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Investor Income and Local Dividend Clienteles

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ABSTRACT

I use a quasi-natural experiment setting and examine whether geographically-varying investors' income needs, proxied by local disasters, affect dividend payout. Firms located in areas severely impacted by local disasters are more likely to be dividend payers, initiate dividends, and have higher dividend yields. I introduce a new local dividend clientele effect induced by income needs. This effect is consistent with the notion that natural disasters generate local economic shocks, leading to a greater need for income among local investors within affected areas. These results are also stronger for firms primarily held by local investors in line with their greater influence on corporate policies.

JEL Classification: G35, G30, G39

Keywords: dividend policy, investor income, local dividend clienteles, natural disasters

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I. INTRODUCTION

The dividend clientele effect has attracted attention in the finance literature since Miller and Modigliani (1961). This effect emphasizes the demand side of dividend policy and suggests that investor characteristics play a key role in dividend preferences, and firms cater to these investor demands through their dividend payouts. For example, Graham and Kumar (2006) report that "older investors, or any investor with a greater need for a regular income stream, may prefer high-yield stocks if they use dividend income to finance consumption." Miller and Modiagliani (1961) underline the role of income for dividend clienteles and give an example of retirees. They suggest that retired investors can have a stronger preference for dividend income and accordingly prefer dividend-paying stocks for their consumption needs. Prior literature highlights the role of investors' income needs in both determining their dividend demands and forming income-based dividend clienteles. This paper focuses on local investors' income needs, as proxied by a novel measure, and examines whether income needs play a role in determining local dividend clienteles leading to geographically varying corporate dividend policies. In particular, I use local major natural disasters to measure local investors' income needs and investigate how these needs affect the propensity to initiate and pay dividends as well as dividend yields for US firms.

Local natural disasters provide a quasi-natural experiment setting and help measure sudden shifts in income levels and needs in a local community. I utilize this setting to identify the effect of geographical variation in investor income on payout policies. Local major natural disasters create exogenous shocks to the local economy and investor income within the affected areas. After natural disasters affect a location, it is expected to see an economic shock to local investor income, leading to an increase in demand for income among local investors. The damage from this local economic shock can reach severe levels as the impact of natural disasters becomes stronger. Prior literature also highlights natural disasters are negative shocks to local economies and communities. Dlugosz et al. (2022) state that natural disasters lead to property damage and increased uncertainty about local economies and have direct effects on communities and investors. Boustan et al. (2017) show that poverty rates increase in areas hit by severe disasters. Keerthiratne and Tol (2017) find that house households have much higher levels of debt after a natural disaster. Using local natural disasters, therefore, helps identify economic shocks to local investors' income and demand for income. Natural disasters can accordingly be considered as a quasi-natural experiment generating local economic shocks on investors' income needs within the affected areas.

My empirical tests demonstrate that a one-standard-deviation increase in the local disasters variable leads to an approximately 30% higher likelihood in the odds that a firm initiates dividends compared to other firms. A one-standard-deviation increase in the local disaster variable is also associated with a 12.4% higher likelihood in the odds that a firm pays dividends compared to other firms. A one standard deviation increase in the local disaster variable also leads to a 0.011 standard deviation increase in dividend yields. These results demonstrate that investors' income demands play an important role in shaping geographically-varying corporate dividend policies, suggesting a new local dividend clientele effect based on these demands induced by investor income.

The robustness checks and additional tests implemented underline the strength of the local dividend clientele effect introduced by this paper. The empirical results are

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similar when different local disaster variable disasters are used. The dividend clientele effect holds after controlling for local economic and demographic factors. The empirical findings also remain robust after using an alternative firm location dataset. The results also hold after using an alternative set of control variables used in the related literature. Moreover, I present additional tests highlighting the role of local shareholders in the dividend clientele effect. I demonstrate that the empirical findings are stronger for firms largely held by local investors. For example, a one-standard-deviation increase in the local disaster variable is associated with a more than 100% increase in the odds that a firm initiates dividends for local firms compared to other firms. Therefore, these empirical tests suggest that the dividend clientele effect shown in this paper emerges through the local investor channel. Overall, these additional tests underline the role of local investors' income needs, as proxied by local disasters, in shaping corporate dividend policies and indicate the strength of the income-based local dividend clienteles.

Prior literature shows that investors have local biases (e.g., Ivkovic and Weisbenner, 2005; Coval and Moskowitz, 1999; Pirinsky and Wang, 2006); these investor preferences and characteristics can affect local corporate policies, including dividends (e.g., Becker et al., 2011; Ucar, 2016). Income shocks leading to changes in local investors' needs and preferences can accordingly play a role in local firms' dividend demands and corporate policies. Previous studies also suggest that firms attempt to maintain stable dividend policies. Firms avoid sudden dramatic changes in payout policies and strive to make gradual changes in dividend policies. One might also expect that it takes time for firms to recognize and respond to changes in investor demands and to subsequently change corporate policies to become consistent with changing investor preferences. I accordingly use a lagged disaster measure as a proxy for local investors' income needs and examine whether firms provide dividend payouts consistent with these dividend demands following local economic shocks generated by natural disasters. My empirical findings demonstrate that firms are more likely to initiate and pay dividends as well as have higher dividend yields after their locations are affected by disasters. These results introduce an income-based local dividend clientele effect.

