

# Does frugality influence firm behavior? Evidence from Natural Disasters

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# Road Map

- ▶ Negative Correlation (Residents' Frugality, Firms' Debt Maturity)
- ▶ The Disaster Shocks - Direct (DisasterCARs), (Large-Disaster-Years)\*(Residents' Thrift)
- ▶ Main Results: (Diff-in-diff) → Financing, Real Effects
  - Capital Raising: ↑Debt, ↓Equity, ↓Maturity, Investment: ↓CAPEX
  - Channels: ↓Local Capital Supply (↑Tap Global Capital Markets, ↑Foreign Operations)
- ▶ Robustness: Placebo Tests, Transportation Disasters

# Meet My Grand-Pa, His “Cheap” Friends

“Some of the world’s most famous economists were **famously frugal**... Milton Friedman, the late Nobel laureate, routinely returned reporters’ calls collect...” **Secrets of the Economist's Trade: First, Purchase a Piggy Bank**, Wall Street Journal, Jan 02, 2010

A-HED

## Economists Say ‘Bah! Humbug!’ to Christmas Presents

Those schooled in Scroogenomics say gifts are inefficient, but even wonks can’t fight the yuletide

By *Josh Zumbrun*

Dec. 23, 2015 9:21 p.m. ET

Economist Sean Snaithe believes deeply, along with many in his trade, that gift-giving represents an inefficient reallocation of resources.

