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ABSTRACT

Financial Shocks and the Erosion of Interpersonal Trust: Evidence from Longitudinal Data*

This paper evaluates the effect of financial shocks on interpersonal trust levels, exploiting longitudinal survey data from 22,112 Australians. Using within-individual level variation, we find that trust does not change meaningfully following a positive financial shock (e.g., winning the lottery). However, trust falls sharply following a negative financial shock (e.g., bankruptcy). In terms of magnitude, this effect is approximately equivalent to the effect observed after one reports being the victim of physical violence or a property crime, but significantly larger than effects from a range of other individual-level shocks (e.g., being fired or getting divorced). We then explore a potential explanation of this finding related to locus of control, which relates to the extent to which people believe they are in control of their circumstances. Indeed, we find evidence consistent with this hypothesis as locus of control tends to change, and become less internal, following a negative financial shock. In turn, locus of control is closely associated with interpersonal trust levels.

JEL Classification: D90, E32, G40, Z1
Keywords: financial shocks, trust levels, locus of control

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1 Introduction

Trusting other members of society has been suggested as a fundamental cornerstone of economic growth and development (e.g., see Zak and Knack, 2001, Guiso et al., 2004, 2006, Dearmon and Grier, 2009, Algan and Cahuc, 2010, Tabellini, 2010, Horváth, 2013, or Forte et al., 2015). The fact that 'trust matters' has become a stylized fact in the associated literature, which makes it all the more important to understand how people's interpersonal trust levels are shaped. Trust is both attributed to culture and to individual attitudes that are to a large degree transferred across generations, being passed down from parents to their children (Ljunge, 2014). Cumulatively, trust can become deeply embedded in culture, and negative historical events (such as the slave trade) can shape societal attitudes which last for many generations (Nunn and Wantchekon, 2011). Taking a more short-run individual-level approach, researchers in psychology, sociology, and behavioral economics are often interested in identifying if and how individual life events can alter one's trust levels in others. One common type of life event concerns major financial shocks such as winning the lottery, receiving an inheritance, or experiencing bankruptcy. For example, in the US, 764,214 bankruptcy cases were filed in the fiscal year 2016 alone (US Department of Justice, 2017). In Australia, the annual number of bankruptcies peaked in the 2009/2010 financial year, with around 35,000 registered personal insolvencies (Australian Financial Security Authority, 2017). In the following pages, we investigate whether and how such financial shocks may be able to systematically affect interpersonal trust levels.[1]

We believe this paper is among the first to exploit rich longitudinal survey data, allowing us to identify within-individual changes in trust levels in a fixed-effects framework. Accessing information for 22,112 individuals in Australia over up to six waves, this data

[1]Note that our research question differs from the idea that *income levels* or social class could systematically be associated with trust levels (e.g., see Brandt et al., 2015).

structure allows us to circumvent several potential endogeneity issues. With respect to measurement error, a valid concern in survey responses is the subjective attitude with which one respondent may classify themselves differently than another respondent (e.g., see Bertrand and Mullainathan, 2001). Since our results are derived from longitudinal data (i.e., following the same people over time) and rely on within-individual variation only, any such differences between people in measuring trust attitudes are controlled for. This panel data structure also allows us to alleviate concerns about omitted variables. Individual-level fixed effects account for any unobservable any differences *between* individuals in terms of beliefs, preferences, early-life experiences, endowments, and any other characteristics that do not change over time for a person. In addition, we control for a number of covariates that may independently affect trust levels and the likelihood of experiencing a financial shock: Income levels, educational attainment, time-fixed effects, civil status, the number of children, and state-fixed effects. Finally, reverse causality is unlikely to drive our findings since trust levels at time t are regressed on responses about whether one experienced a financial shock in time $t-1$. This, in combination with controlling for trust levels *when one has not experienced a financial shock in* $t-1$, addresses the possibility that a person experiences a decrease in trust levels first (potentially for another reason) and then suffers a financial shock thereafter.

Our analysis produces a remarkably consistent and statistically significant negative effect from negative financial shocks to trust levels. However, we find no qualitatively or quantitatively meaningful link between positive financial shocks and trust. In terms of magnitude, the decrease in trust levels following a negative financial shock is equivalent to (and, if anything, marginally *higher* than) the loss in trust from being the victim of physical violence or a property crime. Further, the effect is statistically more powerful in explaining trust levels than those from (*i*) being fired, (*ii*) a divorce, (*iii*) a separation, or (*iv*) an illness, among other major life events. Results are consistent when exploring

trust-related outcome variables, such as believing other people (*i*) keep their word, (*ii*) succeed by stepping on others, (*iii*) make agreements honestly, (*iv*) try to be helpful, or (*v*) mostly look out for themselves.

Finally, we explore one potential mechanism via which a negative financial shock could influence one's trust in others: Locus of control, i.e., the degree to which people believe they have control over their life (e.g., see Rotter, 1966, 1990). The literature on self-serving bias provides rich and consistent evidence that people tend to attribute positive events to their own efforts, and negative events to the failings of others – or to ill luck (the discovery of this phenomenon is often attributed to Miller and Ross, 1975; see Blaine and Crocker, 1993, for a survey of the relevant literature). Consequently, it seems reasonable to hypothesise that life events may affect trust via self-serving bias and locus of control. Indeed, our analysis produces evidence that is consistent with this, as a negative financial shock correlates strongly with fall in a person's perceived degree of control over their life. This effect is, again, significantly larger than those from a range of other individual-level shocks. In turn, locus of control is closely associated with trust levels.

Overall, this paper aims to contribute to our understanding of whether and how major individual life events can affect our beliefs in others. Our findings may carry implications for society's economic and social development, as well as economic growth. For instance, in terms of policy relevance, our results suggest that reducing the incidence of negative financial shocks could prevent the erosion of interpersonal trust levels.

The paper proceeds with a description of our data and methodology, followed by a discussion of our main results in Section 3 and a conclusion in Section 4.

2 Data and Methodology

2.1 Data

Our analysis uses data from the annual Household, Income and Labour Dynamics in Australia ($HILDA$) Survey, accessing responses related to interpersonal trust levels and major shocks to financial circumstances. Table A1 presents a wave-by-wave overview of data availability for all key variables used in our analysis. Questions about interpersonal trust are included in six survey waves, collected in 2005, 2006, 2008, 2010, 2011, and 2014 (waves 5, 6, 8, 10, 11, and 14). Respondents were asked to what extent they agree with the following statement: "Generally speaking, most people can be trusted." Answers can range from one (*strongly disagree*) to seven (*strongly agree*). This measure of interpersonal trust is consistent with comparable studies but provides more detailed response choices with seven categories, as opposed to binary indicators or four-point scales.[2]

Information about significant changes in financial circumstances is captured by two questions, asking whether the respondent has experienced (i) a major improvement (e.g., lottery win or inheritance) and (ii) a major worsening (e.g., bankruptcy) to their financial situation in the last 12 months. Throughout the paper, we refer to these events as positive and negative financial shocks. These data are available from wave 2 onwards.