The finance literature has investigated the determinants of dividends and corporate payout policies for a long time. Miller and Modiagliani (1961) state the irrelevance theory suggests that dividend policies are irrelevant because both dividend-paying and non-dividend-paying firms will have the same value, everything else equal. Black (1976) suggests that why companies pay dividends forms a puzzle when considering theoretical explanations. Easterbrook (1984) suggests some explanations for this puzzle, arguing that agency costs can help us understand why firms pay dividends since dividends can be a method of reducing agency costs (monitoring costs in particular). On the other hand, some studies suggest that investors' perceptions and preferences play an important role in explaining dividend demands and, accordingly dividend payouts (e.g., Gordon, 1963; Lintner, 1962). The dividend clientele argument states that some investor characteristics and preferences lead to variations in dividend demand that form dividend clienteles. Some of these factors include taxes, transaction costs, age, income, etc. (i.e., Black and Scholes, 1974; Miller and Modiagliani, 1961.) I focus on investor income and its role in shaping dividend demands and clienteles. My paper is closely related to the major body of literature investigating the demand side of dividend policies. Baker and Wurgler (2004a and 2004b) examine the catering theory. They suggest that some investors have a greater preference for dividend-paying stocks because they see those stocks as more

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valuable, and firms accordingly cater to these preferences. My paper contributes to this literature by suggesting that investors' income needs as proxied by natural disasters play an important role in geographical dividend demand and corporate dividend policy variations.

The prior literature highlights the role of the need for current income in dividend demands. For example, Shefrin and Thaler (1988) suggest that lifecycle considerations affect investor dividend demands. Black and Scholes (1974) highlight the role of factors such as taxes and transaction costs in determining investor preferences and dividend clienteles. Miller and Modigliani (1961) suggest that dividend clienteles may be induced by investor age or income. I examine the role of investor income in shaping geographically-varying dividend clienteles. Earlier studies suggest (i.e., Gordon, 1963; Lintner, 1962; Ucar, 2016) that dividends are considered safe and currently available income streams versus future risky capital gains. One accordingly expects greater demand for dividend income when investors are exposed to exogenous income shocks as a result of local major natural disasters. My paper uses this quasi-natural experiment setting induced by local natural disasters to identify the impact of local investors' income on corporate dividend policies.

This paper is related to the literature on the local bias. Ivkovic and Weisbenner (2005) find that retail investors have a greater propensity to invest in local firms' stocks. Coval and Moskowitz (1999) demonstrate investment managers' local bias. Pirinsky and Wang (2006) demonstrate that there is a higher level of comovement in stock returns for firms located within the same geographic area. Hong et al. (2008) demonstrate that there is a greater local bias effect in areas hosting relatively few firms, consistent with the lower levels of competition for local investors' money in those areas. My paper contributes to this literature by demonstrating that geographically-varying income need as proxied by natural disasters leads to variations in investor attitudes toward dividend income by forming a local clientele effect. My paper also underlines the role that local investors play in corporate policies by showing a stronger income-based local dividend clientele effect for firms largely held by local shareholders.

Recent studies use natural disasters to identify the impact of local shocks on different economic and financial outcomes. Barrot and Sauvagnat (2016) use natural disasters to examine these idiosyncratic shocks as reflected in the supplier-customer relationship. Dessaint and Matray (2017) investigate managerial reactions to salient risks by examining responses to natural disasters. Elnahas et al. (2017) study the effect of natural disasters on capital structure. Bernile et al. (2017) use natural disasters to measure local economic shocks by examining firm network effects. Bourdeau-Brien and Kryzanowski (2017) study the effect of disasters on stock returns and volatilities. Huang et al. (2022) analyze the impact of natural disasters on ESG disclosure. I contribute to this strand of literature by using natural disasters to identify the local economic shocks impacting investor clienteles and demonstrating a local dividend clientele effect based on investors' income needs and demands.

My paper is also closely related to recent studies in the payout literature. Becker et al. (2011) show local dividend clienteles based on investor age, as proxied by a fraction of local seniors, while Ucar (2016) demonstrates a local dividend clientele effect induced by local religion. In this paper, I use an empirical model similar to Becker et al. (2011) and Ucar (2016) and demonstrate that local investors' income needs as proxied by local disasters lead to geographically-varying dividend demands and corporate dividend

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policies. My paper introduces a new local dividend clientele effect based on investor income by using a novel measure. Furthermore, my results remain robust after controlling for both local seniors and religion effects shown in the previous studies studying local dividend clienteles.

The remainder of the paper is organized as follows. The next section provides the data summary and sample selection method along with the summary statistics. Section 3 presents the baseline empirical tests along with additional tests and robustness checks. Section 4 provides conclusions.

II. DATA, SAMPLE SELECTION, AND SUMMARY STATISTICS

A. Data and Sample Selection

I follow the sample selection criteria used in recent studies (e.g., Ucar, 2016; Grullon et al., 2011) in the related literature. I exclude the firms in the utilities and financials categories (SIC codes 4900 to 4999 and 6000 to 6999), requiring sample firms to have issue codes of 10 or 11. My sample requires firms to have complete accounting and stock price information from the COMPUSTAT and CRSP databases, respectively. My paper uses firm address information from COMPUSTAT in the empirical tests. I use lagged and leading year firm information for some variables, and my sample requires all sample firms to include both lagged and leading year information. The empirical tests focus on the years between 1994 and 2014.

I use local natural disasters as a proxy for local investors' income needs. I obtain natural disasters data from the Federal Emergency Management Agency's (FEMA) website.[1] This dataset provides information on county-level natural disasters include hurricanes, severe storms, flooding, fires, earthquakes, wildfires, tornados, severe snowstorms, tropical storms, etc.[2] I first calculate the total number of days that major natural disasters affect a county during a given year. Next, I construct a local disaster variable, *Local Disaster*, which takes a value of one if natural disasters affect a given firm county for 30 days or more during the year two years prior to the given firm-year, and a value of zero otherwise.[3] This variable helps identify the major natural disaster effect, which can create significant shocks to local investors' incomes.[4] In some robustness tests, I use a local disaster variable, *Local Disaster Days*, which shows the total number of days that natural disasters affected a given firm county during the year two years prior to the given firm-year.

