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A History of Violence: The impact of early violence exposure on financial risk preferences

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Abstract

This paper examines whether growing up in areas with high homicide rates affects financial risk preferences. Our key conjecture is that individuals who have grown up in violent areas possess more risk averse financial preferences. We find support for this hypothesis using a unique dataset of mutual fund investors from one of Colombia's largest stock brokers alongside Colombian official data on homicide rates.

JEL classification: G11.

Keywords: Risk aversion, mutual funds, early childhood, violence.

1. Introduction

Does being raised in a violent environment affect individual's attitudes towards risk? We seek answers to this question by studying the investment decisions of a large number of Colombian mutual fund investors. Our paper is one of the first to examine the behavior of mutual fund investors in Latin America with Colombia providing an ideal setting in which to study the impact of violence.

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Being a witness or victim of violence is regarded by mental health organizations as one of the most traumatic experiences an individual can undergo (World Health Organization 2013). It is well documented in the clinical psychology literature that traumatic experiences lead to physical and mental health problems (see e.g. McNally 2003, Boscarino 2006). Given their powerful effect on our emotions, there is reason to believe traumatic experiences may also affect our preferences towards risk. This potentially important determinant of risk preferences combined with the large number of people worldwide affected by traumatic events has fuelled a growing interest from both economists and policy makers. The resulting literature has sought to connect traumatic experiences with individual's risk preferences. Such studies have looked at the impact of civil war (see e.g. Kim and Lee 2014; Voors, Nillesen, Verwimp, Bulte, Lensink, and Van Soest 2012), natural disasters (see e.g. Bucciol and Zarri 2015; Cassar, Healy, and Von Kessler 2011; Cameron and Shah forthcoming), and terrorist attacks (see e.g. Sacco, Galletto, and Blanzieri 2003). With the exception of Voors et al. (2012), most studies find that risk aversion increases following traumatic events.

The traumatic events literature builds on previous work relating individual risk preferences with their life experiences. A seminal paper of this kind by Malmendier and Nagel (2011) identified that individuals growing up during periods of financial crisis are more risk averse in their investment decisions. Similarly, Knüpfer, Rantapuska, and Sarvimäki (2013) looking at evidence from the Finnish Great Depression find that negative labor market experiences increase aversion towards risky assets. More broadly, this strand of literature complements other papers that have highlighted the importance of both demographic and socio-economic factors (see e.g. Booth and Nolen 2012; Hryshko, Luengo-Prado, and Sørensen 2011) and genetics (see e.g. Barnea, Cronqvist, and Siegel 2010; Calvet and Sodini 2013).

In our paper we look again at the importance of experience and measure the impact growing up in violent areas has on an individual's financial risk preferences. Violence in this context has not been studied before. A recent paper by Callen, Isaqzadeh, Long, and Sprenger (2014) using data from Afghanistan finds that individuals exposed to violence exhibit an increased preference for certainty. However, the violence measured in Callen et al. (2014) derives exclusively from acts of war. We build on Callen et al. (2014) by

observing violence in a more natural setting. We take Colombia a country with a troubled and diverse history of violence and measure the impact of early childhood exposure to violence on individuals financial risk preferences. Our approach contributes to the literature for two main reasons. First, the violence we are able to measure offers a more complete account of violence than has been previously studied. This is because war, rather than violence, has been the context of previous papers (Callen et al. (2014), Voors et al. (2012) and Kim and Lee 2014). War is a transitory phenomenon that contains negative aspects, independent of violence, that may be associated with risk preferences. Such elements include invasion, occupation, destruction, decline in social spending, deterioration in infrastructure, famine, wide spread emigration, genocide and ethnic cleansing. War alters the normal context in which people live and in such an environment it may be difficult to unpick the marginal effect of violence from the for-mentioned elements. Our purpose in this paper is not to study war or the violence associated with it. We want to understand a different type of violence, one that occurs in a natural, every day setting. We believe Colombia is one of the best countries to study for this purpose because its history of violence is unique, stems from a variety of causes and has formed part Colombia's identity and culture (). Our second contribution is that we are able to observe individual's actual investment decisions, whereas previous studies in the traumatic events literature have had to rely on experiments or survey data to ascertain risk preferences. This additional evidence is of particular value useful because while the literature on traumatic events broadly supports the argument that risk aversion increases following such experiences, the evidence with respect to war or violence associated with it is more mixed. Two previous papers find risk aversion increases (Callen et al. (2014), Kim and Lee 2014) while a third finds that it falls (Voors et al. (2012)). Although we are measuring everyday violence and not the effect of war our paper fits most closely with this part of the traumatic events literature. Our results come down firmly on the side of increased risk aversion bringing the balance of evidence with respect to violence related events in line with the more general traumatic experiences.

Colombia is a hugely valuable country to analyze for questions concerning violence because of its unique history of political conflict, drugs cartels and various armed factions such as private justice groups, communist guerrillas and right wing paramilitaries. Homi-

cide rates and acts of terrorism have varied over time depending to a large extent on the activity of these various criminal elements. Our study combines data on fund choices from over 11,000 brokerage clients with Colombian official data on homicide rates. There are 33 departments in Colombia and 28 of those are represented in our client data. This is a highly representative sample and allows us to explore how investors risk preferences vary with cross-sectional differences in violence. The richness of our client data allows us to control for a wide range of demographic and socioeconomic factors. Our results show that individuals spending their early childhood in violent areas are more risk averse in their choice of investment funds. We consider that there are at least two channels that may explain the link between early exposure to violence and increased risk aversion in adult life. One of those channels is neuro-psychological while the other is related to parental upbringing. On the former, the neuroscience literature has established that prenatal maternal stress leads to long-term effects on the child development. In an early study, Barbazanges et al. (1996) show that stress in pregnancy can impair the biological and behavioral adaptation to stress in the adult life of the child. This neuro-chemical mechanism is further supported by Talge, Neal and Glover (2007) who find that if a mother is stressed during pregnancy, her child is more likely to develop anxiety problems due to increased cortisol levels. In other studies, the higher the anxiety an individual has the more risk averse he tends to behave (Moya, 2007).

