Disaster Risk and Capital Exuding: A New Role of Stock Market Participation*

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Abstract

We propose a new function of stock market – to align voters' preferences to politicians' policies that reduce disaster risks. We build a model with politicians' ability to abate negative disaster shocks. Pro-business politicians are more likely to get re-elected when voters hold firm equity, and because of less severe disaster shocks, firms exude less capital and allocate investment more efficiently. We construct a novel stock market participation data for U.S. states using IRS statistics and instrument it with financial literacy. We find that companies in states with higher stock market participation invest more efficiently and elect pro-business politicians. We use a novel neighboring states methodology to eliminate remaining endogeneity concerns.

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I. Introduction

In this paper, we examine how the risk of disasters that can destroy productive capital interplay with stock ownership and government actions affecting the real side of corporations through capital allocation. We propose a new function of stock market – to align voters' preferences to politicians' policies (e.g., better infrastructure) to mitigate disaster risk. We build a model with politicians' ability to abate negative disaster shocks. Pro-business politicians are more likely to get re-elected when voters hold firm equity, and because of lower negative shocks, firms exude less capital and allocate investment more efficiently. A novel stock market participation data for U.S. states are used, applying the IRS statistics. The main finding is that companies in states with higher stock market participation invest more efficiently and elect pro-business politicians. The results are robust when we instrument stock market participation with financial literacy. The paper also uses a novel neighboring states methodology to eliminate the remaining endogeneity concerns.

One of the main drivers of disaster risk is exposure of people and assets to natural hazards due to the substantial growth of population and assets in at-risk areas. According to the World Bank Review (2014), hydro-meteorological disasters alone accounted for 74% (US$2.6 trillion) of total reported losses, 87% (18,200) of total disasters, and 61% (1.4 million) of total lives lost worldwide. While the increase in the disaster risk is of a major concern to companies, state, and local governments, they lack the understanding on its precise economic and financial consequences, as well as possible strategies to mitigate the risks. It is generally accepted that few states and companies have the tools, expertise, and mechanisms to consider the potential impact of disaster risk on their investment decisions.

We build a comprehensive dynamic political economy model of government preparedness to build corporate immunity to disaster shocks. The politician can exert effort, which is costly. If she wins the election, she receives a certain benefit, and her effort incentives are larger if voters hold firm equity. When disaster shock is lower, firms allocate capital more efficiently.

One of the channels through which financial markets affect the real economy is the quality of capital allocation. To generate economic growth, capital should be allocated towards the most productive uses. To this end, capital markets mobilize and pool savings, facilitate trading, and improve diversification and risk management. Therefore, our dependent variable of interest is the quality of capital allocation measured by the elasticity of firm investment with respect to firm growth, aggregated at the state level.

To test the model, we use panel data and regress state capital allocation on the measures of stock market participation. To control for firm characteristics, we switch from state regression to firm-level regressions. We find a strong and robust result that stock market participation, measured by either IRS statistics or public employees with retirement accounts, is positively associated with better capital allocation. Moreover, the result is stronger for geographically-concentrated firms, for which the effect of state policies is more pronounced.

Next, we ascertain that the results are not due to endogeneity. They hold when we instrument participation with s set of exogenous variables: financial literacy, political polarization, and governor term-limit. To ascertain the exogeneity of instruments we perform several IV diagnostics tests such as weak instruments tests, endogeneity of stock market participation variable tests, tests of overidentifying restrictions, and Hausman specification tests.

To address the possibility that there are omitted regional variables from our regressions that can create an endogeneity problem, we use a "neighboring states" difference-in-difference method. Specifically, we calculate the difference in the capital allocation measure between every state and its neighboring states. To the extent that neighboring states are subject to similar economic conditions, the difference in the capital allocation should be driven by the difference in stock market participation.

In a series of additional tests, we show that better investment efficiency steps from curbing underinvestment problem in states with larger stock market participation. Additionally, more market-oriented policies are implemented in states with larger equity ownership. This becomes evident from a series of indicators, such as more optimistic governor annual speeches, more investment in infrastructure, lower taxes, faster income growth, more optimistic state economy

outlook, and lower perks for governors. Finally, better investor efficiency indeed stems from sound economic policies triggered by stock market participation.

Our paper contributes to multiple streams of literature. First, we uncover a new role for stock market. The previous research identified the following roles: managing risk (Froote et al., 1993), providing price signals (Hayek, 1945), curbing agency problems (Jensen and Meckling, 1976) and fostering growth (e.g., Levine 2005). Second, we contribute to the capital allocation studies (Durnev et al. (2004)) by finding that stock market participation by the general public improves investment efficiency. Third, we build a novel theory model that ties together disaster risks, political actions, and firm investment decisions.

II. Model of Disaster

We consider a firm dynamic investment model in which capital can be hit by a negative disaster shock. Citizens hold firm equity and vote according to their political orientation and equity performance. Good corporate performance tilts the vote from political orientation to stock market performance. Consequently, if public stock market participation is high, people are more likely to vote for politicians who can implement policies that lessen capital exuding due to disasters. Thus, politicians gain more from implementing pro-business policies. Our model shows that politicians exert more effort and firms exude less capital, and investment is more efficient when stock market participation is larger.

II.1. Firms

We analyze an infinitely-lived representative firm with capital stock *K*, investment *I*, and zero depreciation. In a standard model, firms accumulate capital according to

$$K_{t+1} = (I_t + K_{t-1}) \,. \tag{1}$$

We assume that with probability p firm capital is adversely affected by an i.i.d. disaster shock ε with mean μ. However, elected politicians, by exerting costly effort e, can abate the negative shock and reduce its probability by k, and k is assumed to be an increasing function of the politician's effort e, $k_e > 0$. Therefore, capital evolves according to

$$K_{t+1} = (I_t + K_{t-1})(1 - (p - k(e_t)\varepsilon_t)\,. \tag{2}$$

Firm production function $F(K, L)$and investment adjustment cost function $C(I, K)$ are homogenious of degree one, that is, $F = F_K K + F_L L$ and $C = C_I I + C_K K$. The firm maximizes expected profits

$$\max_{\{L_{t+j}, I_{t+j}, K_{t+j+1}\}_{j=0}^{\infty}} E_t\left[\sum_{t=0}^{\infty}\left(\frac{1}{1+r}\right)^t\left(F(K_{t+1}, L_{t+1}) - \left(\frac{W_{i+1}}{\bar{P}}\right)L_{t+1} - I_t - C(I_t, K_t)\right)\right], \tag{3}$$

subject to

$$K_{t+1} = (I_t + K_{t-1})(1 - (p - k(e_t)\varepsilon_t)\,. \tag{4}$$

II.2. Politicians

We consider a risk-neutral politician, up for a re-election, and voters. The politician can exert costly effort e with the cost $ke^2/2$ to reduce the probability of a negative shock, and receives benefit A if re-elected. There is the mass of voters who hold share α of company equity. The voters' political preferences m are distributed uniformly from 0 to 1, and the voter receives payoff n from her political preferences. Voter reservation utility is $\overline{U}$.

II.3. Capital exuding and investment efficiency

Our main results is in Proposition 1.

Proposition 1: *Politicians exert more effort and firms exude less capital, and investment is more efficient when stock market participation is larger, that is,* $\frac{\partial e}{\partial \alpha} > 0$*, and* $\frac{\partial (I/K)}{\partial q \partial \alpha} > 0$.