I use an empirical model similar to that used in Becker et al. (2011) and Ucar (2016). The dividend policy and firm characteristics variables used in the empirical tests have definitions following the prior literature (Ucar, 2016; Becker et al., 2011; Grullon et al., 2011). I use the following variables as the dependent variables in my tests: *Dividend Payer*, *Dividend Yield*, and *Dividend Initiation.* The main dividend policy variable is *Dividend Payer*, a dummy variable that takes a value of one if the total amount of dividends is greater than zero for a given year and a value of zero otherwise. *Dividend Initiation* is a dummy variable that takes a value of one if a non-dividend payer firm during the previous year becomes a dividend payer during the current year and zero if a non-dividend payer firm during the previous year remains a non-dividend payer firm during the current year. *Dividend Yield* is defined as the ratio of total dividends to the lagged market value.

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This paper also uses local control variables in the empirical tests. Becker et al. (2011) show that the fraction of local seniors has a role in determining dividend policies and forms local dividend clienteles. This study accordingly controls for the *Local Seniors* variable as the proportion of individuals who are 65 years old or older within a county where a firm is headquartered. Similarly, Ucar (2016) demonstrates the impact of religion on dividend policies and suggests that there is a local dividend clientele effect induced by local religion. This paper accordingly controls for *CP Ratio* as the ratio of Catholics to Protestants within the county where a firm is located.[5] Other local control variables are defined as follows. *Income* is the median household income for the given county where a firm is headquartered. *LogPop* is the natural logarithm of the county's population. *Education* is the proportion of the population holding college degrees within the county where a firm is headquartered.

My empirical tests use the following firm control variables, which are defined as consistent with the related literature (e.g., Ucar, 2016; Becker et al., 2011). *Net Income* is the net income divided by the total assets for a given year. *Cash* is the cash divided by the total assets for a given year. *Q* is the sum of the market value of equity and the book value of liabilities divided by the total assets for a given year. I define *Debt* as the long-term debt divided by the total assets for a given year. *Log of MV* is the logarithm of a firm's market value for a given year. *Log of Assets* is the logarithm of total assets. *Volatility* is the standard deviation of monthly stock returns for the previous two-year period. *Lagged Return* is the monthly stock returns for the previous two-year period.[6] *Asset Growth* is the logarithm of the total assets growth rate calculated using both the current and previous year's figures. This paper defines firm age based on the time between the date that a firm is listed on the CRSP and the current year using the following firm age-group indicator variables: Age 1-5, Age 6-10, Age 11-15, and Age 16-20. Age 21 and over is the dropped category in the empirical tests. The main empirical tests also control for the state, industry[7], and year dummy variables.

Following the related studies (Grullon et al., 2011; Ucar, 2016), I also use an alternative set of control variables in some robustness tests. These variables are defined by following Grullon et al. (2011). These variable definitions are as follows: *NYE* is the measure of firm size based on the NYSE equity percentiles for the corresponding period; *M/B* is the ratio of the market-to-book value of assets where market value is calculated as the market value of equity plus the total assets minus the total equity; *ROA* is the return on assets calculated as income before depreciation divided by the total assets for a given year; *Sales Growth* is the sales growth rate calculated as the change between the previous and current year's figures.

B. Summary Statistics

Table 1 presents the summary statistics for dividend policy variables in addition to some important local control variables and firm characteristics. On average, 26% of the sample firms are dividend payer firms during a given year. The average dividend yield is approximately 0.57% for all sample firms. In my sample, 14% of these counties are affected by all local natural disasters for thirty days or more during a given year. Local disasters affect a given county for approximately, on average, 14 days during a given year. The sample also suggests that approximately 2.5% of the sample firms initiate dividends during a given year. For the average county in the sample; the local senior

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citizen proportion is approximately 11.7%, the local median household income is $51,991, the proportion of the population with a college degree is approximately 26.6%, and the CP Ratio (Catholic to Protestant ratio) is 2.04 for a given firm county. Local characteristics have values consistent with the prior literature. The average sample firm has an equity value equal to the 26th percentile of the NYSE equity size distribution for a given year. On average, the market-to-book ratio is approximately 2.12, the total asset value is approximately $1.7 billion, and firm age is approximately 14.75.

Table 1
Summary Statistics

	Mean	25th Percentile	Median	75th Percentile	Standard Deviation
Dividend Payer	26.36%	0.00%	0.00%	100.00%	44.06%
Dividend Yield	0.57%	0.00%	0.00%	0.32%	1.24%
Dividend Initiation	2.49%	0.00%	0.00%	0.00%	15.59%
Local Disaster	0.14	0.00	0.00	0.00	0.35
Local Disaster Days	14.02	0.00	0.00	11.00	35.53
CP Ratio	2.04	0.60	1.49	2.95	1.86
Local Seniors	11.72%	9.86%	11.54%	13.23%	2.84%
Local Income	51,991	41,466	49,339	60,729	14,345
Local Education	26.61%	23.90%	26.64%	29.61%	4.63%
NYE	26.13	3.00	14.00	43.00	28.16
M/B	2.12	1.12	1.52	2.35	1.82
Total Assets ($ million)	1,662.14	47.88	199.42	902.61	4,632.22
Firm Age	14.75	4.74	10.60	21.15	13.99

III. LOCAL DEBT AND DIVIDEND PAYOUT: EMPIRICAL RESULTS

A. Baseline Tests

This section focuses on the baseline tests for the impact of local investors' income needs as proxied by local natural disasters on dividend payouts. I use an empirical model similar to that used in earlier studies (e.g., Becker et al., 2011; Ucar, 2016) and control for *Net Income, Cash, Q, Debt, Volatility, Lagged Return, Log of MV, Log of Assets, Asset Growth*, and firm age along with state-, industry-, and year-fixed effects. Standard errors are adjusted for heteroskedasticity and clustered at the firm level in my empirical tests. The main dependent variable is *Dividend Payer,* which measures a firm's propensity to pay dividends in Table 2. I use a Logit regression model in the *Dividend Payer* tests. The variable of interest is *Local Disaster,* which shows whether a county is significantly affected by natural disasters two years prior to the current year. Prior literature suggests that firms try to maintain stable dividend policies and avoid sudden dramatic changes in dividend policies. It is also expected that the reflection of local disaster-based economic shocks on investor income needs and dividend preferences can take time. One also expects that it takes some time for firms to recognize and respond to investor needs and develop new corporate policies that are consistent with changing investor preferences. This notion can also be stated for other corporate policies. A lagged local disaster variable can accordingly help identify the role of investors' income needs on dividends.[8]