Recommended Videos

1 Bitcoin: The



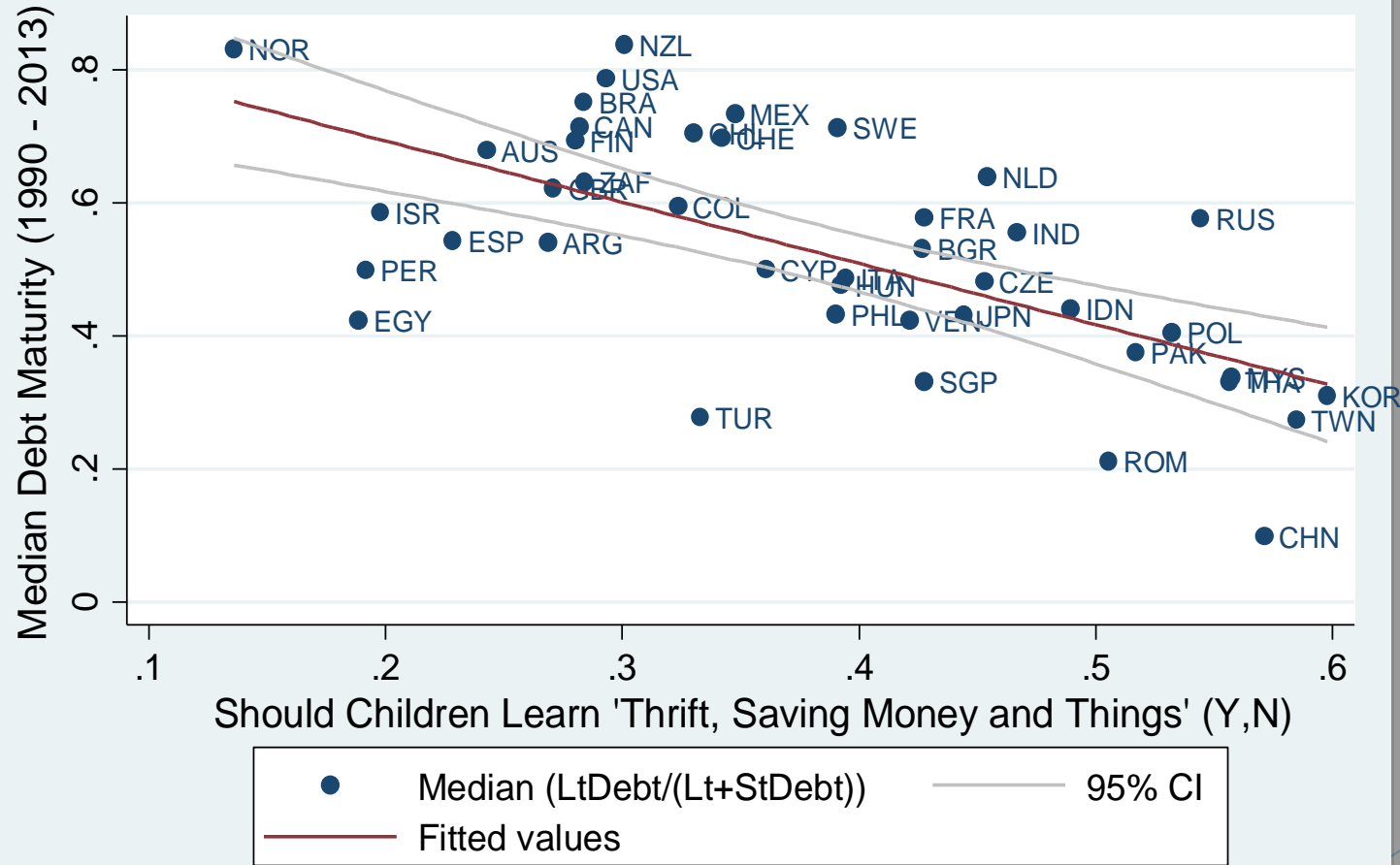
Disney / Everett

Jim Carrey as Scrooge in a scene from *A Christmas Carol*

Sources: Wall Street Journal, Times

# Thriftier countries, shorter debt maturity

Figure 1: Frugality and Debt Maturity Around the World



Sources: Worldscope, World Values Survey

# Frugality: How *much* you save, *how*

- ▶ Thriftier countries (WVS), higher savings rates (Guiso, Sapienza, Zingales, 2008)
  - ▶ More frugal, “care-in-use” (efficiency), short-term sacrifice, long-term goals (Yarrow, 2014; Lastovicka et al. 1999)
  - ▶ Informed by parents’ thrift/social norms/genes (Knowles and Postlewaite, 2004; Guiso, Sapienza, Zingales, 2003; Cronqvist and Siegel, 2015)
- ▶ Correlation (Frugality, Corporate Maturity) = -0.645
  - ▶ Perspective: Correlation (Leverage, Corporate Maturity) = 0.669
  - ▶ Capital-Supply Side: Maturity (non-price, limit risk) (Strahan, 1999; Diamond, 2004)
  - ▶ Financial contracting: Agency (Jensen, 1986; Stulz, 1990), Maturity Matching, Rollover Risk (Diamond, 1991; Myers, 1977, 1984; Hart and Moore, 1995)
- ▶ “Every frugal [person] a public benefactor” (Adam Smith, 1776) (“Thrift days” WWI recovery-propaganda, Garon, 2012; Yarrow, 2014)
  - ▶ Penny-pinching: “Depression-era birth cohorts” (Malmendier, Tate, Yan, 2011) “Paradox of thrift” (Keynes, 1936, Mandeville, 1714)

# World Value Survey (Measuring Frugality)

## Section A: Values

This questionnaire is part of a global study of what people value in life. The participants of this study come from samples representing most of the world's people. The questions are designed to ask your views on a number of different subjects. Your input will be treated strictly confidential, but will contribute to a better understanding of what people all over the world believe and want out of life.

**A1** For each of the following, indicate how important it is in your life. How important is...?

**i** Please select only **ONE** box in each row

	Very important	Rather important	Not very important	Not at all important
Family	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Friends	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Tolerance and respect for other people

Thrift, saving money and things

Determination, perseverance

**A2** Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important?

**i** Please select up to **FIVE** boxes

Independence	<input type="checkbox"/>
Hard work	<input type="checkbox"/>
Feeling of responsibility	<input type="checkbox"/>

Source: Australian World Value Survey, 2012

# Who tends to be frugal?

- ▶  $Frugrality_J = a + (\text{Culture}_J, \text{Legal Origin}_J, \text{Institutional Quality}_J) + e_J$  (Table A.1)
  - ▶ Trust and Uncertainty Avoidance (R-sq, 0.003)
  - ▶ Religious Affiliations (R-sq, 0.388)
  - ▶ Legal Origin (R-sq, 0.231)
  - ▶ Shareholder and Creditor Enforcements (R-sq, 0.025)
- ▶  $Frugrality(Y, N)_{i,j,t} = a + \text{Health}_i + \text{Happiness}_i + \text{Wealth}_i + X_{i,t} + b_j + c_t + e_{i,j,t}$  (Table A.2)
  - ▶ (-)Health, (-)Happiness, (-)Wealth
  - ▶ Controls: Age, Age-sq, Gender, Married, Children, Trust, Education, Religion/Country-FE, Survey-year FE