Second, a nurture channel might be operating. It's plausible that parents living in more stressful environments raise their kids to be more cautious, more pessimistic, and overall, to exhibit more risk aversion. Unfortunately, we did not come across any empirical literature that addresses such a question from the upbringing perspective and an alternative argument, although perhaps less likely, could be put forward that parents in stressful environments actually have a more care free approach to parenting. Ultimately, this remains an empirical question and until further evidence is available our proposed channel is purely conjecture at present. Nevertheless, in the event that we are correct, that parents in such environments do raise their children to be more risk averse, we are able to address one potential criticism. It may be argued that risk averse parents are more likely to flee from violent areas to raise their family in safer environments thus biasing our results. On closer inspection, this explanation, while entirely plausible, would not diminish from our empirical findings. On

the contrary it would seem to enhance them because it would imply risk averse families are underrepresented in our sample. Thus, any purported connection between violence exposure and risk aversion would be biased downward in favor of lower risk aversion. The fact that risk aversion increases with increased exposure to violence, on a sample that should not be hugely risk averse, is suggestive that the impact of violence could be very strong indeed.

There are potential identification issues in measuring the relationship between violence and financial risk preferences. Firstly, exposure to violence during childhood is not random. Violent areas are often poorer and less financially developed. The implication of this might be that individuals have less familiarity with financial investments and therefore demonstrate greater risk aversion towards them. A second identification challenge is that violence can affect perceptions about the quality of legal enforcement and possibly investor protection. This reduction in the generalized level of trust within violent areas may lead to greater risk aversion. We don't feel perceptions regarding the quality of legal enforcement is a major concern for our study. Legislative power is vested at central government level so legal enforcement and investor protection is relatively homogeneous throughout Colombia. Furthermore, when changes do occur they tend to be minor with little variation over time. Nevertheless, we address both these potential identification issues by controlling for department fixed effects at birth in alternative specifications. By construction, these fixed effects control for the average level of violence at department level, as well as for any other financial development differences across departments. In addition, age is included as one of our many control variables in all of our econometric specifications which would mitigate any unidentified cohort effect. We also present additional evidence to support our main finding that exposure to violence is an important determinant of risk preferences.

The paper continues as follows: Section 2 describes the data and methodology. Section 3 presents and discusses the results. Section 4 explains various robustness checks. Section 5 concludes. For readers interested in knowing more about the dynamics of Colombian Violence see Annex 1. Annex 2 gives finer details on the data assumptions employed in this study.

2. Data and methodology

Fund data

This study uses several datasets. Dataset 1 is a proprietary database from one of Colombia's largest brokerage firms and fund managers. It contains information on over 11,000 clients and their investment decisions in funds over a seven year period between 2007 and 2013. Clients include individual, business and institutional investors. The sample represents roughly ten per cent of the Colombian Mutual Fund market by value of assets managed. The dataset includes demographic and socio economic information for both individual and business clients along with all clients fund purchases and sales on a daily basis. The purchases and sales data contains all client account openings and closures as well as any subsequent additions or withdrawals across all fund asset classes managed by this fund manager. It is important to emphasize that in Colombia, the concept of a discount broker does not exist. Individuals wanting to purchase investment funds have to go directly to the company managing that fund. The largest brokerage firms tend also to be the largest mutual fund managers. Over the 2007 to 2013 period the brokerage firm in this study was managing close to 15 funds that can be grouped into four main asset classes namely: Stocks, Bonds, Credit, and Liquidity. Stocks funds are the most aggressive investment fund managed by this brokerage firm. An individual's allocation towards stock funds is used in this study as a proxy for risk preferences.

Crime data

Our crime data merges several datasets to derive annual homicide rates per 100 thousand inhabitants at departmental level from 1913 to 2013 and at municipality level from 1990 - 2013. Dataset 1 contains annual homicide rates at departmental level for 1946 to 1960 and is taken from Montenegro and Posada (1994) (originally from Colombian Ministry of Justice). Dataset 2 contains five yearly homicide rates at departmental level between 1960 and 1990 and is taken from Sánchez, Díaz, and Formisano (2003) (originally from the Colombian National Police Force). Finally, dataset 3 combines data from the Colombian National

Police Force (annual raw homicide figures at municipality and departmental level between 1990 and 2013) with historical population figures at departmental and municipality level from the Colombian Department of Statistics (DANE). For a more detailed explanation of the matching techniques and assumptions applied to derive the complete historical time series of homicide rates see Appendix B.

How to interpret homicide rates in Colombia

We use homicide rates in this study because it is the richest and most widely available data on violence in Colombia. It also encapsulates the different elements of violence that have plagued Colombia's history: political violence between conservatives and liberals (1945-58); the drug cartels (1984 to present); left-wing guerilla groups such as the FARC (1964 to present); and right wing paramilitary groups (1970s to present). Each of these components has contributed heavily to the high homicide rates we observe for specific regions of the country at specific points in time. Homicide rates therefore seem a sensible proxy of the perceived closeness to violence brought about by these different criminal factions.