Proof:

Since voter preferences are distributed uniformly, a voter will choose incumbent politician if $\alpha V + mn \geq \bar{U}$. Therefore, the threshold level of preferences is

$$Prob\left(m \geq \frac{\bar{U}-\alpha V}{n}\right) = 1 - \frac{\bar{U}-\alpha V}{n}. \tag{5}$$

Politician chooses effort *e* to maximize total payoff consisting of benefit *A* if she is re-elected minus effort cost,

$$A\left(1 - \frac{\bar{U}-\alpha V(e)}{n}\right) - k\frac{e^2}{2}. \tag{6}$$

The first-order condition is

$$A\frac{\alpha V_e}{n} - ke = 0. \tag{7}$$

The second-order condition is

$$A\frac{\alpha V_{ee}}{n} - k < 0. \tag{8}$$

Thus, second derivative of firm value with respect to effort is negative. Then the main result follows that politician effort increases as stock ownership gets larger.

$$\frac{\partial e}{\partial \alpha} = -\frac{\frac{AV_e}{n}}{\left(A\frac{\alpha V_{ee}}{n} - k\right)} > 0. \tag{9}$$

We now consider firm objectives. The firm maximizes expected profits

$$\max_{\{L_{t+j},I_{t+j},K_{t+j+1}\}_{j=0}^{\infty}} E_t\left[\sum_{t=0}^{\infty}\left(\frac{1}{1+r}\right)^t\left(F(K_{t+1},L_{t+1})-\left(\frac{W_{i+1}}{\bar{P}}\right)L_{t+1}-I_t-C(I_t,K_t)\right)\right],$$

subject to

$$K_{t+1}=(I_t+K_{t-1})(1-(p-k(e_t)\varepsilon_t)\ .$$

where r is discount rate, L is labor, W is nominal wage, and C is the cost of capital adjustment. The Lagrangian is,

$$\mathcal{L}=E_t\left[\sum_{t=0}^{\infty}\left(\frac{1}{1+r}\right)^t\left(\frac{P_i}{\bar{P}}F(K_{t+1},L_{t+1})-\left(\frac{W_{i+1}}{\bar{P}}\right)L_{t+1}-I_t-C(I_t,K_t)+q_{t+1}\big((I_t+K_t)(1-(p-k(e_t)\varepsilon_t)-K_{t+1}\big)\right)\right]. \tag{10}$$

The first-order condition with respect to investment is

$$\frac{\partial\mathcal{L}}{\partial I_t}=0\ , \tag{11}$$

$$-1-C_I(K_t,I_t)+(1-(p-d(e_t)\mu)q_t=0\ . \tag{12}$$

Assuming a standard quadratic capital adjustment cost

$$C(K_t,I_t)=\frac{b}{2}\left(\frac{I_t}{K_t}\right)^2K_t\ , \tag{13}$$

$$\left(\frac{I_t}{K_t}\right)=\frac{1}{b}\big((1-(p-k(e_t)\mu)q_t-1\big)\ . \tag{14}$$

Thus, investment is less sensitive to marginal q in the presence of capital exuding due to disaster risk.

Q.E.D.

The optimal level of marginal q is then larger than 1 because

$$q_t = \frac{1}{(1-(p-k(e_t)\mu)} > 1 \,. \tag{15}$$

Therefore, firms increase investment only when marginal q is greater than one, that is when one unit of investment results in more than one unit of firm value. We call this problem lower investment efficiency due to capital exuding. Moreover, there larger the exuding is, the higher the threshold level of q: the rise in exuding leads to higher capital replacement cost when firms invest to increase firm value. The fact that investment is less sensitive to q due to disasters is indicative of lower capita allocation efficiency.

To reduce heteroschedasticity and remove capital adjustment cost parameter b, we express investment and value as growth rates,

$$ln\left(\frac{i_t}{i_{t-1}}\right) = ln\left(\frac{d_t V_t - 1}{d_{t-1} V_{t-1} - 1}\right) . \tag{16}$$

Then, in a regression, as d increases, the coefficient on growth in value would also increase.

III. Empirical Predictions and Measures

Our main empirical prediction follows from proposition 1. Namely, in states with more pronounced stock market participation, capital allocation is better, and states implement business-friendly policies.

III.1. Data and Variables

All of the variables are defined in Appendix A. Our main variable of interest is the quality of capital allocation. We follow Wurgler (2000) to construct it as elasticity of investment with respect to firm value, γ. For every state and year (2009-2018), we run OLS regression by firm, $ln\left(\frac{I_{s,t,i}}{I_{s,t-1,i}}\right) = \alpha_{s,t} + \gamma_{s,t} ln\left(\frac{V_{s,t,i}}{V_{s,t-1,i}}\right) + \varepsilon_{s,t,i}$, where *s* labels states, *t* labels years, *i* labels firms, *I* is investment (capital expenditure over total assets), *V* is value (stock price times number of shares plus total assets less book equity, all over total assets), and ε is error term. Larger values of $\gamma_{s,t}$ indicate better allocation of capital. For other tests, we define over-investment and under-investment the value of $\gamma_{s,t}$ for expanding firm (positive $ln\left(\frac{V_{s,t,i}}{V_{s,t-1,i}}\right)$) and for shrining firms (negative $n\left(\frac{V_{s,t,i}}{V_{s,t-1,i}}\right)$).

We use three proxies for stock market participation by state: The ratio of the number of tax returns with dividend income to the number of total tax returns filed from IRS, percentage of employees in a state with public retirement accounts, and the existence of pre-paid tuition plan. The instruments for stock market participation are financial literacy, governor term-limit, and political polarization.

State economic performance is measured by governor speech optimism, state infrastructure, Gallup money worry, Gallup economic confidence, and tax revenues. Firm control variables include cash and size. In state-level regressions, we control for state GDP per capita, income inequality, number of public companies, education level, and media penetration.

Table 1 lists main variables: stock market participation, financial literacy, money worry, economic confidence, prepaid tuition plan, governor travel perks and employees with public retirement accounts. The top three states according to stock market participation are Vermont, Connecticut, and Wisconsin; the bottom states are Alabama, Nevada and Tennessee. According to financial literacy are the top states Michigan, Virginia, and Florida while are the bottom Alaska, Massachusetts, and Kansas. Minnesota, Ohio, and Wyoming have the largest share of employees with public retirement accounts. Kentucky, Virginia, and Maryland are the states with the largest governor perks.

IV. Results

IV.1. Panel Regressions

Table 2 reports state panel regressions of investment efficiency on stock market participation measured by either stock market participation rate (specification 1), employees with retirement accounts (specification 2) or tuition plan (specification 3). The regressions are run using the panel of 550 state-year observations. Every regression includes state and year fixed effects to control for unobserved state and time characteristics. We cluster standard errors at the state and year levels to adjust them for heteroscedasticity, cross-sectional, and time-series correlations. The Hausman specification test compares estimation with state and year fixed effects to estimation without state and year fixed effects. In all three specifications, the coefficients on stock market participation rate are positive and significant indicating better capital allocation in states with higher stock ownership. The Hausman test statistics indicates that the specification with state and year fixed effects is preferable. The state controls that attract significance are GDP per capita (better capital allocation), income inequality (worse capital allocation), number of public companies (better capital allocation), and media penetration (better capital allocation).

Next, we repeat the regressions using firm data in order to control for firm characteristics. Specifically, we regress the growth rates in firm investment on growth rates in firm value and interactions of firm value with stock market participation proxies. Our results survive – the three interaction terms are positive and significant.

IV.2. Instruments

There can be multiple sources of endogeneity in our panel regressions. First, the independent variable may lack exogeneity due to measurement errors. Moreover, there is room for mutual causality, e.g., more profitable firms with efficient investment lobby state governments for risk mitigation strategies.

We establish a set of instruments which are presumably exogenous to stock market participation. They include financial literacy, implemented by K-12 school boards, political polarization, and

exogenously set governor term limits. Intuitively, these variables are exogenous to stock market participation, political polarization, and governor term-limit.

To ascertain that the endogeneity problem is indeed present and that the instruments can be treated as exogenous, we report a series of diagnostics tests in Table 4. They include weak instruments tests, endogeneity of stock market participation variable tests, tests of overidentifying restrictions, and Hausman specification tests. The weak instrument tests are based on F-statistics, partial R^2, and minimum eigenvalues. The endogeneity test ascertains that the error term is not correlated with the endogenous variable. The test of overidentifying restriction establishes whether the instruments are uncorrelated with the error term. The Hausman specification test compares IV estimation to OLS estimation. The Hausman test statistics indicates that the IV specification is preferable. According to these tests in Table 6, we conclude that stock market participation rate is endogenous, the instruments are relevant, and valid.

When we perform the IV estimation we observe a positive and significant coefficient on the market participation variable.