# Empirical Design: Disasters and Data

- ▶ Emergency Events Database (EM-DAT): floods, mudslides, storms, etc
  - ▶ Country-specific: (Treatment = Rolling largest disaster)(Jan 1990, to sample end)
  - ▶ Firms need to raise capital  $\uparrow$ , Investors' willingness to supply capital  $\downarrow$
  - ▶ DisasterCARs:  $R_{i,j,t} = a + B_{m,i}R_{j,t} + B_{W,i}R_{W,t} + \text{LargestDisaster}(0,1)_{J,t}\delta_{\text{Disaster}J,t}$
  - ▶ Weekly returns, USD, every year (DS)
- ▶  $\text{Outcome}_{i,j,k,t} = a + \text{Disaster}_{J,t} * \text{Frugality}_j + \text{Disaster}_{J,t} + \text{DisasterCAR}_{i,j,t} + b_j + C_k + d_t + e_{j,t}$ 
  - ▶ Capital Raising: New-Debt, SEOs, Quantity (Proceeds), Maturity, Currency (SDC)
  - ▶ Investment:  $(\text{CAPEX}+\text{R\&D})/(\text{TA})$ ,  $(\text{CAPEX}+\text{R\&D})/(\text{Sum}+\text{CASH})$ ,  $(\text{R\&D}/\text{CAPEX})$  (WS)
  - ▶ Sample: (42 countries, 1990-2013), Nonfinancial (SIC=6), (Cusip, SEDOL, ISIN)
  - ▶ Controls: Q, Cashflow, LnTA, PPE, InFirmAge, Leverage, GDP Growth, Mkt/GDP