Methodology

Following the literature on fund participation (see e.g. Bailey, Kumar, and Ng 2011), we estimate logit regressions in which the dependent variable is the stock fund participation dummy, which equals one for an investor who invests in stock funds at least once over the sample period. Clients can invest in four main asset classes with this broker (Stocks, Bonds, Credit and Liquidity). Those who invest in stock funds are deemed to have a greater preference for risk. The main independent variables of interest are our four measures of homicide rates (see Appendix B). This includes a homicide rate at birth; during early childhood; present day; and average over lifetime. Specifically, Measure 1 is the homicide rate at departmental level in the year each investor was born. Measure 2 is the five years average of homicide rates, at departmental level, around the year each investor was born. This measure smooths out any extreme observations in violence levels in a given year and acts as a better proxy of the average level of violence individuals were exposed to around the years of their

birth. We refer to this measure as the exposure to violence during early childhood. Measure 3 is the average homicide rate in an individual’s city of residence during the investment period (2007-2013). Measure 4 is the average homicide rate in the department throughout the investors life. Measure 4 is only available for individuals that were born in the same department to where they currently reside. These measures allow us to test whether those who were born, spent there early childhood; or currently live in violent areas are more or less likely to invest in stock funds. We control for age, marital status, gender, income and occupation type. Table 1 presents descriptive statistics for our main sample of 8009 retail investors. Our fund client data contains a representative sample of Colombian departments (28 out of 33) and municipalities (301 out of 1,221) which allow us to exploit the cross sectional variation in violence.

Table 1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Homicide Rate	8,017	44.27	46.62	0	244.95
Average Childhood Homicide Rate	8,017	44.34	44.95	0	209.90
Average Homicide Rate Investment Period (Municipality level)	8,249	40.39	14.99	3.84	108.48
Average Homicide Rate Investment Period (Department level)	8,249	39.11	10.36	11.02	74.37
Age	8,234	47.89	19.41	1.17	103.60
Income (USD)	8,257	5,632.12	25,702.12	0	998,692.20
Gender (% of males)	46.28%				
<i>Marital Status</i>	<i>% of Sample</i>	<i>Municipalities and Departments</i>			
Single	39.78%	Departments in sample		28	
Married	49.41%	<i>Total Departments</i>			
Divorced	5.17%	Municipalities in sample		301	
Widow	4.97%	<i>Total Municipalities</i>			
<i>Source of Income</i>					
Retirement Fund	0.63%				
Entrepreneur	11.60%				
Capital Rents	51.36%				
Wage	36.25%				

3. Results

Table 2 presents the estimated coefficients from our logit regression. Column (1) is the basic model without control variables and column (2) is the regression with controls. The departmental homicide rate at birth is statistically significant and negative when we control for the main demographic and socioeconomic variables that have been shown in previous

studies to explain risk aversion. In order to control for cross sectional fixed features such as culture or financial development differences we add fixed effects by department of birth to our regression (Column 3).

The coefficient for homicide rate at birth place remains highly significant with fixed effects and of the same order of magnitude to that of column (2). In column (4) we replace our homicide rate at birth with our modified version of early violence exposure: the average homicide rate around the first five years of childhood. The coefficient remains negative and statistically significant with the same magnitude.

Our third violence measure: homicide rates in city of current residency (Row 3) is no longer significant once we control for departmental fixed effects (Columns 3 and 4). With respect to our control variables most coefficients are significant and in the direction expected. The likelihood of investing in a share fund decreases with age, is greater for men than for women, and is greater for single people than married people. Entrepreneurs are also less likely to hold a share fund. One possible explanation of this is that the earnings of Colombian business owners may be closely tied to the performance of the Colombian stock market and their preference for less volatile funds could reflect income hedging motives. This would support recent findings in the literature (see e.g. Bonaparte, Korniotis, and Kumar 2014 who show that individuals are more likely to invest in the stock markets when their income and market return correlation is low).

Table 3 presents average elasticities. Column (1) corresponds to the model of column (3) in Table 2 and column (2) presents the elasticities of column (4) of Table 2. The average elasticity of homicide rates with respect to purchasing a share fund is between -0.077 and -0.068, depending on the measure used. This can be interpreted as follows: For a doubling of homicide rates (100% increase), investors are between 7% and 8% less likely to invest in stock funds. Figure 1 shows the average predicted probability of investing in share funds decreases with the homicide rate. To get some idea of magnitude, an otherwise similar individual whose early childhood experience was in one of the 5 most violent departments is 45% less likely to invest in a share fund than if their early childhood had been spent in one of the 5 least violent departments.

Our findings reveal that individuals who were born or spent their early childhood in

violent areas are less likely to invest in stock funds. These results support the current balance of evidence showing risk aversion tends to increase following traumatic events and that this effect is persistent over time. In addition, our results show that only violence at birth place and during early childhood are significant. Violence at current residency does not affect the likelihood of investing in stock funds. This is further evidence that risk attitudes are formed at young ages with the effect lasting into adulthood. Moreover, it supports findings in related literature showing early childhood experiences have a strong impact in adulthood on attitudes and behavior (see e.g. Nave, Sherman, Funder, Hampson, and Goldberg 2010); on life chances (Johnson and Kossykh 2008); and on health and well-being (Felitti, Vincent, Anda, Robert, Nordenberg, Williamson, David, Spitz, Alison, Edwards, et al. 1998).