Table 2 presents the impact of local investors' current income needs on local firms' propensities to pay dividends. The coefficient of *Local Disaster* is approximately 0.1167. This result indicates a positive relationship between the likelihood of being a dividend

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payer and firm locations with higher income needs induced by local disasters. In Logit regressions, coefficient magnitudes can be misleading and do not directly help interpret economic importance. It is, therefore, better to highlight economic significance instead of coefficient magnitudes. I present this interpretation by using the change in odds for the dependent variable using a one standard deviation change in an independent variable. I also use this method highlighting the economic significance of *Local Disaster*, to present and emphasize economic significance in this table as well as all the following tables.

Table 2 shows that a one-standard-deviation increase in *Local Disaster* is associated with a 12.4% higher likelihood that a firm pays dividends compared to another firm located in a county where either local investors are not affected at all or severely by natural disasters. This table demonstrates that local investors' income needs as induced by natural disasters play an important role in determining local firms' corporate dividend policies. An increase in the severity of local natural disasters indicates a greater need for local investors. This table indicates a higher propensity to pay dividends among local firms when local investor bases have a higher demand for current income. This table also suggests a geographically-varying clientele effect induced by local investors' current income needs as proxied by local natural disasters. This point is consistent with the dividend clientele effect suggested by the prior literature, which arises from investors with a greater need for current and regular income streams, such as low-income investors.

Table 2 shows a positive and statistically relationship between the dividend payer variable and the control variables like net income and log of market value, whereas there is a statistically significant negative relationship between the dividend payer indicator variable and the control variables like debt, q, volatility, cash, and asset growth. Also, there is a negative (positive) and statistically insignificant relationship between being a dividend payer and lagged return (log of assets). These empirical findings are consistent with the previous studies (e.g., Ucar, 2016; Ucar and Staer, 2018). For example, this table suggests that firms with a higher level of net income or asset growth have a higher likelihood of being a dividend payer, whereas firms with a higher level of debt or volatility are less likely to be a dividend payer. Overall, this table shows empirical results for the control variables in line with the prior literature (e.g., Becker et al., 2011; Ucar, 2016; Ucar and Staer, 2018).

Table 2
Local Disasters and Dividend Payer

Dependent Variable	Dividend Payer
Local Disaster	0.1167*** (3.43)
Net Income	3.3743*** (13.79)
Cash	-0.8661*** (-4.33)
Q	-0.1058*** (-3.08)
Debt	-0.8036*** (-4.65)
Volatility	-13.8034*** (-24.28)
Lagged Return	-0.0010 (-0.05)
Log of MV	0.3195*** (6.01)
Log of Assets	0.0492 (0.89)
Asset Growth	-0.6594*** (-12.25)
Firm age indicators	Yes
State, industry, year fixed effects	Yes
Observations	75,577
R-square	0.408

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Next, I focus on dividend yield. I use an ordinary least squares (OLS) regression model with an empirical model and control variables similar to those used in the earlier table, reporting the results in Table 3. The coefficient of *Local Disaster* is 0.0004, and it is statistically significant. There is a positive relationship between *Local Disaster* and *Dividend Yield.* A one-standard-deviation increase in *Local Disaster* within a county where a firm is located leads to a 0.011 standard deviation increase in *Dividend Yield.* This finding provides support for earlier results as well as highlights the positive relationship between an increase in investors' income needs and dividend payouts. Consistent with the earlier findings, Table 3 provides results in line with the prior studies suggesting that some investors demand dividends that are considered a safe and currently available income stream compared to a future risk income stream from capital gains.[9] Firms cater to this demand by providing either dividends or higher dividend yields.

Table 3
Local Disasters and Dividend Yield

Dependent Variable	Dividend Yield
Local Disaster	0.0004*** (3.28)
Net Income	0.0001 (0.41)
Cash	0.0003 (0.62)
Q	-0.0003*** (-6.48)
Debt	-0.0024*** (-4.42)
Volatility	-0.0193*** (-19.14)
Lagged Return	0.0000 (0.53)
Log of MV	0.0011*** (8.21)
Log of Assets	-0.0002 (-1.18)
Asset Growth	-0.0013*** (-15.49)
Firm age indicators	Yes
State, industry, year fixed effects	Yes
Observations	75,477
R-square	0.233

I now analyze dividend initiations. I use a Logit regression model with an empirical model and control variables similar to those used in the previous tables, showing the results in Table 4. The coefficient of *Local Disaster* is 0.2592, and it is statistically significant. There is a positive relationship between *Local Disaster* and *Dividend Initiation.* This finding suggests that a one-standard-deviation increase in *Local Disaster* is associated with a nearly 30% higher likelihood that a firm initiates dividends compared to other firms. This effect is not only statistically significant but also economically strong. This result supports the earlier results, as well as underlines the positive relationship between an increase in investors' income needs and dividend payouts. This table also provides strong support for the notion that there is a local dividend clientele effect based on investors' income needs. The results from the baseline tests in this section are consistent with the notion that investors are expected to have a higher demand for a currently available income stream when they are exposed to income shocks induced by local natural disasters. These greater income needs among local investors lead to an increase in demands for dividend income. Local firms with a sizeable local ownership component are therefore expected to satisfy this investor demand by providing higher dividend yields. The results from Table 4, as well as those from the previous tables, are in line with this conjecture.