IV.3. Firm Geographical Concentration

We expect the impact of stock market participation to be stronger for firms with more concentrated sales in states they belong to because these firms' operations are more affected by state policies. To measure the degree of concentration, we use the methodology in Garcia and Norli (2012), Specifically, we count the number of times a firm mentions various states in several sections of its first electronically available 10-K annual report. The sections considered are: "Item 1, Business," "Item 2: Properties," "Item 6: Consolidated Financial Data," and "Item 7: Management's Discussion and Analysis." We define a firm's geographical focus based on the fractions of the times different states are mentioned in these sections. Specifically, a firm is geographically concentrated in its home state if it mentions the home state more than 50% of the time in the four sections of the 10-K document. In our sample, 56% of our sample firms are geographically concentrated; that is, they mention their home state more than 50% of times. We then repeat the regressions for the subsamples of geographically concentrated firms and geographically diversified firms. We find that the

coefficient on market participation is significantly positive for both subsamples of firms, suggesting participation has a positive impact on both types of firms' capital allocation. However, the coefficient for a geographically-concentrated firm is more positive than that for geographically-diversified firms, and the difference is significant, based on the Wald F-test statistics that subgroup coefficients are equal. This is consistent with the hypothesis that geographically-concentrated firms are more sensitive to stock market participation induced policies.

IV.4. Neighboring-States Methodology

By using the IV approach we have largely mitigated the potential endogeneity between capital allocation and stock market participation. Nonetheless, there can be further concerns that our state and nation-wide control variables do not adequately capture variations in economic conditions that can influence both stock market participation and capital allocation. For example, negative sentiment in a state can deteriorate firm values and can worsen investment efficiency. To address this concern, we employ a novel "neighboring states" difference-in-difference method.

Specifically, for every state-year, we identify its bordering states and relate their investment efficiency to stock market participation. Assuming that firms in neighboring states are subject to similar unobserved economic shocks, taking differences in the dependent variables should cancel out the unobserved shocks.

Table 6 reports the results of OLS regression in by using the neighboring-states method, where the dependent variable is the difference capital allocation measure. Our main results hold. Hence, it is unlikely that unobserved common factors are driving the results in the previous sections.

IV.5. Over-investment and Under-investment

When we run the regressions for the sample of over-investing and under-investing companies in Table 7 (we include a quadratic term to account for a possible non-linearity), the stock market participation variable is significant for the either sample, however, the coefficient is larger for the sample of under-investing firms. Our interpretation is that government actions help companies secure external financing to finance profitable projects.

IV.5. State Economic Performance

Our main channel of transmission is that state governments implement policies that reduce probability of disasters. Therefore, we expect that stock market participation is positively related to state economic outlook, especially the forward-looking one. In Table 8 we run panel regressions of state economic measures on stock market participation. The measures are: governor speech optimism (proportion of positive words related to economic conditions in governor annual State of the State address), infrastructure spending over GDP, tax revenue (as indication of less business-friendly tax regime), personal income growth, Gallup pall economic confidence, Gullup pall money worry indicators, and governor travel perks.

We observe that more active stock market participation is positively associated with almost all indicators of better state economic performance.

IV. 6. Channel of Transmission

We have established that larger stock participation is related with better capital allocation and generally pro-business policies. The remaining question, however, is whether worse or better capital allocation occurs because of government policies triggered by stock market participation or other factors. To explore the specific channel, we first regress policy variables (infra) on all of the variables in Table 2, including the stock market participation variable. We then collect the explained and unexplained parts of state performance. The explained part measures economic policies related to stock market participation. In the second stage, we regress investment efficiency on the explained and unexeplained parts. The results in Table 9 confirm that the main channel of propogation from stock market ownership to economic policies to better capital allocation - the coefficients on state economic performance explained by participation are significant.

V. Conclusion

This paper advances our understanding how disaster risks affect corporate investment decisions. We propose a new function of stock market – to align voters' preferences to politicians' policies to mitigate disaster risk. This is a novel part of our paper because previous research largely ignored stock ownership as a tool to change politicians' actions. Specifically, the role of stock market was left to from managing risk (Froote et al., 1993) to providing valuable price signals (Hayek, 1945), from curbing agency problems (Jensen and Meckling, 1976) to alleviating informational asymmetries (Myers and Majluf, 1984). Furthermore, there is plenty of evidence that finance fosters growth (e.g., Levine 2005), promotes entrepreneurship (Guiso et al., 2004, Mollica and Zingales, 2008), favors education (Flug et al., 2008, Levine and Rubinstein, 2014), alleviates poverty and reduces inequality (Beck et al., 2007).

We build a political economy model of government preparedness to build corporate immunity to disaster shocks. The model shows that more reactive state governments can build corporate immunity to disasters to reduce the probability of cost shock by exercising more effort. We test the model using novel data on public stock ownership, financial literacy, and governor speeches.

For future research, we plan to differentiate between disaster shocks pertaining to company capital (e.g., earthquakes and floods) and company labor (e.g., pandemic). Capital shocks are likely to be temporary, and firms operating in states with better governments will recover quicker. When a labor shock is present, people cannot work and that will raise marginal product of labor and decrease marginal product of capital. In this case, if governments are less prepared, firms need to scale down capital but at a larger cost. Therefore, the recovery will be longer.

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Appendix A

Definitions of variables

This table lists main variables organized by firm and state categories.

Variable	Definition	Sources	Years
Firm variables			
Firm disaster risk exposure 1	The number of words in sentences indicating natural disaster risks (e.g, natural disaster, calamity, hazard, catastrophic, weather, drought, hurricane, tornado, wildfire, earthquakes, flood, tsunami) per total number of words in firms' "Item 1A. Risk Factors" of annual 10-K statements, multiplied by 1000.	10-K financial statements from SEC's EDGAR database	2009-2019
Firm disaster risk exposure 2	The number of words indicating natural disaster risks (e.g, natural disaster, calamity, hazard, catastrophic, weather, drought, hurricane, tornado, wildfire, earthquakes, flood, tsunami) per total number of words in firms' "Item 1A. Risk Factors" of annual 10-K statements, multiplied by 100.	10-K financial statements from SEC's EDGAR database	2009-2019
Fixed assets	Ratio of firm property, plant, and equipment to total assets.	Compustat	2009-2019
Cash	Net income before extraordinary item plus depreciation and amortization expenses plus R&D expenses, all scaled by total assets.	Compustat	2009-2019
Size	Log of total assets.	Compustat	2009-2019
State variables			
Investment efficiency	Investment efficiency, denoted as γ, is measured for every firm and year as elasticity of firm investment with respect to firm value. For every state and year, we run OLS regression by firms, $ln\left(\frac{I_{s,t,i}}{I_{s,t-1,i}}\right) = \alpha_{s,t} + \gamma_{s,t} ln\left(\frac{V_{s,t,i}}{V_{s,t-1,i}}\right) + \varepsilon_{s,t,i}$, where *s* labels states, *t* years, *i* firms, *I* is investment (capital expenditure over total assets), *V* is value (stock price times number of shares plus total assets less book equity, all over total assets), and ε is error term.	Compustat	2009-2019
Stock market participation	It is defined as the number of tax return forms with dividend income (Form 1099-DIV) divided by the number of total tax returns, expressed in %.	IRS Tax Statistics	2009-2019
Employees with public retirement accounts	The percentage of employees in a state that hold public retirement accounts.	Book of States	2009-2019
Pre-paid tuition plan	Percentage of state population with pre-paid tuition plan.	Book of States	2009-2019
Financial literacy	Hand-constructed index from the Survey of the States. The attributes are: (i) finance is included in the K-12 standards; (ii) finance class standards required to be implemented by districts; (iii) finance high school course required to be offered; (iv) finance high school class required to be taken; (v) finance is a part of standardized testing; (vi) economics is included in the K-12 standards; (vii) economics class standards required to be implemented by districts; (viii) economics high school course required to be offered; (ix) economics high school class required to be taken; (x) economic is a part of standardized testing.	Survey of the States	2009-2019
Governor term limit	Dummy variable equal to one if the state has a term-limit on governor re-election and zero, otherwise.	Book of States	2009-2019