One explanation why risk aversion in funds may be higher for individuals with greater exposure to violence is a result of parental upbringing. This argument acknowledges the possibility that being born or spending one's early years in a violent area does not necessarily imply the individual is conscious of that violence, particularly if they moved from that area at a very young age. Rather, we argue that high levels of violence may affect an individual's risk preferences via its impact on parental attitudes and in turn how parents bring up and educate their children. These 'upbringing affects' may have a lasting effect on us and influence our risk preference later in life. The literature on the link between parental attitudes and child development is large and covers diverse strands such as children's education attainment (Porumbu and Necşoi 2013) through to childrens attitudes toward subjects like racism (Aboud and Doyle 1996).

Table 2: Probability of investing in a share fund

Dependent Variable: 1 if Invested in Share Fund	(1)	(2)	(3)	(4)
Homicide rate Department Year Born	0 (0.0005)	-0.0023*** (0.0008)	-0.0023*** (0.0008)	
Average Homicide Rate Department during Childhood				-0.0026*** (0.0009)
Homicide rate Residence Municipality Investment Period	0.0113*** (0.0018)	0.0120*** (0.0018)	-0.0015 (0.0027)	-0.0015 (0.0027)
Age		-0.0084*** (0.0021)	-0.0078*** (0.0021)	-0.0082*** (0.0021)
Gender (1 if Male)		0.1411** (0.0549)	0.1387** (0.0554)	0.1399** (0.0554)
Income (ln)		0.0003 (0.0227)	-0.0016 (0.0232)	-0.002 (0.0232)
<i>Marital Status (Single excluded)</i>				
Married		-0.1305** (0.0651)	-0.1415** (0.0656)	-0.1449** (0.0657)
Divorced		0.0566 (0.1226)	0.0186 (0.1223)	0.0144 (0.1223)
Widow		-0.0761 (0.1409)	-0.0947 (0.1405)	-0.0964 (0.1405)
<i>Source of Income (Wage worker excluded)</i>				
Retirement Fund		0.2596 (0.3081)	0.323 (0.3257)	0.3225 (0.3255)
Entrepreneur		-0.2578*** (0.0903)	-0.3106*** (0.0905)	-0.3102*** (0.0906)
Capital Rents		-0.049 (0.0570)	-0.0687 (0.0576)	-0.0676 (0.0576)
Constant	-1.4744*** (0.0790)	-0.9260*** (0.2191)	-0.3007 (0.4249)	-0.2657 (0.4265)
Department Fixed Effects	No	No	Yes	Yes
Observations	8009	7458	7453	7453
Global significance test (p-value)	0.000***	0.000***	0.000***	0.000***
Pseudo R2	0.005	0.01	0.023	0.023
Log Likelihood	-4622.506	-4304.733	-4247.524	-4247.073

Note: * p<0.05, ** p<0.01, *** p<0.001; Robust standard errors in brackets

4. Robustness checks

In this section we report additional evidence to support our main finding that that exposure to violence is an important determinant of risk preferences. In our baseline analysis we impose minimal restrictions on the data so we have the largest possible sample. However, this raises several possible concerns. One such concern is whether the statistical relationship observed in our data is biased by the high homicide rates witnessed in rural areas during La Violencia period (see appendix 1 for more detail on La Violencia). It is possible that the statistical relationship we observe between homicide rates and risk preferences could be driven by other factors correlated with homicide rates or rural areas such as political unrest

Fig. 1. Average estimated probability of investing in a share fund.

