The Impact of Traumatic Memories on Family's Commercial Insurance Expenditure: Evidence from 1959-1961 Famine in China

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April 27, 2022

Abstract

Traumatic memories can have long-term or permanent effects on individuals. Taking the Great Famine in China from 1959 to 1961 as a natural experiment, this paper studies whether an individual's early traumatic memories will affect the family's commercial insurance expenditure. Based on the cross-section data of China Family Panel Studies (CFPS) in 2010, we find that those who experienced more severe famine in the youth and adulthood significantly increased the expenditure on commercial insurance. We further examine the channels of the impact of famine experience on commercial insurance expenditure and find that the health status is not the main reason for the increase. It is more likely that the experience of famine makes individuals more risk-averse, which in turn increases the cost of commercial insurance.

Keywords: Traumatic Memories, Commercial Insurance Expenditure, the Great Famine, DID

1 Introduction

Commercial insurance, including medical insurance, auto insurance, house and property insurance, life insurance, etc., has increasingly become an important part of household expenditure in China. According to China Banking and Insurance Regulatory Commission data, China's insurance depth (insurance income/GDP) increases year by year, from 2.939% in 2011 to 4.465% in 2020. The demand for commercial insurance has also significantly increased. On the one hand, the change of China's population structure has opened up a broad space for the commercial insurance market. The aggravation of population aging has greatly enhanced the attraction of commercial endowment insurance. On the other hand, with the improvement of social risk awareness, residents pay more and more attention to the risk protection of themselves and their families. Many types of insurance, such as commercial property insurance and life insurance, became favored.

Many factors can influence commercial insurance expenditure, including personal, family, and macroeconomic impacts. We intend to explore the impact on family's commercial insurance expenditure by focusing on the personal perspective. In particular, according to vast literature in developmental psychology, early experiences shape psychological states. For example, Austrian psychologist Conrod Lorenz proposed the concept of critical periods, arguing that mental or physical development is particularly sensitive to specific environmental stimuli in these periods (Lorenz, 1937). Psychologist Freud stressed that early experiences are crucial to the formation of an adult personality (Freud, 1905). Based on psychologist research, traumatic memories can have long-term or permanent effects on individuals. Thus, this paper will focus on the impact of traumatic experience on family's commercial insurance expenditure.

The Great Famine from 1959 to 1961 in China provides a good natural experiment in investigating how traumatic experiences will affect a family's commercial insurance expenditure. From 1959 to 1961, people in China experienced the worst famine, during which grain production has decreased by more than 15% annually. The official mortality rate reached 2.54% in 1960, while the national mortality rate was only 1.14% before 1958. Nearly 30 million people died abnormally during the Great Famine in China (Chen & Zhou, 2007). Scholars have found that the

Great Famine significantly affects the rural economic system and human health (Liu, 2016). Besides, in particular, the impact of the experience of the Great Famine will exist for a long time and may affect individuals' behaviors and choices today. Thus, our paper uses evidence from the Great Famine to study whether the traumatic experience will affect family's commercial insurance expenditure.

Based on the setting which regards the great famine as an exogenous shock (Chen & Zhou, 2007), we conduct the difference-in-difference (DID) strategy to analyze. We find that those who experienced more severe famine in the youth and adulthood significantly increased the expenditure on commercial insurance. After controlling for variables such as personal income, gender, and the number of family members, the above conclusion is still valid. Then we conduct the common trend test. We change the observations to the group that has not experienced the great famine and uses the same method to test, we find that the impact disappears, verifying that it is the famine that causes the increase in the expenditure of commercial insurance.

In addition, this paper attempts to explain the reasons for the increase in commercial insurance demand caused by the experience of the Great Famine from two channels: individual health and risk preference. One possible way that traumatic memories can affect commercial insurance expenditure is that, after the famine, the householder is not optimistic about his current or future health status. Thus, he/she will buy commercial insurance as a guarantee to prevent a decline in health status in the future and avoid bringing a huge burden to the family. This paper tests the assumption by adding three variables measuring personal health status, namely "BMI value," "height," and "self-reported health status" in the original model. After adding these variables, we find that the significance and value of the coefficients of core explanatory variables have not changed significantly. Therefore, individual health status is not the main reason for the increase in commercial insurance demand. Secondly, from the perspective of individual risk preference, the traumatic experience of the Great Famine is impressive to individuals. After this experience, people may be more risk-averse and hope to increase insurance purchases to improve their security. This paper indirectly discusses the risk preference of individuals who have experienced famine. We find that the individual's willingness to buy risk assets decreases significantly after experiencing famine, which reflects that the individuals who have experienced famine have greater risk aver-

sion than those who have not experienced famine. Therefore, it is more likely that the famine experience makes the individual more risk aversion and then increases the expenditure of family's commercial insurance.