Political polarization	The difference between the percentage of votes of the winning candidate and the next candidates with the largest percentage of votes in gubernatorial election.	Stateline	2009-2019
Number of years till governor election	Number of years till next governor election.	Book of States	2009-2019
Gallup economic confidence	State economic confidence index.	Gallup State of the States	2009-2019
Infrastructure spending/GDP	State spending on infrastructure scaled by state GDP.	Census Bureau	2009-2019
Geographical concentration	Following the method developed by Garcia and Norli (2012), we define a firm as geographically concentrated in its home state if it mentions the home state more than 50% of the time (out of the total times states are mentioned) in the following sections of its first available 10-K report: "Item 1, Business," "Item 2: Properties," "Item 6: Consolidated Financial Data," and "Item 7: Management's Discussion and Analysis."	SEC Edgar	2009-2019
State GDP/capita	State real (in chained 2009 dollars) GDP per capita.	Census Bureau	2009-2019
Income equality	Minus one multiplied by Gini coefficient.	Census Bureau	2009-2019
Number of public companies	Number of public companies by state.	Compustat	2009-2019
Education level	Percentage of state population with college degree.	Book of States	2009-2019
Media penetration	Number of subscribers for the main newspaper by state.	Statista	2009-2019
Governor speech	The number of words related to economic and financial state conditions in the State of the State addresses by state. The State of the State Address is a speech customarily given once each year by the governors of most states of the United States. The speech is customarily delivered before both houses of the state legislature sitting in joint session, with the exception of the Nebraska Legislature, which is a unicameral body. In Iowa, the speech is called the Condition of the State Address. In Kentucky, Massachusetts, Pennsylvania, and Virginia it is called the State of the Commonwealth Address. In Texas, North Dakota, Nevada and Montana the speech is not given every year because the legislatures meets only every second year (on the odd-numbered years). In other states, some governors choose to skip making a state of the state speeches. This practice can change across administrations.	Stateline	2009-2019

Table 1

Summary statistics by state

This table reports the average values (across years from 2009 through 2019 and states) of the main variables by state.

State	firm disaster risk exposure 1	firm disaster risk exposure 2	investment efficiency	stock market participation, %	financial literacy	Gallup economic confidence	pre-paid tuition plan, %	employees with public retirement accounts, %
Alabama	7.99	2.43	-0.20	33.20	4.69	9.93	14.42	5.10
Alaska	12.60	4.41	5.75	36.15	0.76	6.23	12.32	4.90
Arizona	8.21	2.66	0.02	38.23	7.12	7.52	12.71	6.70
Arkansas	9.91	3.19	-0.01	33.00	3.71	4.27	9.85	5.70
California	8.11	2.91	-0.01	39.00	3.97	1.06	11.53	5.27
Colorado	7.17	2.46	-0.88	42.50	5.94	8.85	16.19	8.06
Connecticut	6.21	1.86	-0.98	47.50	3.43	2.08	15.61	5.18
Delaware	8.19	2.62	-0.17	41.89	6.25	-3.19	12.91	4.95
Florida	9.22	3.11	1.09	41.70	7.78	10.52	15.70	4.15
Georgia	10.16	3.53	3.42	38.32	6.59	11.93	13.33	5.54
Hawaii	11.20	3.86	4.36	44.83	2.14	0.61	15.23	6.00
Idaho	12.80	4.51	7.63	36.12	4.25	20.49	15.31	5.85
Illinois	8.21	2.78	-0.11	43.75	5.00	-1.98	16.51	6.23
Indiana	7.88	2.70	-0.21	43.17	6.53	10.35	14.33	4.78
Iowa	10.90	3.61	3.65	43.10	3.27	8.37	12.34	7.64
Kansas	11.25	3.61	3.80	43.40	3.45	8.27	13.03	6.97
Kentucky	8.19	2.61	0.05	36.38	4.95	8.50	13.16	8.75
Louisiana	15.81	5.16	10.23	30.25	3.76	0.87	11.50	3.18
Maine	7.90	2.50	-0.35	42.25	3.51	3.60	15.78	4.59
Maryland	7.16	2.32	-0.67	44.10	4.45	-1.71	14.05	7.22
Massachusetts	5.50	1.65	-0.59	45.14	6.20	1.85	13.62	5.27
Michigan	8.16	2.94	-0.16	39.50	9.43	7.99	13.47	2.91
Minnesota	9.10	2.88	1.83	44.50	6.12	12.29	17.23	10.17
Mississippi	13.00	4.42	1.02	30.35	3.35	3.66	11.16	9.97
Missouri	9.20	3.23	0.94	40.75	6.13	9.22	13.29	5.46
Montana	10.53	3.59	3.21	41.40	4.84	10.55	16.42	7.91
Nebraska	10.06	3.57	2.74	43.90	3.07	12.00	13.61	4.79
Nevada	8.25	2.72	0.13	31.28	2.96	9.96	13.28	4.04
New Hampsh.	8.21	2.81	0.17	41.56	8.00	10.74	12.19	4.43
New Jersey	9.60	3.08	2.68	42.50	7.33	4.40	15.29	6.14
New Mexico	8.12	2.49	-0.01	36.25	3.04	-5.72	12.26	8.38
New York	9.14	3.05	0.71	42.20	5.55	-1.37	16.65	4.60
N. Carolina	11.45	3.97	2.19	40.45	4.11	7.50	15.91	6.77
N. Dakota	10.75	3.54	0.01	32.85	2.86	24.93	11.84	5.35
Ohio	9.10	3.24	0.22	39.33	4.28	7.32	12.20	11.25
Oklahoma	10.14	3.46	4.06	33.55	2.58	9.66	11.36	4.61

Oregon	8.29	2.6	0.12	41.65	5.09	3.38	13.04	7.37
Pennsylvania	7.16	2.2	-1.81	42.75	3.87	2.77	17.17	4.18
Rhode Island	7.21	2.16	-1.16	40.55	4.64	-1.47	11.65	3.92
S. Carolina	8.14	2.47	-0.03	41.66	6.8	9.12	13.00	7.82
S. Dakota	8.00	2.56	-0.20	43.42	5.21	19.19	14.80	6.61
Tennessee	7.11	2.15	-1.45	36.35	2.70	11.18	13.84	5.18
Texas	10.10	3.59	2.00	32.83	5.87	10.77	13.48	6.17
Utah	9.11	3.21	0.12	32.22	3.35	24.19	10.57	4.66
Vermont	9.00	2.99	1.67	49.10	5.34	-12.50	17.13	4.93
Virginia	8.16	2.54	0.00	44.00	7.86	8.10	14.57	5.80
Washington	6.20	2.27	-2.18	41.15	3.82	7.62	15.60	4.40
W. Virginia	8.20	2.90	-0.01	30.10	4.16	1.06	9.94	5.26
Wisconsin	8.16	2.61	-0.18	44.40	4.44	7.58	17.46	7.28
Wyoming	9.22	2.85	1.06	33.15	1.88	24.72	12.34	7.22
Average	9.07	3.01	1.07	39.55	4.73	7.15	13.80	5.99
St. Dev.	1.91	0.71	2.36	4.86	1.78	7.39	1.99	2.01

Table 2

Summary statistics by industry

This table reports the average values of the main variables (across years from 2009 through 2019 and industries) by two-digit SIC industries.

sic code and industry	firm disaster risk exposure 1	firm disaster risk exposure 2	investment efficiency
01 Agricultural Production – Crops	14.43	4.81	0.10
02 Agricultural Production – Livestock	6.25	2.06	1.01
07 Agricultural Services	5.67	1.77	1.77
08 Forestry	8.84	3.06	1.67
09 Fishing, Hunting, & Trapping	13.10	4.30	0.02
10 Metal, Mining	10.96	3.64	1.17
12 Coal Mining	14.01	3.62	-0.01
13 Oil & Gas Extraction	8.29	2.76	1.45
14 Nonmetallic Minerals, Except Fuels	4.67	1.55	1.71
15 General Building Contractors	10.49	3.47	2.74
16 Heavy Construction, Except Building	10.72	3.57	0.22
17 Special Trade Contractors	3.86	1.28	2.96
20 Food & Kindred Products	4.76	1.59	4.36
21 Tobacco Products	10.74	3.49	0.11
22 Textile Mill Products	3.68	1.25	3.63
23 Apparel & Other Textile Products	4.48	1.44	0.91
24 Lumber & Wood Products	10.51	3.50	1.12
25 Furniture & Fixtures	10.23	3.47	1.83
26 Paper & Allied Products	10.45	3.45	1.21
27 Printing & Publishing	12.37	3.45	1.94
28 Chemical & Allied Products	10.83	3.59	1.53
29 Petroleum & Coal Products	12.84	4.25	0.17
30 Rubber & Miscellaneous Plastics Products	4.26	1.39	0.71
31 Leather & Leather Products	12.56	3.46	1.2
32 Stone, Clay, & Glass Products	12.62	4.20	0.10
33 Primary Metal Industries	10.50	3.51	2.06
34 Fabricated Metal Products	10.62	3.51	0.56
35 Industrial Machinery & Equipment	10.56	3.50	-0.16
36 Electronic & Other Electric Equipment	6.73	1.56	3.42
37 Transportation Equipment	14.76	4.88	0.05
38 Instruments & Related Products	10.61	3.53	3.80
39 Miscellaneous Manufacturing Industries	10.37	3.42	1.02
40 Railroad Transportation	14.42	4.78	0.06
41 Local & Interurban Passenger Transit	10.82	3.60	-0.11
42 Trucking & Warehousing	10.63	3.47	-1.17
44 Water Transportation	13.21	4.38	0.02
45 Transportation by Air	12.81	4.21	0.02
46 Pipelines, Except Natural Gas	11.34	3.86	-0.01
47 Transportation Services	12.85	4.25	-1.19