Our main sample includes every observation where information on trust and financial shocks are available, producing 76,524 entries for 22,112 individuals, i.e., 3.46 observations per respondent, on average. Financial shocks are observed in approximately three percent of the observations (2,153 positive and 2,311 negative shocks) and Table 1 summarizes the numbers and shares of shocks throughout the respective survey waves. The share of

[2]Most such studies use a binary indicator for trust (Alesina and La Ferrara, 2002; Dearmon and Grier, 2009; Wang and Gordon, 2011; Horváth, 2013; Brandt et al., 2015; Corbacho et al., 2015). However, there are some that use a Likert scale (Nunn and Wantchekon, 2011, use four response categories, while Meier et al., 2016, use seven).

positive shocks within waves ranges from 2.65 percent (in wave 14) to 3.06 percent (in wave 6), whereas 2.63 to 3.48 percent of respondents have experienced a negative financial shock.

Table 1: Data availability on financial shocks within relevant HILDA Survey waves.

Wave:	5	6	8	10	11	14	Total
Positive financial shock	340	350	300	338	418	407	**2,153**
(% of sample)	(3.03)	(3.06)	(2.74)	(2.85)	(2.75)	(2.65)	(2.84)
Negative financial shock	329	300	380	378	509	415	**2,311**
(% of sample)	(2.95)	(2.63)	(3.48)	(3.21)	(3.37)	(2.69)	(3.05)

Table 2 documents summary statistics for all data employed throughout the paper, in addition to detailed variable descriptions.[3] Note that these summary statistics treat the data as a pooled sample, meaning the same person contributes up to six observations. Panel A focuses on our main analysis, displaying descriptive data for income levels, respondents' number of children, and the gender distribution. Note that all income data are adjusted for inflation. Panel B displays descriptive data for additional shocks and Panel C lists additional outcome variables.

To get a better understanding of who has experienced financial shocks in our sample, Table 3 compares gender, age, income levels, and the average number of children between those who did experience a respective shock and those who did not. Interestingly, both positive and negative financial shocks affect women and men equally in statistical terms. Older respondents are marginally more likely to experience a positive financial shock, but not negative financial shocks. Interestingly, respondents with higher incomes are more likely to experience a positive financial shock, whereas the opposite is true for

[3]For more general background information on *HILDA*, we refer to Wooden and Watson (2007) and Summerfield et al. (2016).

Table 2: Summary statistics of all variables. Fixed effects for waves, education levels, civil status, and industries are omitted but available upon request.

Variable	Mean	(Std. Dev.)	Min.	Max.	*N*	Variable definition
Panel A: Variables of main analysis						
Trust	4.788	(1.358)	1	7	75,742	"Generally speaking, most people can be trusted" (1 = strongly disagree; 7 = strongly agree)
Positive financial shock	0.028	(0.166)	0	1	75,742	Major improvement in financial situation (e.g., won lottery, received an inheritance), yes/no
Negative financial shock	0.031	(0.172)	0	1	75,742	Major worsening in financial situation (e.g., went bankrupt)
Income	40,368	(38,664)	0	774,346	75,742	Financial year disposable personal income (A$), adjusted for inflation; applying Ln(1+income)
# of children	0.609	(1.037)	0	10	75,742	# of children in household
Female	0.532	(0.499)	0	1	75,742	= 1 if respondent is female
Panel B: Additional shocks						
Fired in last 12 months	0.030	(0.171)	0	1	75,619	Life events in past year: Fired or made redundant
Divorced in last 12 months	0.005	(0.071)	0	1	68,541	Got divorced in previous 12 months
Separated in last 12 months	0.038	(0.191)	0	1	75,542	Life events in past year: Separated from spouse
Sick in last 12 months	0.089	(0.285)	0	1	75,550	Life events in past year: Serious personal injury/illness
Death of spouse/child in last 12 months	0.007	(0.083)	0	1	75,742	Life events in past year: Death of close relative/family member
Death of friend in last 12 months	0.112	(0.316)	0	1	75,593	Life events in past year: Death of a close friend
Suffered natural disaster in last 12 months	0.010	(0.101)	0	1	75,696	A weather related disaster (flood, bushfire, cyclone) damaged or destroyed your home
Detained in jail in last 12 months	0.003	(0.050)	0	1	75,692	Life events in past year: Detained in jail
Close family member in jail in last 12 months	0.003	(0.050)	0	1	75,692	Life events in past year: Close family member detained in jail
Victim of physical violence in last 12 months	0.016	(0.124)	0	1	75,582	Life events in past year: Victim of physical violence
Victim of a property crime in last 12 months	0.040	(0.196)	0	1	75,690	Life events in past year: Victim of a property crime
Panel C: Additional outcome variables (1 = strongly disagree; 7 = strongly agree)						
Most people keep their word	4.713	(1.381)	1	7	64,431	Most people you meet keep their word
Most people do not step on others	4.983	(1.523)	1	7	64,348	Most people you meet succeed by stepping on other people (inverted)
Most people make agreements honestly	4.993	(1.279)	1	7	64,404	Most people you meet make agreements honestly
Most people try to be helpful	5.246	(1.137)	1	7	38,558	Most of the time people try to be helpful
Most people do not look out for themselves	3.527	(1.515)	1	7	38,564	People mostly look out for themselves (inverted)
Locus of control	2.768	(1.642)	1	7	37,766	I have little control over the things that happen to me

negative financial shocks. Finally, negative financial shocks appear to affect respondents with marginally more children in our sample. These simple statistical comparisons are indicative of the notion that a number of other, potentially unobservable characteristics on the individual level can influence the likelihood of experiencing a financial shock.

Table 3: Comparing demographics of respondents experiencing positive and negative financial shocks to the rest of the sample.

	(1) Positive financial shock	(2) No positive financial shock	T-test (1) = (2)	(3) Negative financial shock	(4) No negative financial shock	T-test (3) = (4)
Female	0.529	0.532	0.767	0.517	0.532	0.133
Age	45.139	44.428	0.078*	44.823	44.436	0.320
Income	48,820	40,069	0.000***	36,545	40,436	0.000***
# of children	0.614	0.609	0.816	0.709	0.606	0.000***

Figure 1 visualizes average trust levels for people who reported having experienced a positive or a negative financial shock, compared with everybody else. Although purely descriptive, Figure 1 is suggestive of a fundamental difference in how positive and negative financial shocks are associated with trust levels. Positive shocks are associated with a small, but statistically significant increase in trust levels (from 4.785 to 4.867, on average). Negative shocks, however, relate to an average decrease by 7.4 times that magnitude, from 4.202 to 4.806. With these data in mind, we now turn to describing our empirical strategy.