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Table 4
Local Disasters and Dividend Initiation

Dependent Variable	Dividend Initiation
Local Disaster	0.2592*** (2.80)
Net Income	3.5242*** (6.65)
Cash	0.4545** (2.43)
Q	-0.1625*** (-4.04)
Debt	-0.3589* (-1.73)
Volatility	-4.3117*** (-6.45)
Lagged Return	0.2070*** (7.76)
Log of MV	0.2538*** (3.68)
Log of Assets	-0.1178* (-1.68)
Asset Growth	-0.5487*** (-4.10)
Firm age indicators	Yes
State, industry, year fixed effects	Yes
Observations	55,259
R-square	0.130

B. Robustness Checks and Additional Tests

1. Local Factors and Dividends

In this section, I provide some robustness checks and additional tests supporting and highlighting the local dividend clientele effect induced by investors' income needs. First, I investigate whether local control variables have any effect on my results. I re-examine the baseline tests after controlling for demographic and economic variables. The recent literature suggests either an age-based local dividend clientele effect (Becker et al., 2011) or a local dividend clientele induced by local culture as measured by religion (Ucar, 2016). I, therefore, include the proportion of local seniors and local Catholic to Protestant ratio by following previous studies. I also control for other important local characteristics, including median household income, education, and population, in this analysis by following the related literature.

I then examine the impact of local investors' income needs on geographically-varying dividend demands and dividend policies across US locations after controlling for local factors. Table 5 reports empirical results for the *Dividend Payer*, *Dividend Yield*, and *Dividend Initiation* tests. These results are very similar to those reported in the baseline tests. A one-standard-deviation increase in *Local Disaster* suggests a 10.9% increase in the likelihood that a firm pays dividends. A one-standard-deviation increase in *Local Disaster* leads to an approximately 30% higher likelihood that a firm initiates a dividend. The result for *Dividend Yield* is also similar to the baseline tests. This table demonstrates that my main findings remain robust after controlling for local factors, such as local seniors and religion, that are shown to generate other local dividend clientele effects in the previous literature in addition to other local factors. This table provides additional support for the local dividend clientele effect based on investors' income needs.

2. Different Definitions of Local Disaster and Alternative Variables

Next, I will investigate whether the dividend payout effect induced by local natural disasters remains robust when different local disaster variables are used. In the baseline

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tests, I use an indicator variable, *Local Disaster*, which helps show whether the firm's location is severely affected by local natural disasters. I now use a different variable to measure the local natural disaster effect and examine whether my main findings still hold. In Table 6, I use a new variable, *Local Disaster Day*, to measure the total number of days that natural disasters affect a firm county during the year two years prior to the given firm-year and re-examine the main dividend payout tests.

Table 5
Local Disasters, Dividend Payout, and Local Controls

	(1)	(2)	(3)
Dep. Var.	Dividend Payer	Dividend Yield	Dividend Initiation
Local Disaster	0.1039*** (3.07)	0.0004*** (2.97)	0.2598*** (2.80)
Main controls	Yes	Yes	Yes
Local controls	Yes	Yes	Yes
Firm age indicators	Yes	Yes	Yes
State, industry, year fixed effects	Yes	Yes	Yes
Observations	75,421	75,315	55,188
R-square	0.410	0.234	0.130

Table 6
Dividend Payout and Alternative Local Disaster Variable

	(1)	(2)	(3)
Dep. Var.	Dividend Payer	Dividend Yield	Dividend Initiation
Local Disaster Days	0.0013*** (3.86)	0.0000*** (2.58)	0.0018** (2.14)
Main controls	Yes	Yes	Yes
Firm age indicators	Yes	Yes	Yes
State, industry, year fixed effects	Yes	Yes	Yes
Observations	75,577	75,477	55,259
R-square	0.408	0.233	0.129

Table 6 presents positive and statistically significant *Local Disaster Day* coefficients for all dividend payout tests (*Dividend Payer*, *Dividend Yield,* and *Dividend Initiation*). These results are consistent with my earlier findings and show that the results remain strong when the total number of local natural disaster days is used as an alternative measure of the local natural disaster effect. Therefore, Table 6 provides additional evidence for the local dividend clientele effects based on investors' income needs.

Local Disaster is an indicator variable indicating whether major local natural disasters affect a given firm county for at least 30 days or more during a given year. When natural disasters have a major effect on an area, it is expected to see local economic shocks within these areas and therefore shocks to investors living there. *Local Disaster* accordingly helps to identify whether local natural disasters have a significant impact on a given firm location. I now use different impact period definitions for the *Local Disaster* variable and investigate whether my findings remain robust. I construct new local disaster variables with alternative definitions called *Local Disaster 2* and *Local Disaster 3*. *Local Disaster 2* (*Local Disaster 3*) takes a value of one if natural disasters affect a given firm county for 45 (60) days or more during the year two years prior to the given firm-year and a value of zero otherwise.

I use *Local Disaster 2* and *Local Disaster 3* in Panels A and B of Table 7, respectively, and examine whether my baseline results still hold when using alternative

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impact period definitions. Table 7 presents findings that are very similar to those reported in the main tests. The local disaster variable coefficients in all columns of both Panels A and B are positive and statistically significant, consistent with the earlier findings. Panel A suggests that a one-standard-deviation increase in *Local Disaster 2* leads to a 12.6% (30%) increase in the odds that a firm pays (initiates) dividends. These results become stronger when I use the *Local Disaster 3* definition. Panel B demonstrates that a one-standard-deviation increase in *Local Disaster 3* is associated with a 14% (31.3%) increase in the odds that a firm pays (initiates) dividends. Table 7, therefore, provides additional support for my earlier findings. When an area is majorly affected by local natural disasters, then the local economy and individuals' incomes are affected negatively. Therefore, it is expected to see an additional need for income among local investors. The results in this section support the notion that local investors' income needs induced by local natural disasters lead to a local dividend clientele effect.