48 Communications	4.46	1.48	0.82
49 Electric, Gas, & Sanitary Services	10.78	3.58	0.12
50 Wholesale Trade – Durable Goods	10.51	3.53	1.68
51 Wholesale Trade – Nondurable Goods	8.66	2.89	1.05
52 Building Materials & Gardening Supplies	10.54	3.47	0.67
53 General Merchandise Stores	12.53	4.12	0.20
54 Food Stores	10.53	3.51	1.35
55 Automative Dealers & Service Stations	10.74	3.59	0.71
56 Apparel & Accessory Stores	10.63	3.51	-0.17
57 Furniture & Homefurnishings Stores	10.59	3.52	3.65
58 Eating & Drinking Places	8.64	2.87	1.00
59 Miscellaneous Retail	4.53	1.49	0.88
60 Depository Institutions	10.72	3.56	0.29
61 Nondepository Institutions	6.19	2.05	1.59
62 Security & Commodity Brokers	5.87	1.94	1.50
63 Insurance Carriers	5.31	1.77	2.72
64 Insurance Agents, Brokers, & Service	5.04	1.68	0.61
65 Real Estate	9.15	3.10	1.18
67 Holding & Other Investment Offices	6.17	2.03	1.30
70 Hotels & Other Lodging Places	12.6	4.20	0.18
72 Personal Services	4.80	1.62	0.50
73 Business Services	4.99	1.66	0.87
75 Auto Repair, Services, & Parking	10.54	3.45	1.03
76 Miscellaneous Repair Services	7.55	3.27	1.08
78 Motion Pictures	9.02	3.01	1.00
79 Amusement & Recreation Services	14.74	4.87	-0.01
80 Health Services	10.65	3.55	2.01
81 Legal Services	5.87	1.91	2.19
82 Educational Services	6.09	2.04	1.12
83 Social Services	3.86	1.30	1.11
86 Membership Organizations	1.27	0.62	1.20
87 Engineering & Management Services	10.55	3.50	-0.21
89 Services, Not Elsewhere Classified	2.49	0.56	2.75
99 Non-Classifiable Establishments	3.97	1.33	1.09

Figure 1: Stock market participation by state, %

This graph represents sample average (across years from 2009 through 2018) of stock market participation measure by state**.** Stock market participation is defined as the number of tax return forms with dividend income (Form 1099-DIV) divided by the number of total tax returns filed using the IRS Tax Statistics, expressed in %.

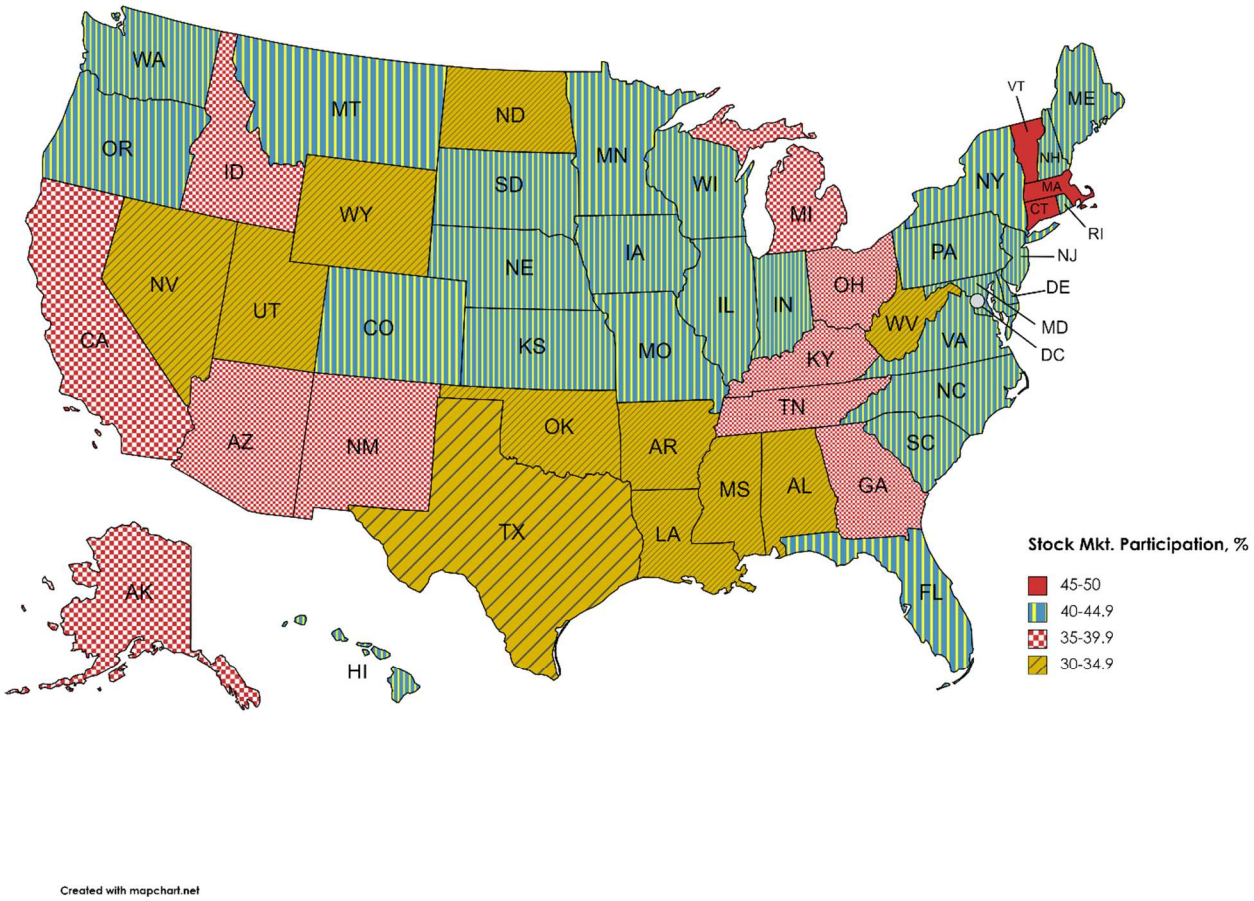


Figure 2: Firm disaster risk exposure by industry

This graph represents sample average (across years from 2008 through 2018) of firm disaster risk exposure 1 by one-digit SIC industries**.** Firm disaster risk exposure 1 is defined as he number of words in sentences indicating natural disaster risks per total number of words in firms' "Item 1A. Risk Factors" of annual 10-K statements.