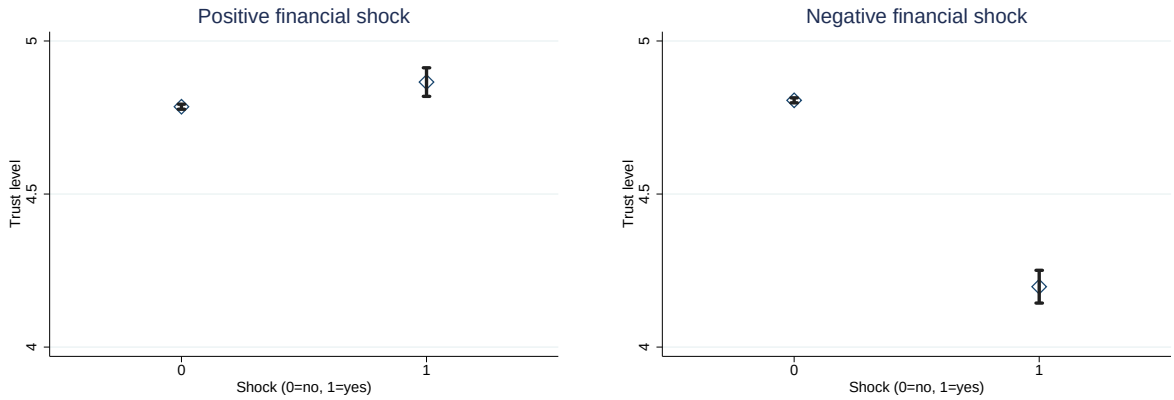

Figure 1: Average trust levels for people experiencing a positive financial shock (left) and a negative financial shock (right) with the respective 95% confidence intervals.

2.2 Methodology

Employing a standard OLS framework, we estimate the effect of financial shocks on interpersonal trust levels via[4]

$$Trust = \beta_0 + \beta_1 Shock_{i,t} + \boldsymbol{X_{i,t}}\beta_2 + \beta_3\lambda_i + \delta_{i,t}, \tag{1}$$

where $Shock_{i,t}$ constitutes a binary indicator for a positive financial shock. We then replicate regression 1 for negative financial shocks and finally include both variables into regression 1. In additional estimations, we also check for trust effects from other personal life events, such as divorce or being the victim of physical violence (see Section 3.2), and then also explore trust-related outcome variables (see Section 3.3). Finally, we use an analogous estimation strategy for predicting locus of control in Section 3.4.

$\boldsymbol{X_{i,t}}$ constitutes a vector of control variables that could independently affect interpersonal trust levels: Personal income [transformed to Ln(1+income) to preserve entries with zero income], wave-fixed effects, education-fixed effects for nine different education levels,

[4]To properly account for fixed effects on the individual level, it is common to use a linear regression approach, rather than a probit, logit, or ordered logit approach (see Greene, 2004).

the number of children, nine binary indicators for civil status, and state-fixed effects.[5] These factors have been suggested as potential correlates of trust levels by a number of associated studies (e.g., see Alesina and La Ferrara, 2002, Delhey and Newton, 2003, and Brandt et al., 2015). Wave-fixed effects ensure that results are not driven by the business cycle (e.g., the Global Financial Crisis in 2007/2008) or any other time-specific nation-wide influences. λ_i incorporates individual-level fixed effects, thereby controlling for any unobservable characteristics on the individual level, such as preferences or beliefs (e.g., see Delhey and Newton, 2003). For instance, particular personality traits may independently affect trust levels and the occurrence of financial shocks.[6] Note that when individual- and wave-fixed effects are incorporated, age is automatically controlled for (e.g., see Delhey and Newton, 2003, and references therein for how trust levels can vary along age). Finally, $\delta_{i,t}$ represents the conventional error term and errors are clustered on the individual level throughout all estimations.

3 Empirical Results

3.1 Main Results

Table 4 presents our main results from regressing trust levels on the covariates presented in equation 1. Columns (1) – (3) focus on positive shocks, subsequently including control variables, whereas columns (4) – (6) follow the same sequence for negative financial shocks. Column (7) displays our most complete estimation results, jointly including binary indicators for positive and negative financial shocks.

[5]Education levels are: Year 11 and below, year 12, Certificate III or IV, advanced diploma, bachelor or honors, graduate diploma, postgraduate degree, non-responding, and undetermined. Civil status are: Never married and not de facto, widowed, divorced, separated, de facto, legally married, don't know, refused/not stated, and non-responding person.

[6]This theory of trust is attributed to Erikson (1950), Allport (1961), and, more recently, Uslaner (1999).

Table 4: Main regression results from estimating trust levels (increasing from 1 to 7).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable: Trust (mean = 4.788)							
Positive financial shock	0.081***	0.031	0.020				0.014
	(0.030)	(0.025)	(0.025)				(0.025)
Negative financial shock				-0.604***	-0.319***	-0.179***	-0.182***
				(0.037)	(0.029)	(0.031)	(0.031)
Ln(1+income)			-0.009***			-0.010***	-0.010***
			(0.003)			(0.003)	(0.003)
# of children			0.015			0.015*	0.015*
			(0.009)			(0.009)	(0.009)
Individual-level fixed effects		yes	yes		yes	yes	yes
Control variables[a]			yes			yes	yes
# of respondents	22,112	22,112	22,112	22,112	22,112	22,112	22,112
# of waves	6	6	6	6	6	6	6
N	75,742	75,742	75,742	75,742	75,742	75,742	75,742

Notes: Standard errors clustered on the individual level are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Includes the natural logarithm of 1 + individual income (to preserve observations with zero income), wave-fixed effects, state-fixed effects, binary indicators for nine education levels and nine categories of civil status, and a variable counting the number of children.

Columns (1) and (4) merely reframe the suggestive correlations from Figure 1, employing univariate regression frameworks. Columns (2) and (3), as well as (5) and (6) acknowledge the potential influence of the suggested control variables and individual-level fixed effects. With respect to positive shocks, an initially strong connection to trust levels becomes statistically meaningless when fixed effects on the individual level are accounted for (these results are in line with those from Gobin and Freyd, 2014). From column (1) to (2) alone, the magnitude of the main coefficient of interest decreases by a factor of 2.6, from 0.08 to 0.03. Perhaps more importantly, the relationship becomes indistinguishable from zero with a t-value of 1.2. This suggests that unobservable characteristics of the respondents can drive the shock-trust relationship in pooled or cross-sectional estimations. We observe a similar trend for negative financial shocks: From column (4) to (5), the respective coefficient decreases by almost 50 percent, from -0.604 to -0.319. Nevertheless, the effect remains firmly different from zero with an associated t-value of 11.

Once we acknowledge the influence of individual-level fixed effects *and* the suggested covariates in columns (3) and (6), the coefficients of interest further diminish. Nevertheless, we continue to identify a statistically powerful effect of negative shocks with a magnitude of -0.179. Finally, column (7) includes both shock variables into the analysis, in addition to all control variables, and the suggested results remain consistent. A negative financial shock is associated with a 0.182 point decrease in trust levels, whereas a positive financial shock produces no statistically significant relationship with trust levels. In additional estimations, we also checked whether the effect varies for respondents with different income levels (e.g., Putnam, 2000, and Brandt et al., 2015) or whether gender differences emerge (e.g., see Delhey and Newton, 2003, and references therein). However, we do not find evidence for such heterogeneity (see Table A2). Further, we also distinguished by the exact timing of the respective shock, since *HILDA* asks whether the shock occurred 0-3, 4-6, 7-9, or 10-12 months before the interview. All results are consistent

and reveal no further anomalies (see Table A2).