Figure 2: Effect of Frugality on Proceeds Around Disasters

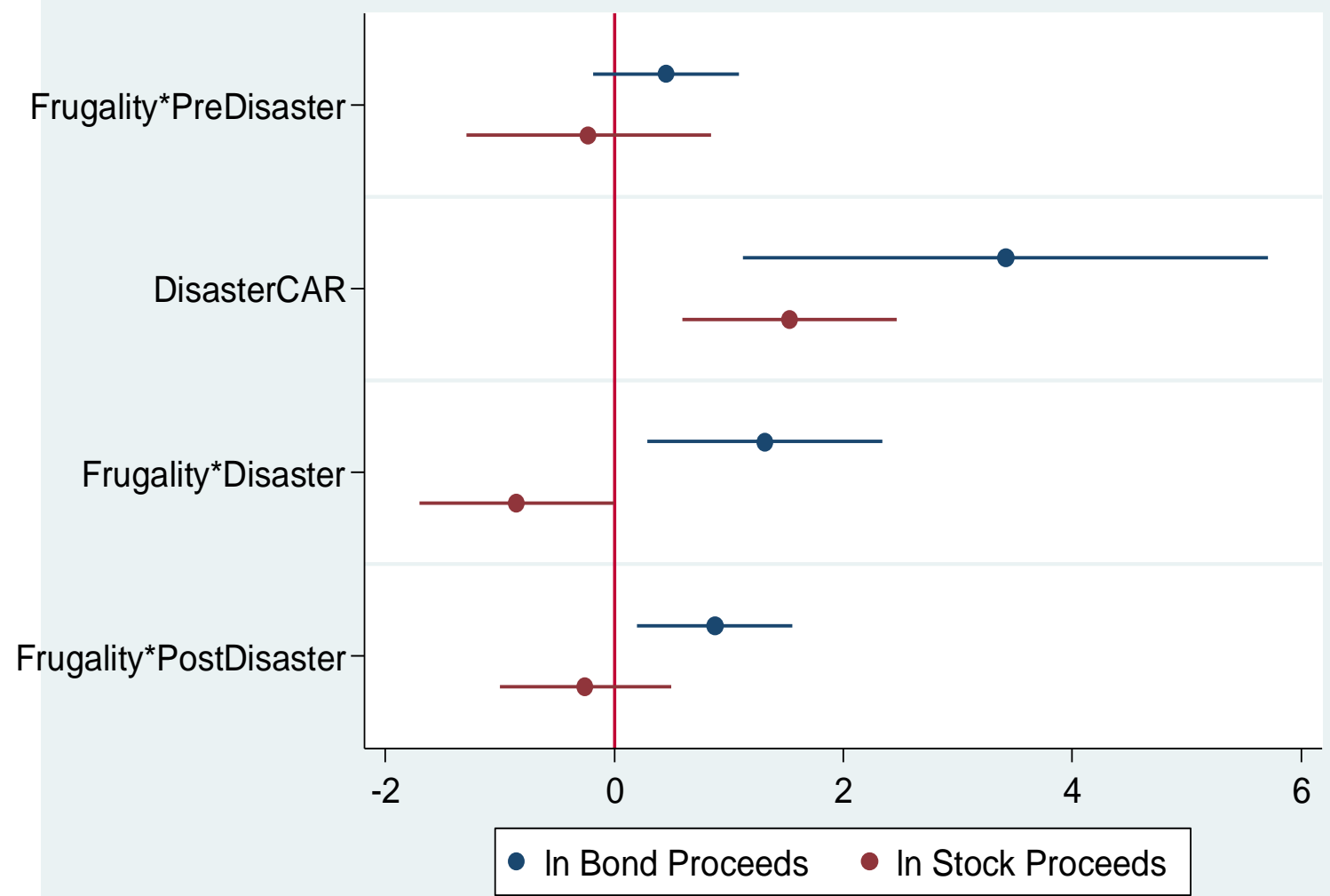
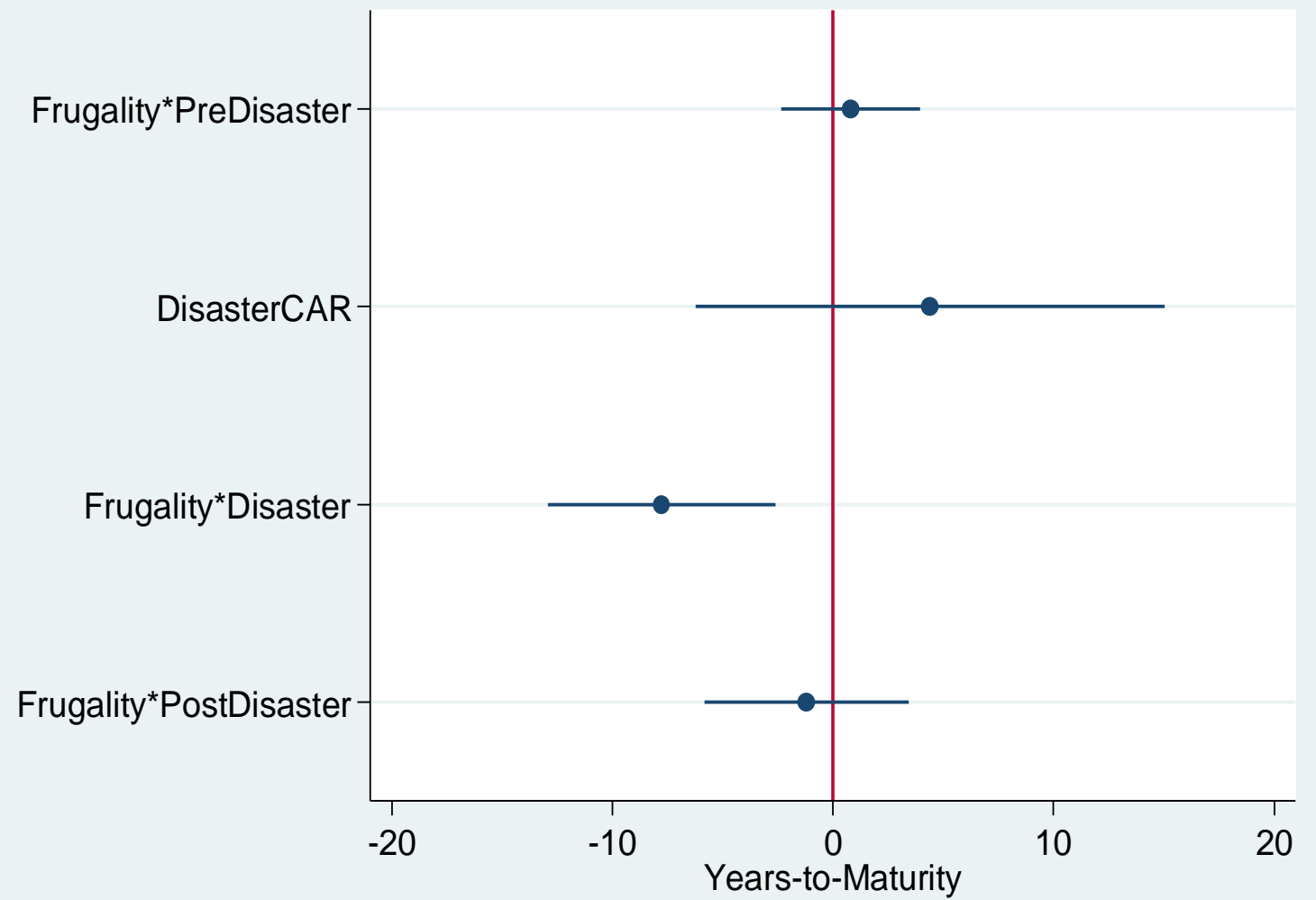