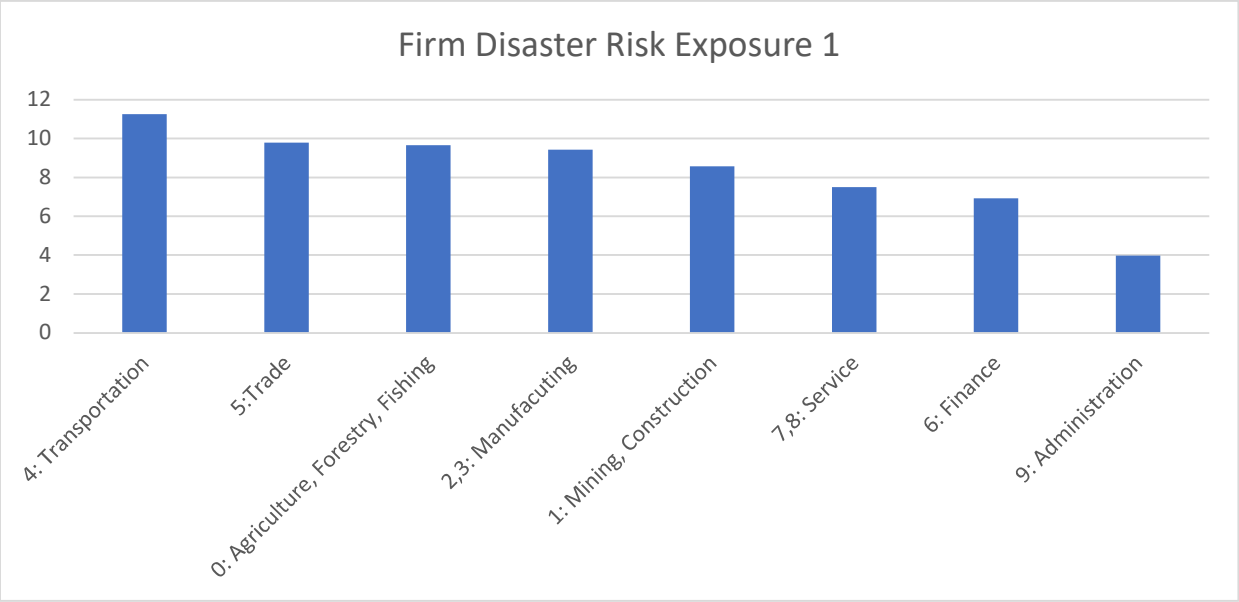
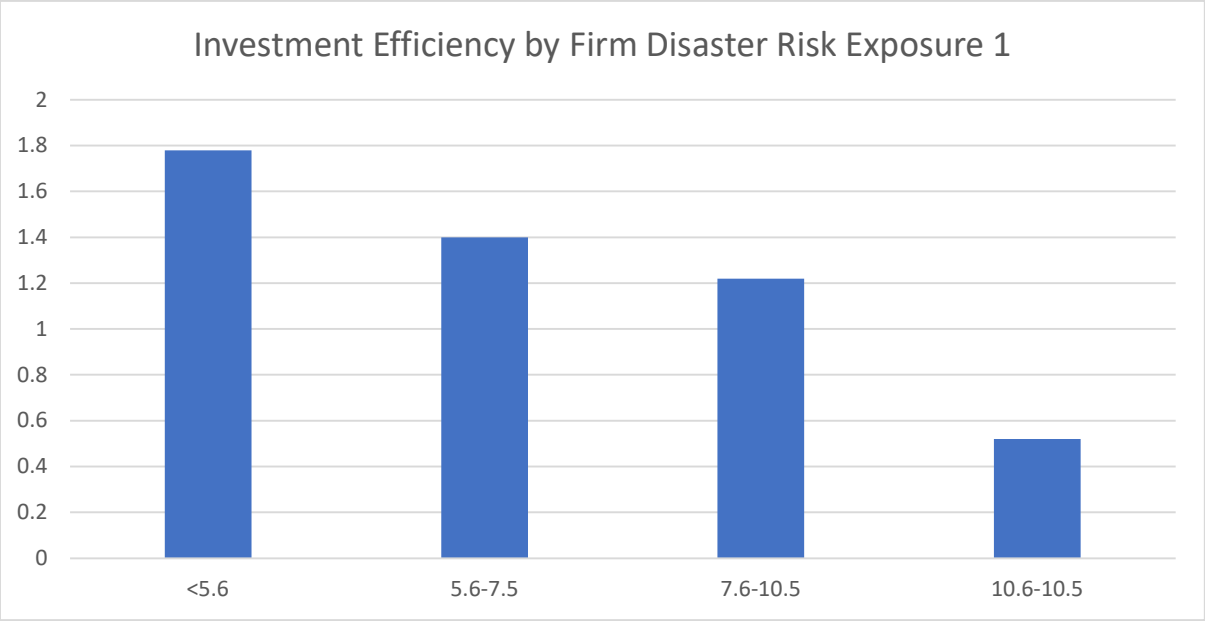


Figure 3: Investment efficiency by firm disaster risk exposure

This graph represents sample average (across years from 2008 through 2019) of investment efficiency for different brackets of values of firm disaster risk exposure 1. Firm investment efficiency is measured for every bracket as elasticity of firm investment with respect to firm value in the regressions run for every risk exposure bracket and year. Firm disaster risk exposure 1 is defined as he number of words in sentences indicating natural disaster risks per total number of words in firms' "Item 1A. Risk Factors" of annual 10-K statements.



Graph 3: Stock market participation by state, %

This graph represents sample average (across years from 2008 through 2019) of stock market participation measure by state**.** Stock market participation is defined as the number of tax return forms with dividend income (Form 1099-DIV) to the number of total tax returns filed using the IRS Tax Statistics (expressed in %).

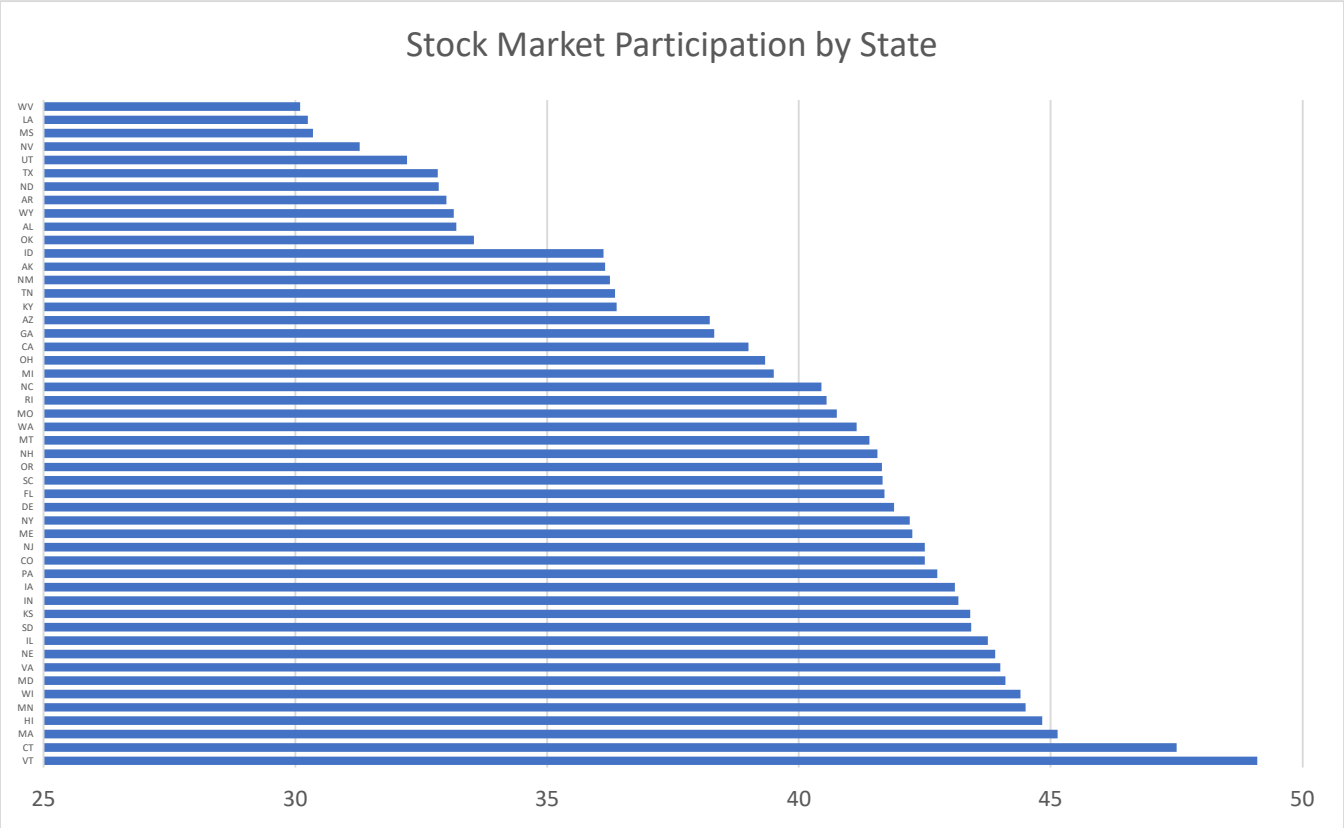


Table 3

State-level analysis: Disaster risk, investment efficiency, and stock market participation