Table 7
Dividend Payout and Alternative Local Disaster Definitions

Panel A. Tests with Local Disaster 2	(1)	(2)	(3)
Dep. Var.	Dividend Payer	Dividend Yield	Dividend Initiation
Local Disaster 2	0.1186*** (3.04)	0.0004*** (2.79)	0.2624** (2.38)
Main controls	Yes	Yes	Yes
Firm age indicators	Yes	Yes	Yes
State, industry, year fixed effects	Yes	Yes	Yes
Observations	75,421	75,315	55,259
R-square	0.408	0.233	0.129
Panel B. Tests with Local Disaster 3	(1)	(2)	(3)
Dep. Var.	Dividend Payer	Dividend Yield	Dividend Initiation
Local Disaster 3	0.1313*** (2.94)	0.0003** (2.30)	0.2725** (2.15)
Main controls	Yes	Yes	Yes
Firm age indicators	Yes	Yes	Yes
State, industry, year fixed effects	Yes	Yes	Yes
Observations	75,577	75,448	55,259
R-square	0.408	0.234	0.129

3. Alternative Timing of Local Disaster

Next, I use alternative timing in defining the local disaster variable and re-examine my baseline results. *Local Disaster* indicates local disasters that take place two years before the given year. Considering the notion that it takes time for firms to recognize and respond to investors' needs, using a two-year lag helps identify firm responses to local investors' income needs induced by income shocks based on local disasters. I use another lagged variable (one-year lag) to see firms' speeds in recognizing and responding to local investors' income demands induced by local disasters. I construct a variable called *Local Disaster*$_{t-1}$, which takes a value of one if natural disasters affect a given firm county for 30 days or more during the year one year prior to the given firm-year, and a value of zero otherwise. I use *Local Disaster*$_{t-1}$ to re-examine the main dividend payout tests regarding whether firms respond to investor dividend demands induced by local natural disasters in Table 8. This table provides results similar to the earlier findings; the *Local Disaster*$_{t-1}$ coefficients are positive in all dividend payout tests in Table 8.

A one-standard-deviation increase in *Local Disaster*$_{t-1}$ leads to an 8.2% increase

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in the odds that a firm pays dividends. Furthermore, a one-standard-deviation increase in *Local Disaster*$_{t-1}$ is associated with a nearly 0.01 standard deviation increase in dividend yields. These results are similar to the main findings. *Local Disaster*$_{t-1}$ is statistically significant in the *Dividend Payer* and *Dividend Yield* tests, while it is statistically insignificant in the *Dividend Initiation* test. This result is somewhat expected since a dividend initiation indicates a major policy change, and firms take time to implement corporate policy changes. Firms usually prefer to maintain stable dividend policies, and changes in dividend policies such as dividend initiations might require time to implement. The dividend initiation results reported in the tests using *Local Disaster* also imply this point. This table accordingly provides some support to earlier findings. This table also suggests that it takes some time for firms to recognize local investors' dividend demands generated by local disasters and cater to this demand by providing updated dividend policies consistent.

Table 8
Dividend Payout and Alternative Local Disaster Time

	(1)	(2)	(3)
Dep. Var.	Dividend Payer	Dividend Yield	Dividend Initiation
Local Disaster$_{t-1}$	0.0792** (2.30)	0.0003*** (2.76)	0.0280 (0.29)
Main controls	Yes	Yes	Yes
Firm age indicators	Yes	Yes	Yes
State, industry, year fixed effects	Yes	Yes	Yes
Observations	75,577	75,477	55,259
R-square	0.408	0.233	0.129

4. Tests with an Alternative Set of Controls

Some recent studies use different control variable definitions in examining dividend policy variables (e.g., Fama and French, 2001; Grullon et al., 2011; Ucar, 2016). I accordingly re-examine whether my results remain robust after controlling for an alternative set of firm control variables. I use the control variables from Fama and French (2001) and Grullon et al. (2011) to re-examine the main dividend payout tests in Table 9. This table includes market-to-book ratio, ROA, sales growth, and NYSE equity percentiles for the corresponding periods. Table 9 also controls for the state, industry, and year dummy variables used in earlier tests.

Table 9
Local Disasters and Dividend Payout with an alternative Set of Control Variables

	(1)	(2)	(3)
Dep. Var.	Dividend Payer	Dividend Yield	Dividend Initiation
Local Disaster	0.0808*** (2.61)	0.0004*** (3.22)	0.2619*** (2.88)
NYE	0.0328*** (27.88)	0.0001*** (16.91)	0.0130*** (10.75)
M/B	-0.3200*** (-11.17)	-0.0004*** (-8.86)	-0.1044*** (-3.97)
ROA	5.6311*** (22.32)	0.0028*** (7.18)	4.0026*** (10.86)
Sales Growth	-1.0307*** (-9.50)	-0.0000 (-1.15)	-0.0188 (-0.28)
State, industry, year fixed effects	Yes	Yes	Yes
Observations	75,684	75,231	55,271
R-square	0.317	0.180	0.115

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My empirical findings remain strong after using an alternative set of control variables, as shown in Table 9. The results are similar to earlier findings. *Local Disaster* has positive and statistically significant results in all the dividend payout tests in Table 9. One standard deviation increase in *Local Disaster* leads to an 8.4% (29.6%) greater likelihood that a firm pays (initiates) dividends. Similarly, a one-standard-deviation increase in *Local Disaster* is associated with a 0.0111 standard deviation increase in dividend yields. These results also indicate that the economic significance of the local dividend clientele effect remains robust after using an alternative set of firm control variables as well as provides additional support for previous tests.