Figure 3: Effect of Frugality on Years-to-Maturity



# Frugality's Economic Magnitude

- ▶ Quantity: Table 3 Column (3, 6) Coeff\*Median(Bond, Stock Proceeds)
  - ▶ Norway (Frugality=0.136), (Median Bond, Stock Proceeds) (USD 140 M, USD 23.6 M)
  - ▶ Norway:  $\Delta$  (USD 24.9 M Larger Bond Proceeds, -2.7 M Smaller Stock Proceeds)
  - ▶ Korea (Frugality=0.598), Median (USD 78 M, USD 9 M)  $\Delta$  (61 M, -4.9 M)
- ▶ Do firms respond by raising capital globally?
  - ▶ Key idea: Local shock, leads firms to raise capital non-locally
  - ▶ Identification: Non-US Firms issuing in USD vs non-USD (local currency)
  - ▶ Controls: Q, Cashflow, LnTA, PPE, InFirmAge, Leverage, GDP Growth, Mkt/GDP
- ▶ Does frugality have real effects on firms?

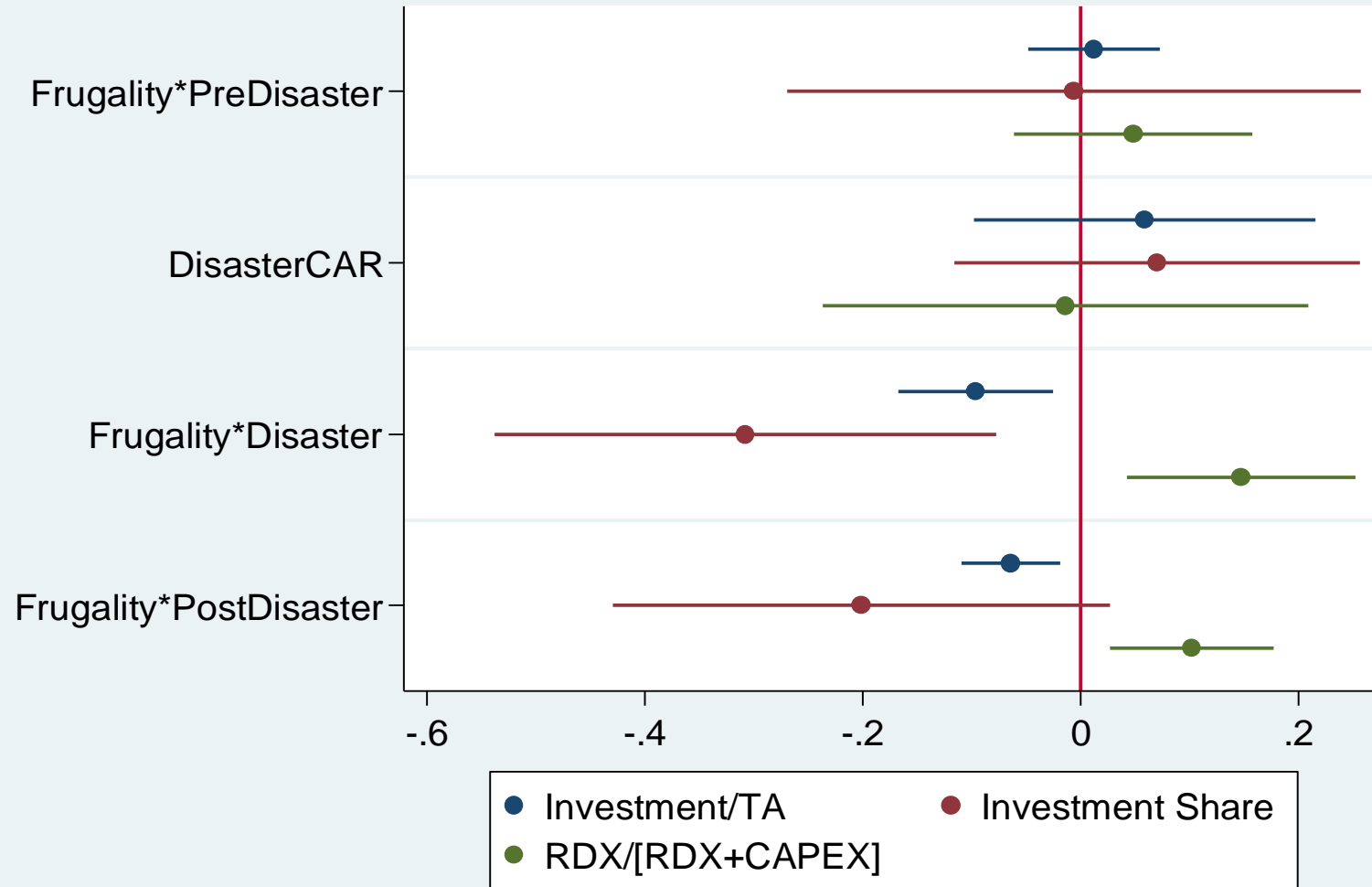
# Table 4 (USD Multinomial logit) (Bonds)