Beyond the statistical relevance of this main result in column (7), it is important to consider quantitative implications. First, comparing magnitudes between positive and negative shocks, the latter effect is 13 times larger. This reinforces the notion that negative financial shocks influence people's trust levels fundamentally more so than positive financial shocks. However, it is important to mention that the *HILDA* data does not permit us to comprehensively quantify the magnitudes of the respective shocks.[7]

An alternative way of assessing the magnitude of the derived effect is to compare its explanatory power to other covariates included in Table 4. For instance, a one standard deviation increase in income levels (equivalent to 2.19) is associated with a 0.022 point decrease in trust levels. The effect of a negative financial shock is more than eight times that size. To provide additional reference points, we now move to incorporating other major life events into our analysis.

3.2 Other Major Life Events

Table 5 displays regression results for various extensions, building on the results displayed in column (7) of Table 4 as our benchmark estimation. In particular, we access the *HILDA* survey for other shocks that could independently affect trust levels. All respective shock variables refer to the preceding 12 months in the respective surveys. These extensions serve two purposes: First, we want to check whether our derived results from Table 4 remain robust to the inclusion of other personal shock variables; and second, we wish to compare the statistical and economic power of a negative financial shock to that of other major life events. To provide a more comprehensive picture of whether and how

[7]Financial shocks are considered here to affect wealth rather than income. Thus, it is possible to look at wave-on-wave changes observed in reported wealth and compare these values for individuals who do and do not report financial shocks. However, wealth data are only reported every four years, so any such comparison would be very inaccurate.

the respective shocks could influence trust levels, we also display results from estimating pooled regressions, i.e., re-estimating the same specification without individual-level fixed effects. The corresponding results are listed under the respective variables in brackets.

We begin by including binary indicators for whether the respondent has been fired from their job, divorced, or separated from their partner. Alesina and La Ferrara (2002) suggest that divorce or separation can significantly decrease interpersonal trust levels, using cross-sectional data from the US between 1974 and 1994 (also see Franklin et al., 1990, or King, 2002, in that regard). However, in our panel data estimation including individual-level fixed effects none of the derived coefficients turns statistically significant on conventional levels. It is important to mention that once we estimate the effect of divorce in a pooled model, i.e., not accounting for fixed effects, the corresponding coefficient does turn negative and statistically significant with a value of -0.13 (standard error of 0.07; t-value of -1.78). Thus, unobservable individual-level characteristics could introduce a downward bias into the relationship between divorce and trust levels. Similarly, the effect of a separation turns negative and statistically significant once fixed effects are not accounted for with a coefficient of -0.38 and a standard error of 0.029 (t-value of -12.81). In turn, the negative financial shock remains powerful in statistical and economic terms in either pooled or fixed effects specifications.

Further, columns (4) to (11) test for whether the respondent has experienced (*i*) a serious illness, (*ii*) the death of a spouse or child, as well as (*iii*) the death of a close friend, (*iv*) a weather-related disaster, (*v*) jail detention of themselves or close family members, and finally (*vi*) being the victim of physical violence or (*vii*) a property crime (e.g., see Alesina and La Ferrara, 2002). Corbacho et al. (2015) show that being the victim of a crime can decrease interpersonal trust levels and Endreß and Pabst (2013) suggest that "[s]hattered trust is induced by interpersonal violence."[8] Finally, column

[8]In related work, Meier et al. (2016) suggest that "a culture of organized crime can affect adolescent

Table 5: Testing for the effects of other major life events on trust levels (increasing from 1 to 7). Below each shock variable, we display the respective coefficient and standard error from a pooled regression (i.e., not account for individual-level fixed effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable: Trust (mean = 4.788)												
Positive financial shock	0.012	0.029	0.013	0.011	0.014	0.016	0.014	0.013	0.014	0.013	0.014	0.022
	(0.025)	(0.026)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.026)
Negative financial shock	-0.187***	-0.174***	-0.183***	-0.179***	-0.182***	-0.184***	-0.181***	-0.183***	-0.182***	-0.180***	-0.179***	-0.179***
	(0.031)	(0.032)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.032)
Fired	-0.004											0.015
[−0.220***(0.032)]	(0.028)											(0.028)
Divorced		0.053										0.108*
[−0.131*(0.073)]		(0.062)										(0.064)
Separated			-0.032									0.011
[−0.375***(0.029)]			(0.027)									(0.029)
Serious personal injury/illness				-0.040**								-0.041**
[−0.162***(0.019)]				(0.017)								(0.018)
Death of a spouse or child					0.028							0.073
[−0.172***(0.064)]					(0.059)							(0.064)
Death of a friend						-0.009						-0.009
[0.074***(0.017)]						(0.015)						(0.016)
A weather-related disaster							-0.028					-0.039
[−0.104**(0.052)]							(0.043)					(0.045)
Detained in jail								-0.019				-0.087
[−0.635***(0.123)]								(0.136)				(0.150)
Close family member detained in jail									-0.015			-0.012
[−0.278***(0.049)]									(0.046)			(0.048)
Victim of physical violence										-0.155***		-0.141***
[−0.605***(0.048)]										(0.046)		(0.049)
Victim of a property crime											-0.128***	-0.119***
[−0.296***(0.028)]											(0.025)	(0.026)
Control variables[a] & Individual-level fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
# of respondents	22,093	19,661	22,095	22,089	22,112	22,098	22,101	22,107	22,105	22,097	22,105	19,571
# of waves	6	6	6	6	6	6	6	6	6	6	6	6
N	75,619	68,541	75,542	75,550	75,742	75,593	75,696	75,692	75,688	75,582	75,690	67,704

Notes: Standard errors clustered on the individual level are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Includes the natural logarithm of 1 + individual income (to preserve observations with zero income), wave-fixed effects, state-fixed effects, binary indicators for nine education levels and nine categories of civil status, and a variable counting the number of children.

(12) displays regression results from including all shock indicators jointly. Throughout these estimations, the effect of negative financial shocks remains stable, both in terms of size and statistical power. As for the additional shocks, we find that a personal injury or illness, as well as suffering from physical violence or a property crime can diminish trust levels in meaningful ways.

To compare the associated findings in one picture, Figure 2 visualizes the derived coefficients from all 13 shocks. Note that standard errors become larger for some coefficients, as the data exhibit less statistical variation.[9] Interestingly, in addition to negative financial shocks, only three shocks are statistically different from zero and two of them are comparable in magnitude: Being the victim of physical violence or a property crime. In terms of magnitude and statistical power in explaining trust levels, a negative financial shock appears equivalent to these two events or, if anything, marginally larger.

In additional estimations, we also tested for other, presumably positive major life events and potential relationships with trust levels. In particular, we checked whether getting married, pregnant, promoted, getting back together with one's spouse, or retiring are associated with trust levels. However, none of the respective coefficients becomes statistically relevant or comparable in terms of magnitude to a negative financial shock. The respective results are available upon request.

norms and attitudes that might support a vicious cycle of in-group favoritism and crime that in turn hinders economic development." In the context of large-scale organized violence, Cassar et al. (2013) conduct behavioral experiments in Tajikistan and find that "exposure to violence undermines trust within localities, decreases the willingness to engage in impersonal exchange." Similarly, crime can influence one's trust in political institutions (e.g., see Blanco, 2013*a*,*b*).