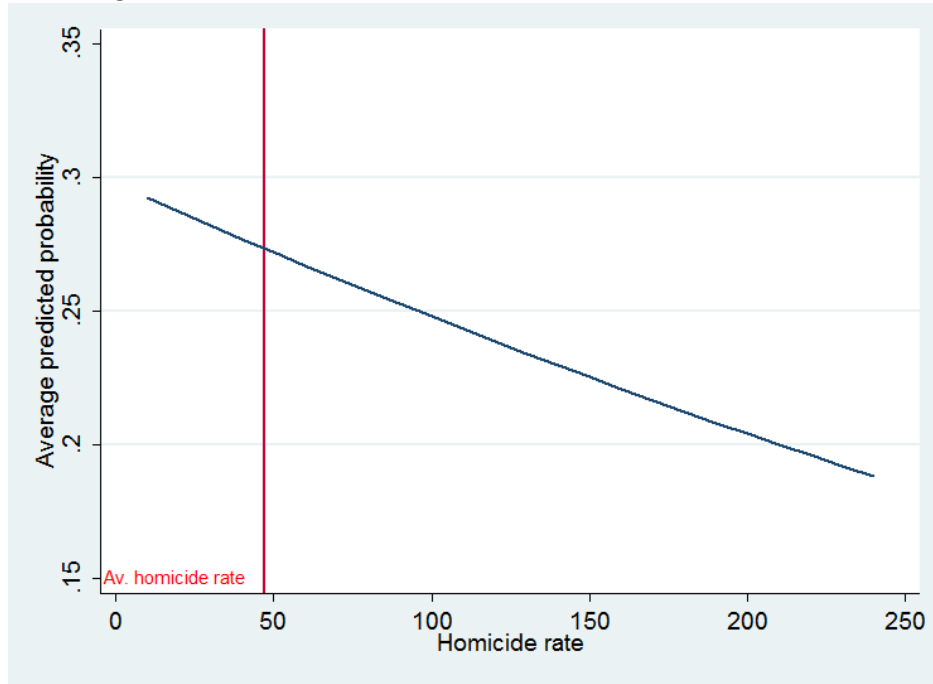


Table 3: Average predicted elasticities

Dependent Variable: 1 if Invested in Share Fund	(1)	(2)
Homicide rate Department Year Born	-0.068*** (0.0245)	
Average Homicide Rate Department during Childhood		-0.077*** (0.0262)
Homicide rate Residence Municipality Investment Period	-0.043 (0.077)	-0.043 (0.077)
Age	-0.285*** (0.077)	-0.302*** (0.079)
Gender (1 if Male)	0.046** (0.018)	0.0464*** (0.018)
Income (ln)	-0.009 (0.129)	-0.011 (0.129)
<i>Marital Status (Single excluded)</i>		
Married	-0.056** (0.025)	-0.056** (0.025)
Divorced	0.001 (0.004)	0.001 (0.004)
Widow	-0.004 (0.006)	-0.004 (0.006)
<i>Source of Income (Wage worker excluded)</i>		
Retirement Fund	0.002 (0.001)	0.002 (0.001)
Entrepreneur	-0.029*** (0.009)	-0.029*** (0.009)
Capital Rents	-0.024 (0.020)	-0.024 (0.020)

Note:* p<0.05, ** p<0.01, *** p<0.001; Robust standard errors in brackets

or lower levels of financial literacy. To control for this we restrict our sample and run our regressions only on those individuals born after La Violencia period.

Our second robustness check measures whether the impact of violence on risk preferences holds for both movers and non-movers. Movers are defined as those individuals who currently reside in a department different to where they were born. Non-movers are individuals who currently reside in the same department to where they were born. In our initial specification no restrictions are made to the data (both movers and non-movers are included). One possible criticism of this approach is that people could have lived in several different departments during their childhood, which would not be captured by homicide rates at birth nor our five year average measure of homicide rates around the year of birth. By restricting the sample to include just those individuals that have not moved, we can be far more confident about the level of overall violence individuals experienced during their childhood.

The baseline regression in the study measure the probability of investing in a risky fund. A third robustness check analyzes the opposite situation - the probability of investing in a conservative fund. Assuming our hypothesis that exposure to violence increases risk aversion holds, we would expect to see a positive relation, or no relation at all, between homicide rates and the likelihood of investing in a liquidity fund. Liquidity funds are the most conservative of the four asset classes managed by our fund manager.

Table 4 presents results for the three robustness checks: Columns (1) and (2) show the results after restricting the sample to include only those born after La Violencia period. Columns (3) and (4) present results for just non-movers. Finally, columns (5) and (6) show the results from the logit regression with dependent variable equal to 1 if the investor has ever bought a liquidity fund, and 0 otherwise.

Even columns (2,4 and 6) present average predicted elasticities while odd columns (1,3 and 5) show raw coefficients. The coefficient and the average elasticity associated with the violence at birth and violence during early childhood variable in the first two robustness checks, remain negative, significant, and with same order of magnitude to those that use the whole sample. This supports the original finding and provides further evidence that risk aversion increases with violence exposure. The third robustness check represented by the last two columns (5 and 6) reveals a positive relationship between choosing a highly

conservative fund and homicide rates. Furthermore, the coefficients of our standard control variables are of the opposite sign to those from the baseline regression. Such a relationship it what we would expect if our original finding were true and therefore this result can be taken as additional evidence that violence exposure affects risk preferences.

Table 4: Robustness checks

Dependent Variable: Sample:	1 if invested in a share fund				1 if invested in liq. fund	
	Born after La Violencia		Non-migrants		Full	
	(1)	(2)	(3)	(4)	(5)	(6)
Average Homicide Rate Department during Childhood	-0.0018** (0.0009)	-0.0736** (0.0369)	-0.0023** (0.0010)	-0.075** (0.0343)	0.0035** (0.0016)	0.0087** (0.0037)
Homicide rate Department Invest. Period			0.0763 (0.0693)	2.1266 (1.9308)		
Average Homicide Rate through Life			-0.1351 (0.2313)	-5.8547 (10.023)		
Homicide rate Municipality Invest. Period	0.0019 (0.0033)	0.0546 (0.0928)			0.0056 (0.0048)	0.0131 (0.0110)
Age	-0.0057 (0.0040)	-0.1524 (0.1085)	-0.0047* (0.0028)	-0.1587* (0.0931)	0.0097** (0.0039)	0.0258** (0.0103)
Gender (1 if male)	0.2156*** (0.0669)	0.0744*** (0.0224)	0.1587** (0.0687)	0.0523** (0.0221)	-0.1204 (0.1044)	-0.0031 (0.0029)
Income (ln)	0.0262 (0.0293)	0.1406 (0.1570)	-0.0046 (0.0280)	-0.0253 (0.1531)	0.2198*** (0.0467)	0.0910*** (0.0192)
<i>Marital Status (Single excluded)</i>						
Married	-0.1126 (0.0816)	-0.0368 (0.0270)	-0.0991 (0.0826)	-0.0361 (0.0303)	0.1886 (0.1242)	0.0046 (0.0028)
Divorced	0.1070 (0.1747)	0.0028 (0.0044)	-0.0671 (0.1619)	-0.0024 (0.006)	-0.0894 (0.2329)	-0.0003 (0.0008)
Widow	0.0484 (0.3435)	0.0003 (0.0021)	-0.0238 (0.1852)	-0.0007 (0.0058)	-0.3534 (0.2383)	-0.0013 (0.0011)
<i>Source of Income (Wage worker excluded)</i>						
Retirement Fund	0.6682 (1.8234)	0.0004 (0.001)	0.1065 (0.4623)	0.0003 (0.0013)	-0.1391 (0.5305)	-0.0000 (0.0003)
Entrepreneur	-0.3592*** (0.1148)	-0.0304*** (0.0103)	-0.3069*** (0.1118)	-0.0289*** (0.0111)	0.6738*** (0.2047)	0.0026*** (0.0004)
Capital Rents	-0.0527 (0.0705)	-0.0527 (0.0233)	-0.0294 (0.0721)	-0.0103 (0.0254)	0.2108* (0.1076)	0.0057* (0.0026)
Constant	-1.0252** (0.5097)		2.0354 (9.3668)		0.9965 (1.1654)	
Department Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4700		4617		7412	
Gobal significance test (p-value)	0.000***		0.000***		0.000***	
Pseudo R2	0.022		0.020		0.027	
log-likelihood	-2780.251		-2730.039		-1569.461	