Sample Type of issuance	(1) Multinomial Logit Exclude U.S.		(2) Multinomial Logit Exclude U.S.		(3) Multinomial Logit Exclude U.S.	
	Local Debt	USD Debt	Local Debt	USD Debt	Local Debt	USD Debt
Disaster <sub>J,t</sub> *Frugality <sub>J</sub>	1.8190*	3.1569*	1.5911*	0.3037	2.0742**	0.9243
	(1.058)	(1.619)	(0.952)	(1.362)	(0.995)	(1.238)
Disaster <sub>J,t</sub>	-0.5834	-0.8028	-0.4749	0.1123	-0.7026*	-0.1034
	(0.431)	(0.649)	(0.374)	(0.510)	(0.398)	(0.452)
DisasterCAR <sub>ij,t</sub>	-0.0485	1.8239	-0.4112	-0.5031	0.1124	1.9933
	(1.442)	(2.671)	(1.390)	(5.236)	(1.295)	(4.717)
PreDisaster <sub>J,t</sub> *Frugality <sub>J</sub>					3.0522***	-0.0415
					(1.178)	(1.159)
PostDisaster <sub>J,t</sub> *Frugality <sub>J</sub>					1.7133*	2.7205**
					(0.876)	(1.192)
PreDisaster <sub>J,t</sub>					-1.1794**	0.2073
					(0.483)	(0.501)
PostDisaster <sub>J,t</sub>					-0.6280*	-1.0552**
					(0.357)	(0.465)
Constant	-6.0546***	-4.3853***	-11.2233***	-11.9318***	-12.1280***	-12.2831***
	(0.601)	(0.874)	(0.700)	(0.848)	(0.687)	(0.913)
Observations	318,048	318,048	249,217	249,217	230,359	230,359
Country FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Controls	N	N	Y	Y	Y	Y
Pseudo R-Squared	0.122	0.122	0.327	0.327	0.334	0.334

# Table 4 (USD Multinomial logit) (SEOs)

Sample Type of issuance	(1) Multinomial Logit Exclude U.S.		(2) Multinomial Logit Exclude U.S.		(3) Multinomial Logit Exclude U.S.	
	Local SEO	USD SEO	Local SEO	USD SEO	Local SEO	USD SEO
Disaster <sub>J,t</sub> *Frugality <sub>J</sub>	-0.7898 (0.989)	3.1995** (1.594)	-1.3472 (0.901)	2.4594 (1.912)	-1.2215 (0.905)	2.9648 (1.838)
Disaster <sub>J,t</sub>	0.1829 (0.308)	-1.2104** (0.555)	0.3717 (0.301)	-1.1629* (0.609)	0.1642 (0.285)	-1.3055** (0.618)
DisasterCAR <sub>i,j,t</sub>	-1.5252** (0.711)	7.8863** (3.704)	-1.0664 (0.958)	14.2269*** (2.527)	-0.3466 (0.710)	11.8156*** (2.546)
PreDisaster <sub>J,t</sub> *Frugality <sub>J</sub>					-0.7155 (1.028)	-1.2306 (2.110)
PostDisaster <sub>J,t</sub> *Frugality <sub>J</sub>					-0.0715 (0.804)	5.1454*** (1.577)
PreDisaster <sub>J,t</sub>					0.0036 (0.339)	-0.0450 (0.814)
PostDisaster <sub>J,t</sub>					-0.2836 (0.276)	-1.5928** (0.672)
Constant	-7.8207*** (0.518)	-6.8798*** (1.349)	-5.8796*** (0.594)	-7.5380*** (1.205)	-5.7914*** (0.636)	-7.7094*** (1.170)
Observations	318,048	318,048	249,217	249,217	230,359	230,359
Country FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Controls	N	N	Y	Y	Y	Y
Pseudo R-Squared	0.195	0.195	0.211	0.211	0.216	0.216