[9]In our sample, the respective events happened with the following frequencies displayed in parentheses: Positive financial shock (2,153), negative financial shock (2,311), fired (2,289), divorced (348), separated (2,877), sick/illness (6,768), death of spouse/child (523), death of friend (8,553), disaster (794), jail of family member (193), jail (1,084), physical violence (1,187), property crime (3,055).

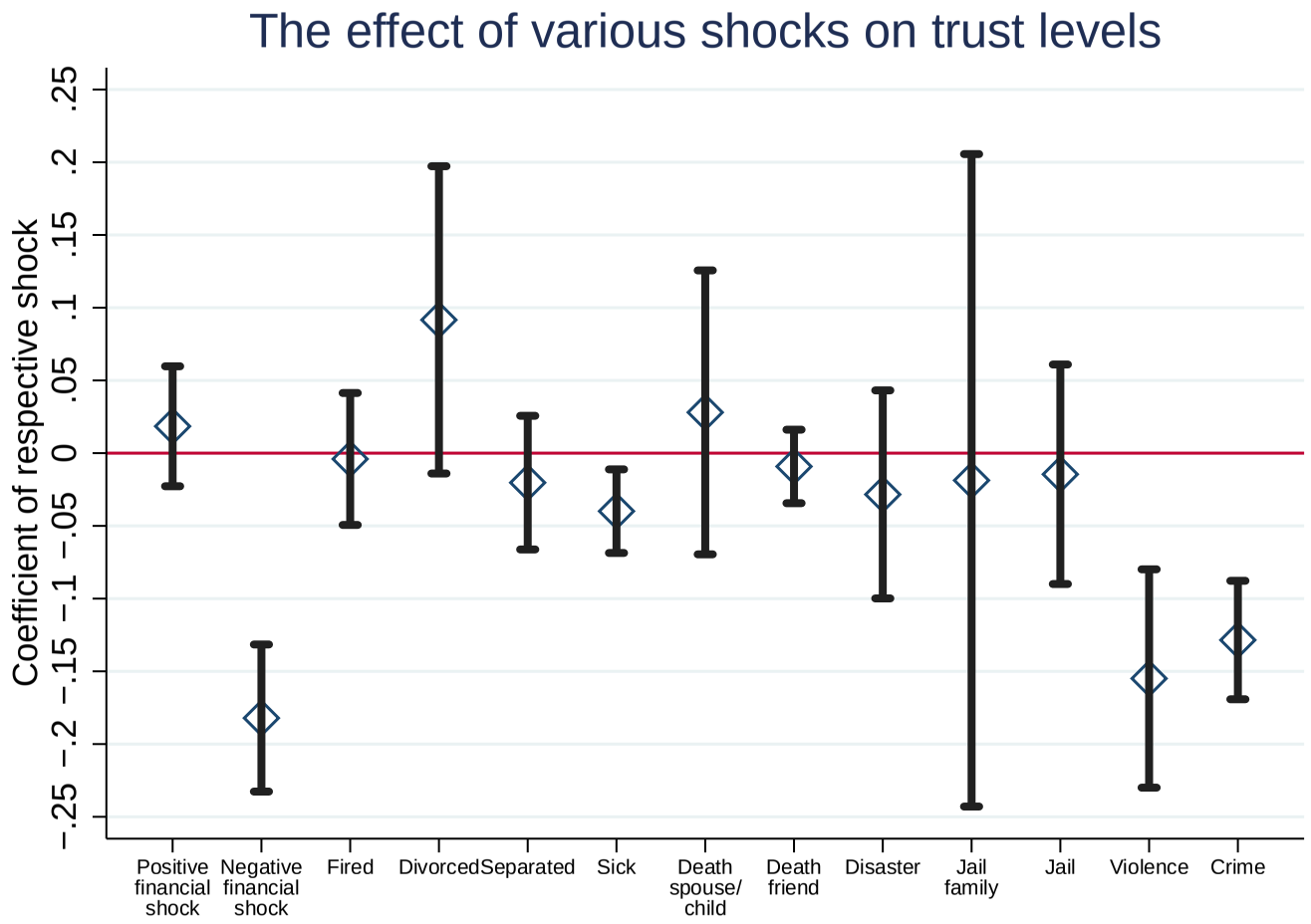

Figure 2: Displaying the effect of various shocks on average trust levels, visualizing the respective 95% confidence intervals.

3.3 Alternative Trust-Related Outcome Variables

To further test for the robustness of our main result, we now turn to a more detailed investigation of the outcome variable. In the *HILDA* data set, we can identify five survey questions that are closely linked to trust levels: (*i*) Most people you meet keep their word, (*ii*) most people you meet succeed by stepping on other people (inverted), (*iii*) most people you meet make agreements honestly, (*iv*) most of the time people try to be helpful, and (*v*) people mostly look out for themselves (inverted). As with the trust variable, responses can range from one (*strongly disagree*) to seven (*strongly agree*). The respective summary statistics are displayed in Table 2.

Table 6 displays the respective results, where all estimations include the full set of control variables and individual-level fixed effects. Most importantly, the effect of a negative financial shock remains robust throughout all these estimations. It is also interesting to see that a positive financial shock appears to lead people to believe that most people keep their word.[10] Nevertheless, that relationship only marginally reaches conventional levels of statistical relevance and remains substantially smaller in magnitude than the effect from a negative financial shock. Thus, overall, results from predicting trust-related outcome variables confirm our benchmark findings.

3.4 A Potential Mechanism: Locus of Control

3.4.1 Background

Finally, we now move to exploring locus of control as one potential mechanism via which a negative financial shock may be able to alter interpersonal trust levels. Locus of control is a concept used in psychology to describe the extent to which a person views outcomes as

[10]Perhaps related to this finding, Apouey and Clark (2015) document that people winning lotteries report a positive effect on mental health, but not on physical health.

Table 6: Alternative trust-related outcome variables (increasing from 1 to 7), following the benchmark estimation displayed in column (7) of Table 4. Dependent variable in column (1): Most people you meet keep their word; column (2): Most people you meet succeed by stepping on other people (inverted); column (3): Most people you meet make agreements honestly; column (4): Most of the time people try to be helpful; column (5): People mostly look out for themselves (inverted).