5. Alternative Firm Location Dataset Tests

Next, I use the Compact Disclosure address information and re-examine the empirical results. Earlier tests use the COMPUSTAT firm address information, and the COMPUSTAT location information provides the most recent address information for all sample years. Prior literature suggests that some firms may relocate, and COMPUSTAT does not include these address changes for earlier firm years. On the other hand, the prior literature also demonstrates that there is a small number of headquarters relocations (e.g., Pirinsky and Wang, 2006), and this might not affect the results. Recent studies also show similar results when they use the Compact Disclosure address information instead of the COMPUSTAT address information (e.g., Ucar, 2016.) Nevertheless, I re-run the main regressions using the Compact Disclosure firm headquarters information in Table 10 to determine whether my earlier results remain robust.[10]

Table 10
Local Disasters and Dividend Payout with the Compact Disclosure Dataset

	(1)	(2)	(3)
Dep. Var.	Dividend payer	Dividend yield	Dividend initiation
Local Disaster	0.1299*** (2.86)	0.0004** (2.46)	0.3515*** (2.70)
Main controls	Yes	Yes	Yes
Firm age indicators	Yes	Yes	Yes
State, industry, year fixed effects	Yes	Yes	Yes
Observations	36,942	36,962	25,972
R-square	0.442	0.290	0.127

Although the number of observations in this test is smaller than the number of observations in the baseline tests reported in the earlier tables, *Local Disaster* is still statistically significant and positive for all dividend payout tests in Table 10. The economic significance is either similar to or stronger than the baseline tests. For example, a one-standard-deviation increase in *Local Disaster* is associated with a 13.9% (42.2%) greater likelihood that a firm pays (initiates) dividends. This table demonstrates that my findings on corporate dividend policies are robust to the address information dataset. The test using the alternative firm location dataset, therefore, supports the earlier findings and highlights the income-based geographically-varying dividend clientele effect. Table 10 provides additional evidence on the notion that local investors have a higher demand for dividend-paying stocks when they have greater income needs following a decline due to exogenous shocks from local disasters. Table 10, therefore, confirms income-based local dividend clienteles, suggesting that firms whose local investor bases have a greater

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demand for dividend income are more likely to become dividend payers to cater to demand.

6. Role of Local Investors: Local Channel

The empirical findings demonstrate a geographically-varying dividend clientele effect induced by local investors' income shocks as proxied by local natural disasters. Earlier findings suggest that this effect is generated by local investor bases. To shed additional light on the channel through which this effect emerges, I focus on the role of local investors by employing different local ownership measures and re-examine the empirical results. This way provides a better method of identifying the main driver for the dividend effect shown in this paper.

A good way to investigate local ownership is focusing on the only-game-in-town effect as well as measuring local stock ownership using the number of firms per capita. Hong et al. (2008) find that firms located in areas with a relatively small number of firms have greater local ownership due to a reduced level of competition that such firms experience in attracting local investors. Firms located in areas with a small number of firms per capita are accordingly expected to have a greater local investor base. Following Ucar (2016), I construct a variable measuring the number of local firms per capita[11] and divide my sample into terciles based on this variable. The lowest tercile of the number of firms per capita variable represents areas with a small number of firms that are associated with a greater only-game-in-town-effect. The highest tercile of this variable represents areas with a large number of firms associated with a smaller only-game-in-town-effect. Firms in the lowest (highest) tercile are accordingly associated with a greater (smaller) local ownership. I re-examine my empirical findings for these two subsamples in Panel A of Table 11.

Local Disaster is positive and statistically significant only for firms located in areas with a small number of local firms per capita in the odd-numbered columns for all tests in Panel A. This result is consistent with a greater only-game-in-town-effect or local ownership associated with this subsample in the odd-numbered columns. The *Local Disaster* coefficients in the odd-numbered columns also have more pronounced coefficient values. Economic significance for the subsample of firms located in areas with a small number of local firms per capita is accordingly much stronger than in the earlier main findings. For example, a one-standard-deviation increase in *Local Disaster* is associated with a 17% increase in the odds that a firm becomes a dividend payer for firms largely held by local investors compared to other firms with a low local ownership ratio. The economic significance of this effect in the dividend yield tests is also stronger for the firms located in areas with a small number of local firms per capita. The economic significance of this effect is much stronger in dividend initiation tests shown in the last two columns of Panel A. A one standard deviation increase in *Local Disaster* is associated with a 75.8% increase in the odds that a firm initiates dividends for firms largely held by local investors as proxied by the only-game-in-town-effect compared to other firms with small local ownership. These findings present additional evidence and highlight the notion that the dividend effect is stronger for firms with a large local stock component. The evidence demonstrated in this table also indicates that the dividend effect presented in this paper is generated via local shareholder channels.

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Table 11
Local Disasters, Dividend Payout, and Local Ownership

Panel A. Number of Firms per Capita	(1)	(2)	(3)	(4)	(5)	(6)
Number of Firms per Capita	Low	High	Low	High	Low	High
Dep. Var.	Dividend payer	Dividend payer	Dividend yield	Dividend yield	Dividend initiation	Dividend initiation
Local Disaster	0.1569***	-0.0140	0.0004**	0.0001	0.5639***	0.0777
	(2.66)	(-0.26)	(2.01)	(0.47)	(3.46)	(0.44)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm age indicators	Yes	Yes	Yes	Yes	Yes	Yes
State, industry, year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24,522	24,838	24,623	24,851	17,086	17,867
R-square	0.406	0.416	0.251	0.226	0.162	0.131
Panel B. Local vs. Geographical Dispersed Firms	(1)	(2)	(3)	(4)	(5)	(6)
Local vs. G. Dispersed Firms	Local	G. Dispersed	Local	G. Dispersed	Local	G. Dispersed
Dep. Var.	Dividend payer	Dividend payer	Dividend yield	Dividend yield	Dividend initiation	Dividend initiation
Local Disaster	0.0532	0.1098	0.0001	0.0000	0.7236**	0.3141
	(0.46)	(1.37)	(0.47)	(0.10)	(2.43)	(1.22)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm age indicators	Yes	Yes	Yes	Yes	Yes	Yes
State, industry, year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,211	9,501	8,314	9,557	5,636	5,372
R-square	0.500	0.426	0.267	0.327	0.198	0.144

Next, I examine the role of local investors in dividend payouts by using another proxy for local ownership in Panel B. Garcia and Norli (2012) examine information on the number of states where a firm has operations from 10-Ks for the US firms between 1994 and 2008, and investigate differences in stock returns between local and geographically dispersed firms. I use Garcia and Norli's (2012) local and geographically dispersed firm dataset[12], matching their data dataset with my sample and re-examining my results. I focus on the main dividend payout tests for these subsamples for local and geographically dispersed firms separately in Panel B. Local firms are expected to have stronger local ownership compared to geographically dispersed firms.