The main contribution of this paper is to cut in from a new perspective, enrich the research on the influencing factors of commercial insurance demand, and help us better understand the impact of early traumatic memory on future commercial insurance expenditure behavior. The rest of our paper proceeds as follows. In section two, we review the past literature and the theoretical assumptions. Section three provides the data sources, variables, and descriptive statistics; In section four, we provide the results of the model estimation, perform robustness tests, and discuss the impact channels. The last part concludes the whole paper.

2 Literature Review

Commercial insurance purchase is affected by many factors. Hopkins & Kidd (1996) found that personal income, education, and other factors will affect commercial insurance expenditure. People with higher income are more able to buy commercial insurance, but at the same time, the impact of income growth on commercial insurance expenditure turns out to be S-shaped. In the early stage, due to lack of awareness, the demand for insurance grows slowly, and then economic ability allows individuals to increase insurance expenditure. When the demand for risk protection is relatively satisfied, the growth of insurance expenditure is relatively slow (Ye Minghua, 2009). In addition, the more educated individuals are, the more conscious they are to buy commercial insurance. Shi & Xu (2021) found that the level of education has a positive impact on the purchase behavior of commercial insurance. Compared with those with lower education, people with higher education are more likely to buy commercial insurance and spend a larger proportion on the purchase of commercial insurance. Furthermore, the availability and sufficiency of national or regional social security systems will also affect the choice of commercial insurance. For example, Cutler & Gruber (1995) believe that improving national social insurance will squeeze out the demand for commercial insurance, and commercial and social insurance can play a complementary role. However, no scholars have studied the impact of traumatic memories on family commercial insurance expenditure. According to psychologists' research,

traumatic memory has a long-term or permanent impact on people. They have recognized the importance of childhood in people's growth, and the special experience in the early years will affect individual cognitive preferences. Based on these research and theories, this paper studies the impact of traumatic memories on individuals' family's commercial insurance expenditure.

We take the Great Famine that occurred in China from 1959 to 1961 as a natural experiment to study the impact of traumatic memories on family's commercial insurance expenditure. Scholars agree that the famine was a sudden and natural shock. Also, since China's long-standing household registration system restricts the free movement of people between regions, it is difficult for people to escape this disaster by moving across provinces (Xiaoquan Wang et al., 2015). Therefore, using the experience of the Great Famine between 1959 and 1961 as an exogenous shock can resolve the endogeneity problem well.

Many scholars have studied the long-term effects of the Great Famine on those individuals who experienced it. The experience of the Great Famine may affect the health status of individuals, their career choice, charitable donations, savings, etc. Chen & Zhou (2007) found that the group's average height born in 1959 was 3.03 cm lower than the normal people who did not experience the famine. Guangrong Ma (2011) found that for infants who experienced famine within 12 months of birth, the more severe the famine, the poorer health and a higher rate of obesity. Similarly, Meng Qian (2015) found that famine experience had a negative impact on individual height and health. Xiaoquan Wang, et al. (2015) found that individuals who experienced more severe famine in their early years were more unwilling to choose self-employment. Nianxing Xu and Zhe Li (2016) found that found that CEOs who experienced famine in childhood also had higher levels of charitable giving. Lingguo Cheng and Ye Zhang (2011) found that individuals who experienced famine in their early years showed a higher propensity to save. Every 1% increase in the severity of famine, household saving has subsequently risen by 23-26%. Yinan Yang et al. (2018) found that farmers who experienced the famine also had higher pay grades for the"New Rural Insurance". Based on these scholars' research on the impact of the Great Famine, we raised a new question: will the traumatic memories produced by the Great Famine affect a family's commercial insurance expenditure? This is the core question that this paper intends to resolve.

According to the Adverse Selection Theory of Information Economics, due to

market inefficiency caused by information asymmetry, those with higher risk are more willing to buy insurance, so traumatic memories may affect individual's risk preference, and then affect family's commercial insurance expenditures. Some scholars have studied some channels in which traumatic memories affect individual's household insurance expenditures. Wolfe and Goddeeris (1991) found that the higher the personal health risk, the more likely they are to buy health insurance. Moreover, using US federal medical data, he found that the more medical expenses the elderly spent in the previous period, the greater the probability of purchasing supplementary medical insurance in the next period. In addition, personal preferences can also have an impact on commercial insurance expenditures. Turnbull (1983) found that the more risk averse an individual is, the more likely he is to be insured, and the deductible will be lower if he insures more types of insurances. Also, personal preferences are not static, but will change with a series of factors, for example, the impact of natural disasters will affect personal endogenous preferences. Ulrike Stefan (2011) believe that the Great Depression will affect the risk preferences of those who experienced it at that time, making them more risk averse. Basing on previous research, the second half of this paper will verify the channels through which famine experience affects family's commercial insurance expenditures from two aspects: individual health status and risk aversion.