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Trust (mean = 4.788)					
Positive financial shock	0.066**	-0.034	0.054*	0.014	-0.052
	(0.031)	(0.033)	(0.029)	(0.035)	(0.052)
Negative financial shock	-0.200***	-0.261***	-0.197***	-0.132***	-0.196***
	(0.035)	(0.038)	(0.033)	(0.045)	(0.058)
Ln(1+income)	-0.008**	-0.008**	-0.002	-0.011**	-0.007
	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)
# of children	-0.001	-0.004	0.008	0.023**	0.027*
	(0.011)	(0.012)	(0.010)	(0.011)	(0.015)
Control variables[a]	yes	yes	yes	yes	yes
Individual-level fixed effects	yes	yes	yes	yes	yes
# of respondents	21,343	21,336	21,347	19,832	19,828
# of waves	6	6	6	6	6
N	64,431	64,348	64,404	38,558	38,564

Notes: Standard errors clustered on the individual level are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Includes the natural logarithm of 1 + individual income (to preserve observations with zero income), wave-fixed effects, state-fixed effects, binary indicators for nine education levels and nine categories of civil status, and a variable counting the number of children.

being caused by own behavior (Rotter, 1966). People who believe they have little control over what happens to them in life have an external locus of control, while people who believe they have a great degree of control over their circumstances have an internal locus of control (Gatz and Karel, 1993). A rich and growing literature continues to produce evidence that locus of control plays a key role in explaining individual economic behaviors (see Cobb-Clark and Schurer, 2013, for a survey).

Financial shocks may affect locus of control via self-serving bias, which is considered a key motivational factor explaining changes in locus of control (Wichman and Ball, 1983). Psychological research and neuroscience provide consistent evidence that losses and gains are processed differently.[11] Self-serving bias refers to the idea that people tend to internalize positive events by disproportionately attributing them to own efforts, rather than to the efforts of others. However, people may externalize negative events by disproportionately attributing them to the failings of others (e.g., see Blaine and Crocker, 1993, and Forsyth, 2008). Thus, negative and positive events can affect locus of control and thereby trust. People may perceive negative financial events, like bankruptcy, to reflect negatively on others, and thus diminish trust in others.

The lack of any observed association between positive financial events and trust may be explained as follows. People tend to view the world with a positive bias, as one ruled by meaning, logic and justice (Janoff-Bulman et al., 1998). That is, an internal locus of control is both normal and beneficial for self-esteem and good mental health. Thus, only negative events elicit a shift in locus of control, and thereby – potentially – trust.[12]

The *HILDA* survey provides information on locus of control in the form of the question

[11] Losses are found to produce larger effects than gains on psychological arousal and brain activation in cortical and striatal areas, which manifest in stronger physiological responses like pupil dilation and an accelerated heart rate (see Yechiam and Hochman, 2013, for a survey of this evidence).

[12] Studies of how individuals react to significant negative events, such as natural disasters and health shocks to self and loved ones, have shown that these events can produce a dramatic shift in the way individuals view the world and their place within it (see Janoff-Bulman et al., 1998, for a comprehensive review).

"I have little control over the things that happen to me", where respondents can again answer on a scale from one (*strongly disagree*) to seven (*strongly agree*). Thus, higher values indicate people think they have less control over their life, i.e., an external rather than internal locus of control. This variable has been used in other comparable studies concerning locus of control (e.g. Cobb-Clark and Schurer, 2013, Cobb-Clark et al., 2014, Buddelmeyer and Powdthavee, 2016, and Schurer, 2017). This variable is available in waves 3, 4, and 11.

In sum, we propose that financial shocks affect trust via locus of control. Figure 3 illustrates this hypothesis. First, we evaluate the extent to which people's locus of control changes in response to a financial shock. Second, we investigate the relationship between locus of control and interpersonal trust levels.

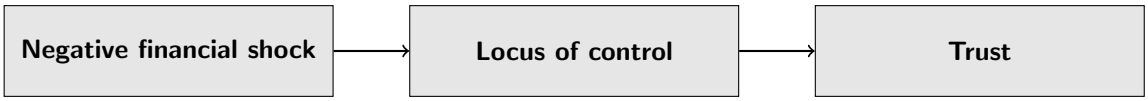

Figure 3: The link between negative financial shocks and interpersonal trust levels, mediated by locus of control.

3.4.2 Empirical Findings Related to Locus of Control

Figure 4 shows a simple comparison of the average locus-of-control score of people reporting positive and negative shocks versus those who do not. This Figure illustrates that people who report positive financial shocks tend to also report a more internal locus of control (i.e., more individual control over circumstances) compared to people who do not report any such shocks. While this difference is statistically significant, it remains small. On the other hand, people who report negative financial shocks tend to report a markedly more *external* locus of control (i.e., less individual control over circumstances). In terms of magnitude, the increase in the locus-of-control score following a negative financial shock

is more than five times larger than the associated magnitude of a positive financial shock (a rise in 0.775 versus a fall in 0.150).

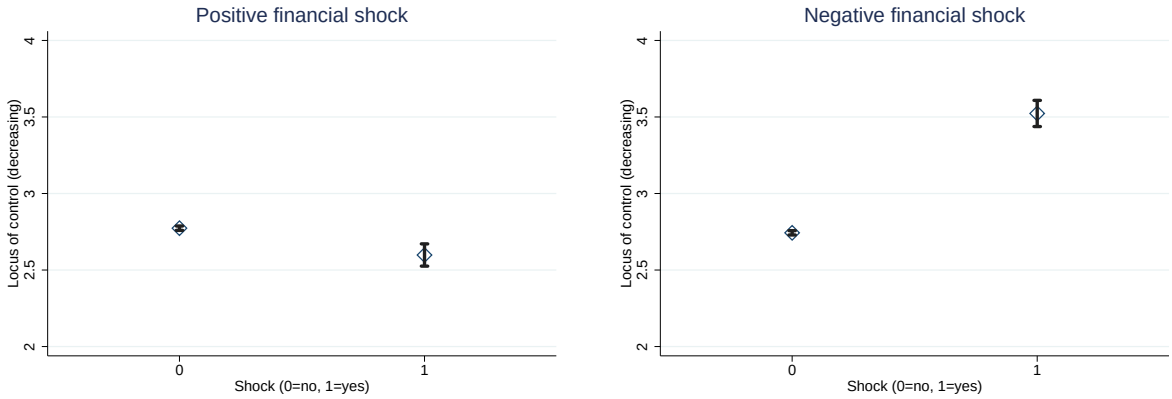

Figure 4: Average responses to locus of control questions (decreasing from 1 – 7) for people experiencing a positive financial shock (left) and a negative financial shock (right) with the respective 95% confidence intervals.

In order to observe changes in locus of control following reported financial shocks, we re-estimate our benchmark equation, though this time with locus of control as the outcome variable. These additional estimates are presented in Table 7. Note that we access only three waves in this analysis where data on locus of control is available (also see Table A1 for data availability). Columns (1) – (3) show estimates for the effect of positive financial shocks, whereas columns (4) – (6) turn to estimates for negative financial shocks. Finally, column (7) incorporates both shocks into the analysis.