Note: * p<0.05, ** p<0.01, *** p<0.001; Robust standard errors in brackets

5. Concluding remarks

Using thousands of fund accounts of Colombian investors alongside official data on violence, we show that individuals who were born or spent their early childhood in areas with high homicide rates are less likely to allocate their liquid assets towards stock funds. This is the first study to examine the implications of the level of violence where one is raised on financial risk preferences. The impact of violence on risk preferences prior to this study had only been considered in the context of war. The benefit of looking at a country with a rich and varied history of violence like Colombia is that it permits a more holistic interpretation of violence which in turn enables more realistic inferences to be made with respect to other countries and markets. Our findings are robust to various controls and diagnostic tests and can be used by policy makers and asset managers. The former may identify opportunity costs to excessive levels of risk aversion in violent areas. Accordingly, policy makers may wish to target individuals in such regions through appropriate awareness and educational campaigns. Asset managers may interpret these results as additional evidence that traumatic circumstances really matter in the lives of individuals. Consequently, they may look at ways of identifying such experiences in their risk assessment of clients enabling them to better tailor products towards them. More broadly within the risk preferences literature our results provide further evidence of the importance of experiences at young ages, giving us deeper insights into decision making.

We conclude the paper with some caveats. First, we are only able to observe investors risk preferences towards mutual fund investments. It is possible that such preferences may not be consistent across other financial assets such as ordinary share purchases. Ideally, we would also like to have info on clients non-fund investments. Second, differences in education levels across departments should be addressed by the use of fixed effects in our regressions. However at the individual level we do not have data on investors education. There exists therefore the possibility that we are omitting a potentially important determinant of risk preferences from our controls. While data on non-fund investments and individual education levels would enhance our analysis, their omission does not substantially detract from the paper's main finding that exposure to violence at young ages tends to increase risk aversion in

mutual funds choices. Further, our results are consistent with other findings in the literature which have shown that early exposure to traumatic events leads to greater risk aversion. There would be value in broadening this question on violence to measure risk aversion across all types of financial assets and between different types of violent crimes.

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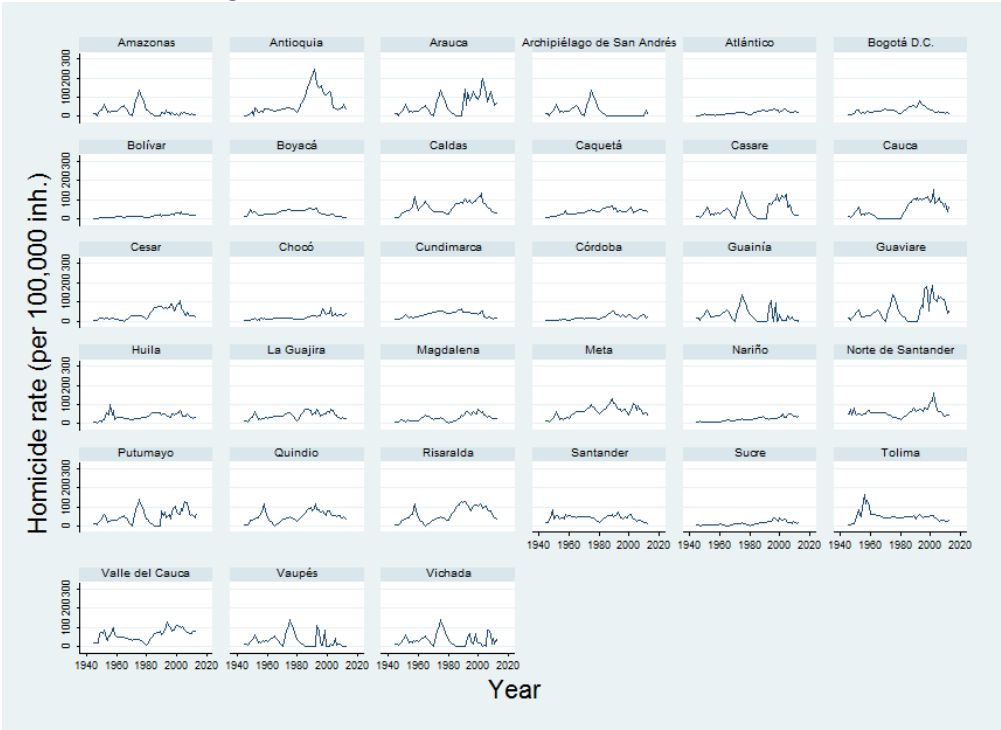
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Appendix A: Brief History of Violence in Colombia

Fig. 2. Homicide rates in Colombia by department.