Figure 4: Effect of Frugality on Investment



# Table 6 (Investment OLS) (Matched)

Sample	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	ForSales CAPEX +RDX	NoForSales CAPEX +RDX	ForAT CAPEX +RDX	NoForAT CAPEX +RDX	ForINC CAPEX +RDX	NoForINC CAPEX +RDX
Disaster <sub>j,t</sub> *Frugality <sub>j</sub>	-0.0776** (0.039)	-0.0890* (0.046)	-0.0444 (0.043)	-0.0752** (0.038)	-0.0722 (0.053)	-0.0704* (0.036)
Disaster <sub>j,t</sub>	0.0295** (0.014)	0.0330* (0.018)	0.0171 (0.016)	0.0273* (0.015)	0.0251 (0.019)	0.0259* (0.015)
DisasterCAR <sub>i,j,t</sub>	0.1418* (0.080)	0.0138 (0.117)	0.2019** (0.087)	-0.0270 (0.082)	0.3282*** (0.088)	-0.0449 (0.094)
PreDisaster <sub>j,t</sub> *Frugality <sub>j</sub>	0.0669* (0.038)	0.0065 (0.036)	0.0963** (0.041)	0.0166 (0.033)	0.0735 (0.051)	0.0252 (0.032)
PostDisaster <sub>j,t</sub> *Frugality <sub>j</sub>	-0.0487 (0.031)	-0.0500* (0.027)	-0.0356 (0.036)	-0.0423* (0.023)	-0.0901 (0.065)	-0.0430* (0.022)
PreDisaster <sub>j,t</sub>	-0.0226* (0.014)	-0.0064 (0.014)	-0.0339** (0.014)	-0.0083 (0.013)	-0.0255 (0.017)	-0.0118 (0.012)
PostDisaster <sub>j,t</sub>	0.0113 (0.011)	0.0178* (0.010)	0.0100 (0.014)	0.0132 (0.009)	0.0222 (0.020)	0.0145* (0.008)
Constant	0.2830*** (0.020)	0.2346*** (0.022)	0.2899*** (0.025)	0.2486*** (0.023)	0.2599*** (0.030)	0.2504*** (0.021)
Observations	23,046	43,626	18,032	48,640	13,259	53,413
Model from Panel A	1	2	3	4	5	6
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Adjusted R-Squared	0.606	0.526	0.574	0.536	0.606	0.534

# Table 7 (Placebo OLS All)

Sample	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	All	All	All	All	All	All
	In(Debt Proceeds)	In(SEO Proceeds)	Years-to- Maturity	CAPEX +RDX	Investment Share	RDX Share
Placebo-Disaster <sub>J,t</sub> *Frugality <sub>J</sub>	-0.1359 (0.160)	-0.1258 (0.193)	1.1618* (0.627)	-0.0024 (0.007)	0.0003 (0.021)	0.0055 (0.015)
Placebo-Disaster <sub>J,t</sub>	-0.0062 (0.065)	0.0269 (0.080)	-0.6419** (0.262)	0.0015 (0.003)	0.0019 (0.007)	0.0007 (0.004)
Placebo-DisasterCAR <sub>i,j,t</sub>	-0.3486 (0.550)	0.0722 (0.427)	-3.2533 (2.085)	-0.0054 (0.016)	0.0212 (0.030)	0.0164 (0.017)
PrePlaceboDisaster <sub>J,t</sub> *Frugality <sub>J</sub>	-0.0652 (0.244)	-0.2347 (0.345)	1.6315 (1.021)	0.0101 (0.013)	0.0248 (0.037)	-0.0583** (0.023)
PostPlaceboDisaster <sub>J,t</sub> *Frugality <sub>J</sub>	-0.1233 (0.236)	-0.2240 (0.332)	1.5552 (1.028)	-0.0126 (0.011)	-0.0231 (0.034)	0.0184 (0.025)
PrePlaceboDisaster <sub>J,t</sub>	0.0705 (0.098)	-0.0317 (0.142)	-0.7907* (0.438)	-0.0045 (0.005)	-0.0028 (0.013)	0.0179** (0.008)
PostPlaceboDisaster <sub>J,t</sub>	0.0373 (0.096)	0.0601 (0.140)	-0.9755** (0.444)	0.0045 (0.005)	0.0117 (0.013)	-0.0061 (0.009)
Constant	-0.3590** (0.176)	-0.5261*** (0.198)	6.0676*** (1.175)	0.1909*** (0.007)	0.2387*** (0.022)	0.1805*** (0.013)
Observations	15,803	24,413	15,819	348,196	305,843	297,685
Country FE	Y	Y	Y	N	N	N
Industry FE	Y	Y	Y	N	N	N
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Adjusted R-Squared	0.601	0.658	0.279	0.505	0.620	0.813