The corresponding results indeed reveal a similar pattern to that of Table 4. Once individual-level fixed effects are accounted for in column (2), we see no meaningful relationship between a positive financial shock and locus of control. This result prevails once we include our standard set of control variables. However, a negative financial shock remains a statistically significant predictor of people's locus of control shifting from internal to external (i.e., a perceived loss of control over circumstances). In terms of magnitude, a negative financial shock raises the locus of control response by 0.4 units which is equivalent

Table 7: Main regression results from estimating locus of control (decreasing from 1 to 7).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable: Locus of control (mean = 2.775)							
Positive financial shock	-0.175***	-0.064	-0.070				-0.061
	(0.046)	(0.055)	(0.055)				(0.054)
Negative financial shock				0.780***	0.400***	0.405***	0.399***
				(0.055)	(0.065)	(0.065)	(0.065)
Ln(1+income)			-0.012*			-0.011	-0.011
			(0.007)			(0.007)	(0.007)
# of children			0.034*			0.034*	0.033*
			(0.018)			(0.018)	(0.018)
Individual-level fixed effects		yes	yes		yes	yes	yes
Control variables[a]			yes			yes	yes
# of respondents	19,681	19,681	19,681	19,680	19,680	19,680	19,673
# of waves	3	3	3	3	3	3	3
N	37,766	37,766	37,766	37,774	37,774	37,774	37,741

Notes: Standard errors clustered on the individual level are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Includes the natural logarithm of 1 + individual income (to preserve observations with zero income), wave-fixed effects, state-fixed effects, binary indicators for nine education levels and nine categories of civil status, and a variable counting the number of children.

to approximately 25 percent of a one standard deviation.

To get a better idea of the underlying magnitude of that relationship, Figure 5 illustrates the respective relationship for the same personal shocks considered in Figure 2. As before, all coefficients are derived from individual regressions that incorporate all our control variables, as well as fixed effects on the individual level. Interestingly, people report a less internal locus of control (i.e., less personal control) following a negative financial shock than they do following being fired, sick, or even incarcerated.

Investigating the second arrow of Figure 3, we now evaluate the link between locus of control and trust. Figure 6 displays the mean response to the locus of control question by people's trust levels. Indeed, we document a negative relationship, indicating that people with a more external locus of control display systematically lower interpersonal trust levels. Further, Table 8 shows that this relationship prevails after including the usual set of control variables when regressing trust levels on locus of control. (Note that we cannot compare changes in locus-of-control and trust over time at the individual level, and thereby account for fixed individual effects, because data for both trust and locus of control are only available in wave 11.) In combination, these results provide evidence that is consistent with the idea that negative financial shocks alter one's trust levels via changes in locus of control.

Finally, it is important to note that we are not suggesting this to be the only possible channel through which financial shocks affect trust levels – in fact, the underlying psychological processes are possibly multi-dimensional. For example, it is possible that our self-reported psychological measures here mask other underlying mechanisms through which financial shocks can affect trust levels. Nevertheless, the explanation presented here is consistent with suggested relationships from prior research in psychology, as discussed at the beginning of this Section.

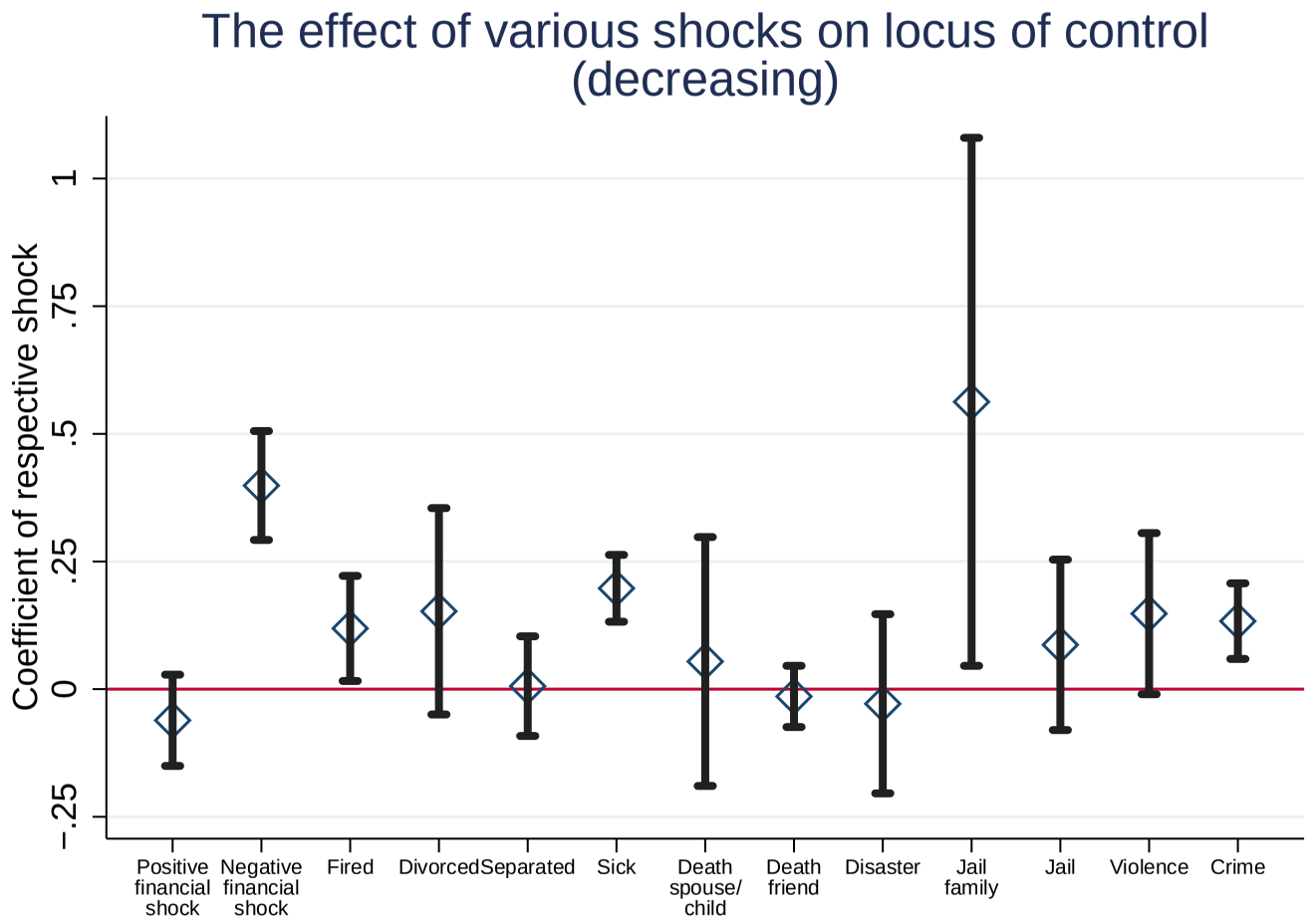

Figure 5: Displaying the effect of various shocks on average levels of **locus of control**, visualizing the respective 95% confidence intervals.