In this section, we describe the most important features of Colombian violence in the last 100 years. High levels of violence has not been a constant phenomenon throughout Colombia’s history, rather Colombia’s past has been turbulent and characterized by periods of both relative peace and extreme violence. Figure 2 shows the evolution of homicide rates from 1945 to 2013. Violence peaked between 1946-58 before falling back in the 60s and 70s, only to surge again during the mid 1980s (Pecaut and González (1997); Chacón, Robinson, and Torvik (2011)). The periods 1930-1945 and 1965-1985 were comparatively peaceful. Of the two violent phases (1946-58 and 1985-2002) the causes were very different. The earlier period corresponds to the political conflict known as ‘La Violencia’, while the latter corresponds to the governments war against the drug cartels and the atrocities committed by communist guerrillas and right wing paramilitaries. In the following sub sections we explore the different periods of peace and violence in more detail.

First period of peace (1902 - 1945)

The beginning of the 20th century saw Colombia embroiled in a civil war between the two main political parties, Liberals and Conservatives. This "War of a Thousand days" (1899-1902) was the most damaging of several civil wars between these two factions since the middle of the 19th century and cost an estimated 100,000 lives (Hartlyn (1993)). While tensions between the two political groups never completely subsided, a relatively peaceful period in Colombia's history occurred between 1902 until the early 1940s, initially with the Conservative Party holding office, and from 1930 onwards with the Liberal Party in power.

La Violencia (1946 - 1958)

Tensions between the two political factions and their respective rural supporters reignited in 1946 when the Conservative party won the presidency. This culminated in a brutal yet irregular period of civil war termed La Violencia, between 1946 and 1958. The unrest gained intensity after the murder in April 1948 of Jorge Eliecer Gaitán, center-left Liberal candidate for the presidency, and poised to win the 1950 election. The assassination and ensuing turmoil prompted the Liberal party to boycott the 1950 election. This irregular civil war took place mainly in the country side, where liberal and conservative armed self-defense groups fought against each other. Both sides were widely condemned for targeting and murdering large numbers of unarmed civilians. As a consequence, most Colombians currently in their 60s and 70s, particularly those raised in rural areas, have bitter memories of this tragic period. 'La Violencia' has been called "the largest armed conflict in the western hemisphere since the Mexican Revolution" (Ramsey, 1973, pp. 3), with an estimated 200.000 deaths Hartlyn (1993) and took the heaviest toll in regions like Tolima, Huila, The Great Caldas Santander, and parts of Antioquia.

Second period of peace (1958 - 1974)

La Violencia began to recede following the military coup led by General Gustavo Rojas Pinilla in 1953. The dictator offered amnesty to the self-defense groups and undertook measures to pacify the countryside. Rojas Pinilla was himself overthrown in 1957 following

widespread national protests, instigated by the conservative and liberal parties. The two parties subsequently signed a famous truce called Frente Nacional bringing La Violencia officially to an end. The agreement stipulated the disbanding of the self-defense groups and a power sharing agreement, starting in 1958, whereby conservatives and liberals would rotate the presidency every four years. A small number of the former armed self-defense groups, however, refused to demobilize and switched allegiance to the Communist party, forming the strongest left-wing guerilla, Fuerzas Armadas Revolucionarias de Colombia (FARC).

New drivers of Violence: communist guerrillas, drug cartels, and right wing paramilitaries (1985 - 1993)

From the middle of the 1960's onwards, while the violent struggle between the Liberal and Conservative parties had largely ended, three new major drivers of violence in Colombia were being established: The left-wing guerillas (the largest groups being FARC, M19, ELN), the drug cartels and the right wing paramilitary groups. Atrocities committed by each of these factions were relatively limited and isolated prior to the 1980s however since then violence increased dramatically. Forty thousand deaths were attributed to these three elements over the period 1985 - 2001 (Garfield and Llantén Morales (2004)).

The FARC

The FARC, started as a small group in 1964 but grew rapidly in the 1980's, funding their activities with money raised from kidnappings, extortion and drug trafficking. At the height of their power in 2001 the FARC had a membership of more than 16.000 members (Saab and Taylor, 2009)¹. A formidable threat to the state the Colombian authorities have sought to engage with the group several times over its 50 year history. During the 1991-2001 peace negotiations with the government of President Andres Pastrana, the FARC was able to obtain important concessions which ultimately backfired for the Colombian authorities

¹In an article by the BBC on 27th May 2014 discussing The FARC's 50th anniversary they state "the number of active FARC fighters now stands at about 7,500, down from 20,000 at its height in 2000, according to the Colombian defense ministry"

as it allowed the group to reorganize and expand its operations². From that point onwards, two presidents Alvaro Uribe (in power between 2002-2006 and 2006-2010), and Juan Manuel Santos (2010-2014) have led intense military campaigns against the FARC, seriously weakening the organization³. Today, while still a formidable force in certain parts of the country, the threat to ordinary citizens outside remote rural areas, is at one of its lowest points in the FARC's 50 year existence. At the present time, President Juan Manuel Santos is negotiating a new peace agreement with FARC, amidst military confrontations.