This table reports state panel regressions of investment efficiency on firm disaster risk exposure and stock market participation. The regressions are run using the panel of state-year observations spanning years from 2009 through 2019. Every regression includes state and year fixed effects. Numbers in parentheses are probability levels at which the hypothesis of zero coefficient can be rejected. Standard errors are clustered at the state and year levels to adjust them for heteroscedasticity, cross-sectional, and time-series correlations. The Hausman specification test compares estimation with state and year fixed effects to estimation without state and year fixed effects. The Hausman test statistics indicates that the specification with state and year fixed effects is preferable. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	**Investment efficiency**		
	1	**2**	**3**
Firm disaster risk exposure 1	-0.127***	-0.122***	-0.115***
	-5.52	-4.80	-3.25
Stock market participation rate	0.129***		
	3.17		
Employees with public retirement accounts		1.907***	
		2.69	
Pre-paid tuition plan			0.105**
			2.20
Firm disaster risk exposure 1 × stock market participation rate	0.008***		
	4.19		
Firm disaster risk exposure 1 × employees with public retirement accounts		0.015***	
		3.56	
Firm disaster risk exposure 1 × pre-paid tuition plan			0.021**
			2.29
State GDP/capita	0.030***	0.032***	0.038***
	5.67	5.54	4.60
Income equality	-0.177	-0.179	-0.198
	-1.21	-1.08	-1.17
Number of public companies	0.024***	0.025***	0.021***
	4.34	4.00	3.40
Education level	0.218***	0.302***	0.218***
	3.59	3.65	3.60
Media penetration	0.161***	0.127***	0.199***
	8.18	7.09	8.21
Fixed effects	state and year	state and year	state and year
N	550	550	550
R^2-adj	0.245	0.248	0.205
Standard errors clustering	state and year	state and year	state and year
Haussman specification test vs. no fixed effects	17.303***	7.616***	16.100***
	0.00	0.00	0.00

Table 4

Firm-level analysis: Disaster risk, investment efficiency, and stock market participation

This table reports firm panel regressions of growth in investment on growth in value, stock market participation, firm disaster risk exposure, and their interactions. The regressions are run using the panel of firm-year observations spanning years from 2009 through 2019. Every regression includes state and year fixed effects. Numbers in parentheses are probability levels at which the hypothesis of zero coefficient can be rejected. Standard errors are clustered at the firm and year levels to adjust them for heteroscedasticity, cross-sectional, and time-series correlations. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	$\ln(I_{i,t}/I_{i,t-1})$		
	1	**2**	**3**
$\ln(V_{i,t}/V_{i,t-1})$ × firm disaster risk exposure 1 × stock market participation	0.109***	0.112***	0.175***
	2.65	2.89	3.87
$\ln(V_{i,t}/V_{i,t-1})$	0.477***	0.584***	0.571***
	38.24	40.18	36.08
Firm disaster risk exposure 1	-0.017***	-0.026***	-0.104***
	-6.14	-7.21	-10.12
Stock market participation rate	0.321***		
	4.40		
Employees with public retirement accounts		2.217***	
		2.81	
Pre-paid tuition plan			1.115**
			1.89
Firm disaster risk exposure × stock market participation rate	0.032**		0.017
	-2.28		1.53
Firm disaster risk exposure × employees with public retirement accounts		-0.012**	
		2.18	
Firm disaster risk exposure × Pre-paid tuition plan			-0.011
			1.21
$\ln(V_{i,t}/V_{i,t-1})$ × firm disaster risk exposure 1	-0.021***	-0.025***	-0.017**
	-4.21	-3.17	-2.10
$\ln(V_{i,t}/V_{i,t-1})$ × stock market participation rate	0.131***		
	5.17		
$\ln(V_{i,t}/V_{i,t-1})$ × employees with public retirement accounts		0.125***	
		3.30	
$\ln(V_{i,t}/V_{i,t-1})$ × pre-paid tuition plan			0.121***
			2.99
$\ln(V_{i,t}/V_{i,t-1})$ × GDP/capita	0.117***	0.123***	0.128***
	3.26	3.10	3.14

State GDP/capita	0.080***	0.077***	0.083***
	6.26	5.80	6.20
Income equality	-0.292	-0.021	-0.310
	-1.18	-1.23	-1.12
Number of public companies	0.061***	0.069***	0.071***
	5.11	5.67	5.61
Education level	0.218***	0.138***	0.219***
	3.35	3.50	3.43
Media penetration	0.188***	0.114***	0.129***
	5.06	5.21	5.01
Cash	0.029***	0.021***	0.021***
	12.17	12.26	11.17
Size	0.179***	0.192***	0.190***
	8.78	9.21	9.48
Fixed effects	firm and year	firm and year	firm and year
N	38,218	38,218	38,218
R^2-adj	0.270	0.289	0.276
Standard errors clustering	state and year	state and year	state and year

Table 5

State-level analysis: Disaster risk, investment efficiency, and stock market participation: Instrumental Variable approach

This table reports firm panel regressions of investment efficiency on firm disaster risk exposure and stock market participation using the 2SLS Instrumental Variable approach. The instrumented variable is stock market participation rate. The instruments are: financial literacy, number of years till governor elections, political polarization, and governor term-limit. The regressions are run using the panel of firm-year observations. Every regression includes state and year fixed effects. Numbers in parentheses are probability levels at which the hypothesis of zero coefficient can be rejected. Standard errors are clustered at the firm and year levels to adjust them for heteroscedasticity, cross-sectional, and time-series correlations. We perform the following IV diagnostic tests (i) weak instruments tests; (ii) endogeneity of stock market participation variable tests; (iii) tests of overidentifying restrictions; (iii) Hausman specification tests. The weak instrument tests are based on F-statistics, partial R, and minimum eigenvalues. The endogeneity test ascertains that the error term is not correlated with the endogenous variable. The test of overidentifying restriction establishes whether the instruments are uncorrelated with the error term. The Hausman specification test compares IV estimation to OLS estimation. The Hausman test statistics indicates that the IV specification is preferable. According to these test we conclude that stock market participation rate is endogenous, the instruments are relevant, and valid. * , **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	**Investment efficiency**	**Stock market participation rate**
	1	**2**
	Second-stage regression	**First stage regression**
Instrumented stock market participation rate	0.028***	
	6.12	
Firm disaster risk exposure 1 × stock market participation rate	0.016***	
	5.20	
Firm disaster exposure 1	-0.138***	-0.122***
	-4.17	-2.99
Financial literacy, instrument		0.519***
		3.18
Number of years till governor election year, instrument		-0.055***
		-3.29
Political polarization, instrument		-0.119***
		-2.54
Governor term limit, instrument		-0.22***
		-6.12
State GDP/capita	0.062***	0.071***
	6.89	4.02
Income equality	-0.120	-0.582
	-1.21	-1.29
Number of public companies	0.038***	1.1
	4.22	1.01
Education level	0.021***	0.831***
	3.80	3.47
Media penetration	0.134***	0.034***
	4.15	3.97
Fixed effects	state and year	state and year

N	550	550
R^2-adj	0.353	0.318
Standard errors clustering	state and year	state and year
IV diagnostics tests		
Weak instruments tests, F-stat.	10.219***	
	0.00	
R2, partial	0.181	
Minimum eigenvalue statistics	70.09***	
2SLS relative bias at 5%	20.26	
Endogeneity test, Durbin Chi^2	56.20***	
	0.00	
Test of overidentifying restrictions, Basman Chi^2	37.10***	
	0.00	
Hausman specification test, OLS vs IV	7.16***	
	0.00	