Local Disaster is positive for both local and geographically dispersed firms, but it is only statistically significant for the local firm subsample in the dividend initiation tests. This result is somewhat expected considering that Panel B has much smaller sample sizes compared to both Panel A and the baseline dividend tests. However, the dividend initiation tests provide some important evidence supporting both Panel A and the main tests. A one-standard-deviation increase in *Local Disaster* leads to a 106.2% increase in the odds that a firm initiates dividend for local firms compared to other firms. Dividend initiations present important implications regarding a firm's dividend payout policies. Findings from the dividend initiation tests in Panel B suggest that firms, particularly local firms, recognize the income needs of local investors following local natural disasters and cater to this need by initiating dividends. The results for both Panel A and B of Table 11 accordingly underline the role that local investors play in the geographically-varying income-based dividend clientele effect shown in this paper. The evidence demonstrated

in this table also demonstrates that this dividend clientele effect emerges through the local shareholder channel.

IV. CONCLUSION

The demand side of dividend policies and dividend clienteles has attracted the attention of many studies since Miller and Modigliani (1961). The dividend clientele argument suggests that investor characteristics or preferences are important in determining dividend demand variations and shaping dividend clienteles. Recent studies examine geographical variations in dividend demand by focusing on dividend clienteles based on local factors such as local age or religious characteristics (Becker et al., 2011; Ucar, 2016). I contribute to this literature by examining dividend clienteles based on a different characteristic at the local level: income or investor' current income needs. To identify this effect, I use a quasi-natural experiment setting which utilizes a novel measure highlighting the impact of local investor income on dividend payout. Local major natural disasters can create exogenous shocks to income levels and the needs of local people in an area, which can lead to sudden and important changes in local investors' income needs for current income. My empirical tests employ local natural disasters as a proxy for local investors' investment needs and demonstrate a positive relationship between dividend payouts and local investors' income demand.

My paper demonstrates that firms located in areas whose income levels are affected by natural disasters are more likely to pay and initiate dividends and offer higher dividend yields. My results show a local dividend clientele effect based on investors' income needs. Investors are expected to have a greater need for current and stable income when there is a decline in income following severe major natural disasters. These empirical results suggest a geographically-varying demand for dividend income when local investors have a greater need. These results also highlight the notion that firms cater to this geographically-varying dividend demand. Local natural disasters affecting investors play an important role in local dividend demand and dividend policies. My paper also underlines the notion that the dividend clientele effect is more pronounced for firms largely held by local stockholders, highlighting the role of local investors in determining corporate policies.

This paper suggests a new local dividend clientele effect consistent with the investors' income needs. This paper's findings indicate that investors from areas that experience economic hardship induced by natural disasters have higher levels of income need and thus demand higher levels of dividend income. This new local dividend clientele effect can have some practical or professional implications. Firms can cater to these investor demands through their corporate payout policies. Dividend payer firms can increase their dividend payout levels to attract investors with higher levels of income needs following natural disasters. Non-dividend payer firms can initiate dividends to cater to the investors that demand higher levels of income after natural disasters. Local investors usually have access to more information about local firms. Local firms from the affected areas can have a better understanding of economic shocks to their communities and local investors' income needs after a natural disaster, and therefore local firms can have a better ability to cater to these investor demands by changing their payouts. Also, considering the notion that those investors from the areas affected by natural disasters can have higher levels of income needs, finance professionals may

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present investment opportunities which include firms with higher levels of dividend income if the investors have a stronger need for current income and want to consider dividend payer firms in their portfolios.

ENDNOTES

1. http://www.fema.gov. The agency states that "FEMA and the Federal Government cannot vouch for the data or analyses derived from these data after the data have been retrieved from the Agency's website(s) and/or Data.gov." I obtained the FEMA Summary of Disaster Declarations data from: https://www.fema.gov/media-library/assets/documents/106308 (last accessed on 04/28/2017). FEMA Disaster Declarations can also be downloaded from: http://www.fema.gov/media-library/assets/documents/28318.
2. This dataset also provides information (i.e., beginning and ending dates of the disaster) in order to measure the impact period of natural disasters in addition to location.
3. A major natural disaster affecting an area can create significant shocks to local investors' incomes. It is therefore expected to see that greater local investor income needs emerge following local natural disasters. It takes some time for firms to recognize and respond to investor needs and subsequently change or develop corporate policies consistent with investor preferences. I accordingly use a lagged variable (two-year lag) in order to measure local natural disasters. In some robustness tests, I use another lagged variable (one-year lag) in order to measure local natural disasters.
4. In some robustness test, I use some alternative threshold definitions such as 45 days or 60 days in order to identify major disaster effects.
5. I define Cpratio by following Kumar et al. (2011) and Ucar (2016) and using the ARDA datasets. I use the US Census data from the US Census website to construct other local variables. I use data interpolation to construct the variable for years without available data.
6. Volatility and Lagged Return requires that stock return information for at least the previous 12 months be present for firms with stock return available for less than 24 months when following Ucar (2016).
7. The empirical tests include Fama-French (1997) 48 industry classifications.
8. I also use a different timing for the local disaster variable as well as different definitions of the local disaster variable in additional tests and robustness later in the paper.
9. See the related literature (e.g., Baker and Wurgler, 2004a among others).
10. The Compact Disclosure dataset is available until the fiscal year 2006, and therefore Table 10's regression sample periods end earlier than the main sample.
11. Ucar (2016) uses the Census data and calculates this variable by dividing the number of local firms located within a firm's headquarters county by the county's population. By following Ucar (2016) I use interpolations of the Census for years without available Census data.
12. This dataset is available on Garcia's website: http://www.unc.edu/~garciadi/research.htm.

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