The Drugs cartels

Like the FARC, The drug cartels grew in size and power from the middle of the 1980's. The infamous Medellin Cartel gained immense wealth during this period and engaged in irregular terrorist activities against the state. The attacks were a response to the increasing crackdown by the Colombian and US authorities on the cartels activities. The first attack against the state occurred in April 1984, with the murder of Justice Minister, Rodrigo Lara Bonilla. Such attacks grew with frequency and included the assassination and kidnappings of government and police officials and leftist politicians. There were also several extreme attacks against the civilian population⁴. The government's war against the Medellin Cartel ended with the hunting and killing of their main leaders, Gonzalo Rodriguez Gacha in 1989, and Pablo Escobar in 1993. A low intensity violence related to other smaller cartels ensued and continues up to the present day.

The Right wing paramilitaries

The last main feature of violence in Colombia's recent history has been the paramilitary groups, originally established in the late 1970s by wealthy landowners against the threat of kidnap and extortion from left-wing guerillas. The paramilitary groups gained huge power

²The principle concession was the granting of a demilitarized zone in the region of El Caguan

³The campaigns led to the deaths of top FARC leaders: Alfonso Cano, Mono Jojoy, Raul Reyes and Ivan Rios

⁴E.g. Car bomb against major newspaper El Espectador wounding 84, The bombing of Avianca flight 203 killing 110, The bombing of the State Security Agency (DAS) HQ killing over 50 and injuring more than 600

due to alliances with sectors of the army and resources from the drug cartels. Like the FARC, paramilitary groups also became directly involved in drug trafficking. Despite being established to confront left-wing guerillas, this role was often deprioritized in favor of pursuing their own agendas. The paramilitaries have been responsible for the murders of members of left wing political groups, members of trade unions and their leaders⁵. Along with the FARC, paramilitaries have been accused of forced displacement of large groups of poor land owners, widespread kidnappings and general extortion. Some of the largest massacres in Colombia's history, have been committed at the hands of the paramilitary groups. In 1997 the paramilitary groups increased their political power by creating a united front called Autodefensas Unidas de Colombia (United Self Defense Forces of Colombia). During the first presidency of Alvaro Uribe, they began formal negotiations with the government that led from 2003 to 2006 to demobilization, land return and short term, symbolic imprisonment for most of the leaders. However, not all paramilitary groups demobilized, and at present some continue to engage in criminal activities. They are now officially referred to as *Bandas Criminales Emergentes* (BACRIM or spanish for 'emerging criminal organizations').

⁵Colombia has for several decades been the most dangerous country in the world for trade union members according to AI (2007)

Appendix B: Crime data assumptions

Our crime data incorporates three different datasets. Dataset 1 is taken from Montenegro and Posada (1994) (originally from the Ministry of Justice). It contains yearly homicide rates per 100 thousand inhabitants from 1946 to 1960 by department. Dataset 2 comes from Sánchez et al. (2003) (originally from the Colombian National Police Force) and contains homicide rates per 100 thousand inhabitants between 1960 and 1990 by department on a five yearly basis. Dataset 3 combines raw homicide figures from the Colombian National Police Force with population data from the department of statistics (DANE) that allows us to calculate homicide rates per 100 thousand inhabitants between 1990 and 2013 at both departmental and municipality level. We make adjustments to the three violence dataset and merge them to obtain a time series of homicide rates per 100 thousand inhabitants from 1946 to 2013.

We start by making adjustments to both dataset 1 and 2 to obtain an annual time series of homicide rates between 1946 and 1990. As dataset 2 comprises homicide rates on only a five yearly basis, we use simple linear interpolation to fill in the homicide rates for the non-recorded years. This is a reasonable assumption given that violence is a relatively persistent phenomenon in our dataset and our figures do not change abruptly over short time periods.

Between the period 1946-1960 (dataset 1) and 1960-1990 (dataset 2) a small number of departments were split by the Colombian government. Table 5 below shows that Caldas is split into Caldas, Quindio and Risaralda. Magdalena becomes Magdalena and Cesar and so on. To ensure we have the same departments present across the whole time period when we merge dataset 1 and 2, we replace the aggregated department of dataset 1, with the newly formed departments from dataset 2. For these new departments that now appear in the earlier time period (1946-60) we assign them the same homicide rate as the aggregated department from which they came, in their respective years between 1940 and 1960. Thus, Quindio, Risaralda and Caldas will appear as separate departments in the merged dataset from 1946 onwards and will be assigned the same homicide rate as the aggregated Caldas had in the period between 1946 and 60.

Finally, dataset 3 combines additional information from the Colombian National Police

Force and DANE that allows us to calculate homicide rates per 100 thousand inhabitants between 1990 and 2013 at both departmental and municipality level. The police data contains raw numbers of homicides each year per city and department. The DANE data contains population size on a yearly basis by city and department. We combine the Police data and DANE data to calculate the homicide rate per 100 thousand inhabitants.

Combining these three dataset gives us a panel data of homicide rates per 100 thousand inhabitants from 1946 to 2013 at the departmental level and from 1990 to 2013 at both departmental and municipality level. While we do not have homicide rates for the period prior to 1946, in order to avoid missing observations for older investors when we come to merge our combined violence dataset with our fund client dataset, we use the departmental homicide rates in 1946 as our estimate for the preceding years. We feel this is a reasonable assumption to make because between 1903 and 1946 Colombia was characterized by relative peace (see Appendix A).

Table 5: Colombian departments

Departments 1946	Departments 1960-2013
Caldas	Caldas, Quindío, Risaralda
Magdalena	Magdalena, César
Bolívar	Bolívar, Sucre
Intendecias and Comisarías	Caquetá, Meta, La Guajira