	(18.9)	(10.0)	(1.86)
Inverse of number of firms	**-3.91**	**-10.33***	**-0.85**
	(6.96)	(4.33)	(0.60)
Seniors x Inverse of number of firms	**104.0***	**92.1***	**9.68+**
	(51.3)	(40.1)	(5.62)
Firm controls	Yes	Yes	Yes
Age group dummies	Yes	Yes	Yes
State-Year interaction Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
N	12,107	6,200	12,107
Adjusted R-squared	0.555	0.092	0.448

Table 8 – Ex-dividend day returns

This table presents regression results for pooled regressions for the 1980, 1990 and 2000 cross-sections. Ex-dividend day return, R[t-1, t], is the price drop from cum-dividend to ex-dividend day divided by the amount of the dividend. An observation is the annual average of this return for a firm. Observations were winsorized at 5% to avoid large outliers influencing the results. Q is the ratio of debt plus the market value of equity to debt plus the book value of debt. Log of market value refers to equity. Robust standard errors clustered by firm are reported under each coefficient. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	(1)	(2)
	R[t-1, t]	R[t-1, t]
Seniors	**0.878***	**1.18***
	(0.46)	(0.72)
Q	**-0.01**	**-0.03**
	(0.06)	(0.07)
Log (Market Value)	**0.056****	**0.045****
	(0.008)	(0.010)
Year Dummies	Yes	Yes
Industry Dummies	No	Yes
N	5,815	5,815
Adjusted R-squared	0.115	0.133