Table 6

State-level analysis: Disaster risk, investment efficiency, and stock market participation conditional on fixed assets and geographical concentration

This table reports state panel regressions of investment efficiency on firm risk exposure, and stock market participation, conditional on the level of fixed assets and geographical concentration. High (low) fixed assets subsample contains state-year observations above (below) the sample median of fixed assets. Geographically concentrated (dispersed) firms subsample contains firms with geographical concentration above (below) 50%. The regressions are run using the panel of state-year observations spanning years from 2009 through 2019. Every regression includes state and year fixed effects. Numbers in parentheses are probability levels at which the hypothesis of zero coefficient can be rejected. Standard errors are clustered at the state and year levels to adjust them for heteroscedasticity, cross-sectional, and time-series correlations. The Wald test of coefficient equivalence reports the F-test statistics of the test that regression coefficients on stock market participation rate for subsamples of state-years with high fixed assets and low fixed assets (specifications 1 and 2) geographically concentrated and geographically dispersed subsample are equal (specifications 3 and 4). The test statistics indicates that the coefficients across the two subsamples are significantly different. * , **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Here, we do by RD and actual disasters

Dependent variable	Investment efficiency			
	high fixed assets	**low fixed assets**	**geographically concentrated firms**	**geographically dispersed firms**
	1	**2**	**3**	**4**
Firm disaster risk exposure	-0.120***	-0.015		
	-4.21	0.59		
Geographical disasters			-0.119***	-0.053
			-4.53	-1.55
Stock market participation rate	0.117***	0.071**	0.117***	0.112**
	4.22	1.98	64.23	1.95
Firm disaster risk exposure × stock market participation rate	0.015***	0.002	0.045**	0.004
	-3.29	-0.94	-2.25	-1.20
State GDP/capita	0.021***	0.019***	0.021***	0.037***
	4.08	5.00	5.00	5.39
Income equality	-0.159	-0.282	-0.148	-0.225
	-1.22	-1.45	-1.09	-1.59
Number of public companies	0.027***	0.048***	0.029***	0.030***
	4.17	4.17	4.05	4.29
Education level	0.247***	0.125***	0.270***	0.125***
	3.60	3.80	3.68	3.20
Media penetration	0.114***	0.119***	0.146***	0.119***
	5.22	4.47	5.21	4.17
Fixed effects	state and year	state and year	state and year	state and year
N	183	183	200	350
R^2-adj	0.402	0.442	0.426	0.381
Standard errors clustering	state and year	state and year	state and year	state and year
Wald F-test statistics that subgroup coefficients are equal	12.023***		27.200***	
	0.00		0.00	

Table 7

State-level analysis: Neighboring states methodology

This table presents the results of OLS regressions using the neighboring states method. For every state-year we identify all its neighboring states. The dependent and independent variables are defined as differences in values of the variables between state and year and its neighboring states for the same year. The regressions are run using the panel of state-year observations. Every regression includes state and year fixed effects. Numbers in parentheses are probability levels at which the hypothesis of zero coefficient can be rejected. Standard errors are clustered at the state and year levels to adjust them for heteroscedasticity, cross-sectional, and time-series correlations. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	**ΔInvestment efficiency**
ΔFirm disaster risk exposure	-0.104***
	-4.39
ΔStock market participation rate	0.28***
	5.21
ΔFirm disaster risk exposure × Δstock market participation rate	0.019**
	2.39
ΔState GDP/capita	0.115***
	4.39
ΔIncome equality	-0.200
	-1.23
ΔNumber of public companies	0.015**
	2.31
ΔEducation level	0.221***
	3.76
ΔMedia penetration	0.124***
	4.38
Fixed effects	state and year
N	2,076
R^2-adj	0.224
Standard errors clustering	state and year
Haussman specification test vs. no fixed effects	13.40***
	0.00

Table 8

Under-investment and over-investment

This table reports state panel regressions of investment efficiency on firm disaster risk exposure and stock market participation. The regressions are run using the panel of state-year observations. The under-investment sample includes observations with positive growth in value; the over-investment sample includes observations with negative growth in value. Every regression includes state and year fixed effects. Numbers in parentheses are probability levels at which the hypothesis of zero coefficient can be rejected. Standard errors are clustered at the state and year levels to adjust them for heteroscedasticity, cross-sectional, and time-series correlations.

	under-investment	**over-investment**
Dependent variable	**investment efficiency**	
	1	**2**
Firm disaster risk exposure	-0.100***	-0.139***
	-3.22	-6.59
Stock market participation rate	0.109***	0.085***
	5.34	6.32
Firm disaster risk exposure × stock market participation rate	0.075***	0.014*
	2.38	1.65
State GDP/capita	0.048***	0.107***
	6.59	7.19
Income equality	-0.108	-0.175
	-1.90	-1.17
Number of public companies	0.036***	0.024***
	4.42	3.36
Education level	0.250***	0.339***
	3.12	3.17
Media penetration	0.154***	0.149***
	6.73	5.27
Fixed effects	state and year	state and year
N	550	550
R^2-adj	0.314	0.332
Standard errors clustering	state and year	state and year

Table 9

Stock market participation and state performance

This table reports state panel regressions of state performance measures on stock market participation. The regressions are run using the panel of state-year observations. Every regression includes state and year fixed effects. Numbers in parentheses are probability levels at which the hypothesis of zero coefficient can be rejected. Standard errors are clustered at the state and year levels to adjust them for heteroscedasticity, cross-sectional, and time-series correlations. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	**infrastructure spending/state GDP**	**governor speech tone**	**Gallup economic confidence**
	1	**2**	**3**
Number of years till governor election year	-0.025***	-0.317***	0.015***
	-3.19	-2.99	1.30
Stock market participation rate	0.120***	0.319***	0.121***
	5.10	2.56	4.08
Election year × stock market participation rate	0.020***	0.019***	0.016*
	3.08	2.21	1.78
State GDP/capita	0.037***	0.014***	0.028***
	4.22	5.09	4.49
Income equality	-0.137**	-0.008	-0.160***
	-1.80	-1.22	-3.21
Number of public companies	0.020***	0.019***	0.007
	3.18	4.22	1.29
Education level	0.217***	0.122***	0.104***
	3.17	3.20	3.49
Media penetration	0.013	0.047	0.011
	1.22	1.39	1.39
Fixed effects	state and year	state and year	state and year
N	550	550	550
R^2-adj	0.328	0.341	0.317
Standard errors clustering	state and year	state and year	state and year
Haussman specification test vs. no fixed effects	12.110***	5.290***	12.393***
	0.00	0.00	0.00

Table 10

State economic policies channel for investment efficiency

This table reports the results of OLS panel regressions of investment efficiency on explained and unexplained levels of state performance measures: infrastructure spending, governor speech optimism, and Gallup economic confidence index. To obtain the explained and unexplained parts, we first regress state performance on all variables as in Table 2, including stock market participation. The regressions are run using the panel of state-year observations. Every regression includes state and year fixed effects. Numbers in parentheses are probability levels at which the hypothesis of zero coefficient can be rejected. Standard errors are clustered at the state and year levels to adjust them for heteroscedasticity, cross-sectional, and time-series correlations. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	**Investment efficiency**		
	1	**2**	**3**
Infrastructure explained	0.121***		
	3.33		
Infrastructure unexplained	-0.216		
	0.26		
Governor speech explained		0.198***	
		2.99	
Governor speech unexplained		-0.275	
		0.65	
Gallup economic confidence explained			0.028**
			2.29
Gallup economic confidence unexplained			0.014
			1.39
State GDP/capita	0.077***	0.117***	0.087***
	6.16	4.87	5.17
Income equality	-0.132	-0.175	-0.199
	-1.56	-1.14	-1.21
Number of public companies	0.027***	0.036***	0.063***
	3.19	4.22	5.29
Education level	0.314***	0.317***	0.222***
	3.45	3.49	4.00
Media penetration	0.138***	0.184***	0.110***
	5.88	5.19	4.39
Cash	0.029***	0.017***	0.025***
	14.29	11.12	10.30
Size	0.181***	0.184***	0.156***
	8.57	8.00	7.55
Fixed effects	state and year	state and year	state and year
N	550	550	550
R^2-adj	0.321	0.314	0.37
Standard errors clustering	state and year	state and year	state and year