# Table 8 (Alternative Treatment)

Sample Dependent Variable	(1) Multinomial Logit		(2)	(3)	(4)
	All New-Debt	All SEO	All ln(Debt Proceeds)	OLS All ln(SEO Proceeds)	All Years-to- Maturity
Transport <sub>J,t</sub> *Frugality <sub>J</sub>	0.0305 (1.640)	-3.6589* (2.017)	2.6182*** (0.692)	1.7111 (1.332)	-6.7536 (4.274)
Transport <sub>J,t</sub>	0.0608 (0.561)	1.3357* (0.775)	-0.8378*** (0.241)	-0.5582 (0.466)	1.8007 (1.361)
PreTransport <sub>J,t</sub> *Frugality <sub>J</sub>	0.0048 (0.532)	-0.1343 (0.603)	0.2048 (0.254)	-0.2268 (0.405)	-2.6508* (1.360)
PostTransport <sub>J,t</sub> *Frugality <sub>J</sub>	0.7982 (0.588)	-0.1798 (0.610)	0.4286* (0.236)	0.3688 (0.412)	-1.0503 (0.968)
PreTransport <sub>J,t</sub>	-0.0975 (0.196)	-0.1672 (0.214)	-0.1248 (0.101)	0.1419 (0.163)	0.9500* (0.563)
PostTransport <sub>J,t</sub>	-0.3131 (0.212)	0.0818 (0.222)	-0.1937** (0.095)	-0.0433 (0.158)	0.5719 (0.410)
Constant	-10.6650*** (0.398)	-4.6118*** (0.737)	-0.4010** (0.165)	-0.6357*** (0.213)	6.7469*** (1.157)
Observations	323,885	323,885	14,662	21,852	14,678
Country FE	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Pseudo, Adjusted R-Squared	0.249	0.249	0.598	0.655	0.282

# Table 8 (Alternative Treatment)

Sample Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All CAPEX +RDX	OLS All Investment Share	All RDX Share	ForAT CAPEX +RDX	OLS NoForAT CAPEX +RDX	ForINC CAPEX +RDX	NoForINC CAPEX +RDX
Transport <sub>J,t</sub> *Frugality <sub>J</sub>	-0.0872** (0.043)	-0.3752** (0.179)	0.3400* (0.188)	-0.0067 (0.041)	-0.0621* (0.036)	-0.0033 (0.060)	-0.0659* (0.036)
Transport <sub>J,t</sub>	0.0296* (0.016)	0.1191** (0.058)	-0.0999* (0.054)	-0.0026 (0.013)	0.0220* (0.013)	0.0020 (0.021)	0.0231* (0.013)
PreTransport <sub>J,t</sub> *Frugality <sub>J</sub>	0.0042 (0.012)	0.0404 (0.050)	0.0096 (0.028)	0.0228 (0.019)	0.0066 (0.012)	0.0122 (0.020)	0.0087 (0.011)
PostTransport <sub>J,t</sub> *Frugality <sub>J</sub>	-0.0106 (0.013)	-0.0535 (0.046)	0.0518** (0.026)	0.0225 (0.020)	-0.0123 (0.013)	0.0211 (0.021)	-0.0095 (0.013)
PreTransport <sub>J,t</sub>	-0.0033 (0.004)	-0.0133 (0.016)	-0.0018 (0.009)	-0.0087 (0.006)	-0.0043 (0.004)	-0.0053 (0.007)	-0.0053 (0.004)
PostTransport <sub>J,t</sub>	0.0057 (0.005)	0.0254 (0.015)	-0.0143* (0.008)	-0.0073 (0.007)	0.0067 (0.006)	-0.0040 (0.008)	0.0052 (0.005)
Constant	0.1960*** (0.008)	0.2539*** (0.021)	0.1614*** (0.013)	0.2625*** (0.013)	0.1840*** (0.008)	0.2634*** (0.014)	0.1861*** (0.008)
Observations	325,043	285,332	277,995	66,188	258,855	50,275	274,768
Firm FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y
Adjusted R-Squared	0.514	0.625	0.812	0.572	0.516	0.591	0.514

# Conclusion

- ▶ Residents' thrift seems to swell firms' financing frictions during disaster periods
  - Worsens: Negative Correlation(Residents' Frugality, Firms' Debt Maturity)
  - ↑Debt, ↓Equity, ↓CAPEX
  - Channels: Local Capital Supply (Tap Global Capital Markets, Foreign Operations)
- ▶ These financing frictions have real-effects on firms' investment decisions
  - Placebo Tests, Transportation Disasters



Disney / Everett

Jim Carrey as Scrooge in a scene from *A Christmas Carol*