3 Data and Statistics

This paper uses the data of China Family Panel Studies (CFPS) in 2010, which tracks more than 14,000 households in 25 provinces (cities and autonomous regions) across the country. The core explanatory variable of this paper is the expenditure of family's commercial insurance, which is characterized by "your family's commercial insurance expenditure in the past year" in the survey. In addition, this paper also constructs a dummy variable "whether the family buys commercial insurance," to explore the change in commercial insurance purchase probability. If the commercial insurance expenditure is greater than 0, the variable is taken as 1; otherwise, it is 0. The core explanatory variable is the severity of the famine, which is measured by the excess mortality of each province. This paper uses the excess mortality rate from 1959 to 1961 calculated by Xinzheng Shi (2011) to mea-

Table 1: Excess Mortality Rate by Province in 1960 (per mil)

Province	Excess Mortality	Province	Excess Mortality
Beijing	0.97	Shandong	11.73
Tianjin	2.13	Henan	28.77
Hebei	5.22	Hubei	10.53
Shaanxi	2.1	Hunan	17.17
Inner Mongolia	-1.13	Guangdong	6.3
Liaoning	3.32	Guangxi	18.11
Jilin	0.47	Sichuan	41.11
Heilongjiang	0.87	Guizhou	37.58
Shanghai	0.35	Yunan	11.55
Jiangsu	8.02	Shanxi	0.88
Zhejiang	2.54	Gansu	28.82
Anhui	58.28	Qinghai	29.82
Fujian	11.1	Ningxia	2.82
Jiangxi	4.57	Xinjiang	2.86

sure the degree of famine in each province. Table 1 shows the excess mortality rate of each province from 1959 to 1961. As can be seen from the data in Table 1, Anhui, Sichuan, Guizhou, Gansu provinces were the most affected areas from 1959 to 1961, while Shanghai, Inner Mongolia, and other places were less affected by the famine.

To further describe the impact of famine at different ages, we divided the householders into five groups according to the age at the time of famine: unborn at the time of famine (cohort1), infancy (cohort2: 0-3 years old), early childhood (cohort3: 3-12 years old), youth (cohort4: 13-18 years old) and adulthood (cohort5: more than 18 years old). Among them, cohort1 (unborn at the time of famine) is used to compare with the population who had experienced famine. Table 2 shows the mean value of each variable in the five birth cohorts. It is found that the proportion of insurance expenditure in income is significantly higher for householders who experienced the famine in their youth (cohort4: 13-18 years old) and adulthood (cohort5: more than 18 years old) than in other ages. Table 3 introduces the definition and measurement of variables.

Table 2: Statistical Description of each Cohort

Birth Cohort	**Unborn**	**Infancy 0-3**	**Early childhood 3-12**	**Youth 13-18**	**Adulthood over 18**
Commercial insurance expenditure /Total income	0.09	0.03	0.06	0.23	0.18
Income (¥)	14209	11771	10762	7389	5793
Gender	0.75	0.71	0.73	0.76	0.7
Years of education	7.9	8.8	7.3	5.7	4.5
BMI	22.7	22.9	22.3	21.6	20.5
Health (self-reported)	1.8	1.8	2	2.1	2.3
Heights	164.2	164.2	162.7	159.1	156.3
Sample Size	2966	708	1446	1405	1247

Table 3: Variable Identification

Variables	**Description**
Dependent Variables	
expense	The expenditure of the commercial insurance
buy	Dummy variable, whether to buy commercial insurance
Independent Variables	
deathrate	Excess mortality during famine
*D2*deathrate*	Interaction between infantile cohort and excess mortality
*D3*deathrate*	Interaction between the early-childhood cohort and excess mortality
*D4*deathrate*	Interaction between the youth cohort and excess mortality
*D5*deathrate*	Interaction between adulthood cohort and excess mortality
Controlled Variables	
income	Income
gender	Gender
retirement	Retire or not
edu	Years of education
BMI	BMI value, i.e. (weight (kg)/height^2(m^2))
height	Height
health	Health (self-reported)
n	Number of Family Members

4 Empirical Strategy

According to the previous description, the 1959-1961 Great Famine provides a natural experiment to estimate the impact of famine experience on family's com-

mercial insurance expenditure. Referring to the setting of Chen & Zhou (2007), this paper constructs the interaction term between birth cohort and mortality to conduct the difference-in-difference (DID) strategy:

$$expense_{ijt} = \alpha + \beta * deathrate_j + \gamma \sum_{2}^{5} D_{it} + \phi \sum_{2}^{5} D_{it} * deathrate_j + \mu X_i + \epsilon_{ijt} \quad (1)$$

$$buy_{ijt} = \alpha + \beta * deathrate_j + \gamma \sum_{2}^{5} D_{it} + \phi \sum_{2}^{5} D_{it} * deathrate_j + \mu X_i + \epsilon_{ijt} \quad (2)$$