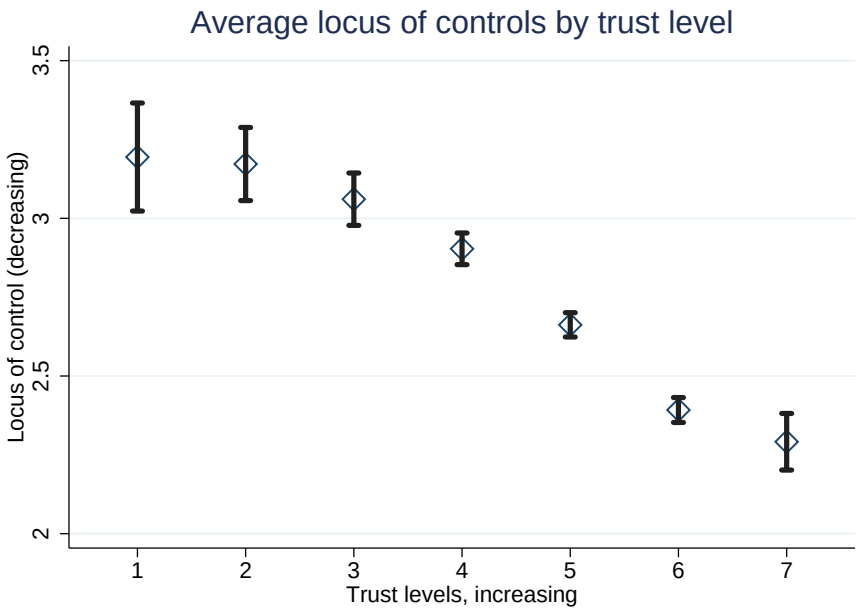

Figure 6: Average locus of control (decreasing) by trust levels with the respective 95% confidence intervals.

Table 8: Predicting trust levels with locus of control, including the familiar set of control variables.

	(1)	(2)
Dependent variable: Trust (mean = 4.788)		
Locus of control	-0.133***	-0.133***
	(0.008)	(0.008)
Control variables[a]		yes
# of respondents	15,111	15,111
# of waves	1	1
N	15,111	15,111

Notes: Standard errors clustered on the individual level are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Includes the natural logarithm of 1 + individual income (to preserve observations with zero income), state-fixed effects, binary indicators for nine education levels and nine categories of civil status, and a variable counting the number of children. (The reported coefficients and their standard errors are, indeed, identical at this level of specificity.)

4 Conclusion

In this paper, we study the link between financial shocks and interpersonal trust levels, using longitudinal data from 22,112 Australian-based respondents in 75,742 observations. This data structure permits us to control for individual-level fixed effects, thereby controlling for any unobservable differences across individuals. Our regression results consistently document a strong detrimental effect of negative financial shocks on interpersonal trust levels, whereas a positive financial shock produces no effect. To better compare the underlying magnitude of our findings, we consider 11 other major shocks on the individual level, such as a divorce or separation, bereavement, and being the victim of violent crime. Surprisingly, the effect of a negative financial shock is comparable in magnitude to (and, in fact, marginally *larger* than) that of being the victim of physical violence or a property crime.

What could explain this result? One possible mechanism comes from the idea of a 'self-serving bias': People may internalize positive shocks, but externalize negative shocks. Put simply, one may ascribe a positive financial shock to one's own doings, but responsibility for a negative financial shock is assigned to others. Consequently, a financial win would be seen as reflecting positively on the self, and may thus remain irrelevant for interpersonal trust levels, while a financial loss could be seen as reflecting poorly on others, consequentially reducing interpersonal trust.

To test this hypothesis, we use available data on locus of control, i.e., one's perception of individual control over life's outcomes. The corresponding results produce evidence that is consistent with this explanation, as those who experience a negative financial shock systematically report a lower sense of control over their lives and circumstances. In turn, we do not observe any significant change in locus of control following a positive financial shock once we account for potentially confounding factors. Finally, we also

observe a systematic link between locus of control and trust levels, though due to limited data availability we are only able to investigate this relationship across individuals and not within individuals.

We hope this study contributes to our understand about whether and how financial shocks can systematically influence interpersonal trust levels – a fundamental asset in any society. A possible implication for economic policy is that negative financial shocks to an individual may fundamentally erode interpersonal trust levels in society. Positive financial shocks, however, do not carry the same effect to alleviate that effect. This provides additional evidence of the costs of macroeconomic volatility, particularly in terms of trust. Nevertheless, our results should of course be interpreted carefully and we conclude with the usual disclaimer of scientific humility.

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Appendix A: Data Availability

Table A1: Data availability for key variables in *HILDA*.

Wave:	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Trust					yes	yes		yes		yes	yes			yes
Positive financial shock		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Negative financial shock		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Other shocks[a]	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Additional outcome variables I[b]						yes		yes		yes	yes			yes
Additional outcome variables II[c]						yes				yes				yes
Locus of control			yes	yes							yes			

Notes: [a]Includes fired, divorced, separated, sick, death of a spouse/child, death of a friend, a weather-related disaster, detained in jail, close family member detained in jail, victim of physical violence, and victim of a property crime. [b]Includes most people (*i*) keep their word, (*ii*) do not step on others, and (*iii*) make agreements honestly. [c]Includes most people (*i*) try to be helpful, and (*ii*) do not look out for themselves.

Appendix B: Robustness Checks and Extensions

First, column (1) includes interaction terms between income levels and the respective shock indicators. Intuitively, it is possible that shocks may affect people differently depending on their income levels. For example, people who generally earn more could be less affected by financial shocks. However, the corresponding results do not support that notion and the respective interaction terms remain meaningless, both in terms of statistical and economic relevance, whereas our main results are confirmed.

Second, columns (2) and (3) turn to gender-specific subsamples to check whether women's and men's trust levels are affected differently by financial shocks. Related research has shown substantial gender differences in behavioral attitudes (e.g., see Grove et al., 2011) and we want to check whether the shock-trust relationship varies across gender. However, the results pertaining to negative financial shocks are equally relevant for

Table A2: Robustness checks, predicting trust levels.

	(1)	(2) Women	(3) Men	(4)
Dependent variable: Trust (mean = 4.788)				
Positive financial shock	-0.006	0.051	-0.029	
	(0.163)	(0.036)	(0.035)	
Negative financial shock	-0.301**	-0.188***	-0.177***	
	(0.129)	(0.044)	(0.043)	
Positive financial shock × Ln(1+income)	0.002			
	(0.016)			
Negative financial shock × Ln(1+income)	0.012			
	(0.013)			
Ln(1+income)	-0.010***	-0.005	-0.015***	-0.010***
	(0.003)	(0.004)	(0.005)	(0.003)
# of children	0.015*	0.012	0.021	0.015
	(0.009)	(0.013)	(0.014)	(0.009)
Positive financial shock 0-3 months				-0.036
				(0.044)
Positive financial shock 4-6 months ago				0.019
				(0.050)
Positive financial shock 7-9 months ago				-0.040
				(0.055)
Positive financial shock 10-12 months ago				0.052
				(0.054)
Negative financial shock 0-3 months				-0.236***
				(0.055)
Negative financial shock 4-6 months ago				-0.143**
				(0.061)
Negative financial shock 7-9 months ago				-0.070
				(0.066)
Negative financial shock 10-12 months ago				-0.166***
				(0.061)
Control variables[a] & Individual-level fixed effects	yes	yes	yes	yes
# of respondents	22,112	11,566	10,548	22,112
# of waves	6	6	6	6
N	75,742	40,288	35,454	75,742

Notes: Standard errors clustered on the individual level are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Includes wave-fixed effects, state-fixed effects, binary indicators for nine education levels and nine categories of civil status.

respondents from either gender. Note that, although unrelated to our main focus in this paper, men trust less following an increase in income levels, whereas women do not (also see Bilson et al., 2017).