In this model, $expense_{ijt}$ is the amount of household commercial insurance expenditures in the survey year. buy_{ijt} is a dummy variable to measure whether the householders purchase commercial insurance or not. $deathrate_j$ is the excess mortality rate in each province during the famine, which measures the severity of the famine in each province. D_{it} is a dummy variable representing whether individual i is in a particular (infantile, early childhood, youth, and adulthood) birth cohort. D_{it}*$deathrate_j$ is the interaction term between birth cohort and excess mortality rate, and its coefficient represents the long-term effect of famine. X_i are other control variables, including income, gender, years of education, number of household members, etc. The subscripts i, j, and t represent individual i in province j of birth cohort t.

5 Results

5.1 Impact of the Great Famine on Family's Commercial Insurance Expenditures

Run the regression (1) & (2) and Table 4 shows the result of the impact of famine experienced by different age groups on their family's commercial insurance expenditures. This paper focuses on the value and significance of the coefficients on the interaction terms between the birth cohort and the excess mortality ($Di * deathrate$).

Table 4: Impact of the Great Famine on Family's Commercial Insurance Expenditure

Variables	(1) Commercial insurance expenditure	(2) Commercial insurance expenditure	(3) Commercial insurance or not	(4) Commercial insurance or not
deathrate	-9.375***	-4.872	-0.000496	4.89e-06
	(3.127)	(3.058)	(0.000412)	(0.000409)
D2	-4.604	43.05	-0.0258	-0.0292
	(163.7)	(149.9)	(0.0194)	(0.0189)
D3	-35.30	116.6	-0.0349***	-0.0198*
	(110.1)	(99.58)	(0.0118)	(0.0119)
D4	-320.4***	-126.1	-0.0661***	-0.0407***
	(109.2)	(104.3)	(0.0136)	(0.0142)
D5	-552.3***	-285.1***	-0.123***	-0.0824***
	(98.74)	(95.70)	(0.0112)	(0.0125)
D2*deathrate	-4.069	-3.566	0.000327	0.000424
	(6.009)	(5.714)	(0.00105)	(0.00102)
D3*deathrate	-1.521	-1.480	-0.000717	-0.000638
	(3.947)	(3.859)	(0.000539)	(0.000534)
D4*deathrate	8.275*	8.323*	-0.000159	-0.000107
	(4.559)	(4.616)	(0.000589)	(0.000588)
D5*deathrate	14.32***	13.09**	0.00151**	0.00136**
	(5.377)	(5.396)	(0.000614)	(0.000618)
income		0.0205***		1.56e-06***
		(0.00624)		(3.35e-07)
gender		-108.8**		-0.0197***
		(49.28)		(0.00719)
retirement		-8.792		0.00597***
		(6.849)		(0.000748)
edu		24.41***		0.00126
		(7.234)		(0.000838)
n		4.773		0.00149
		(29.58)		(0.00328)
Constant	596.5***	74.88	0.147***	0.0889***
	(92.00)	(95.63)	(0.00925)	(0.0132)
Observations	9,581	9,581	9,581	9,581
R-squared	0.005	0.043	0.014	0.037

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

After controlling for individual characteristics (gender, years of education) and household characteristics (household income, number of household members, etc.), it is found that those who experienced more severe famine in the youth and adulthood period significantly increased the expenditure on commercial insurance. Specifically, for individuals experiencing famine in their youth, each 1% increase in famine severity was associated with an increase in family commercial insurance expenditure of ¥83.23; for individuals experiencing famine in their adulthood, each 1% increase in famine severity was associated with an increase in family commercial insurance expenditure of ¥130.90. Besides, experiencing famine in adulthood significantly increases the probability of purchasing commercial insurance, specifically by 1.36% for each 1% increase in famine severity, which is significant at the 5% level. Then we focus on the control variables and find that the coefficient of *income* and *edu* is positive and significant at the 1% level, indicating that an increase in income or level of education significantly increases the household's expenditure on commercial insurance.

5.2 Robust Test

5.2.1 Common Trend Test

Although the above results show that people who experienced more severe famine in the youth and adulthood period significantly increased the family's commercial insurance expenditure, we may still miss some critical variables. The omission of key variables will cause endogenous problems. Therefore, it is necessary to test whether the common trend assumption is satisfied. It is assumed that different birth cohorts should have the same trend in the expenditure and probability of commercial insurance. The approach of this paper is to take five groups of birth cohorts in the period without famine and reuse the above difference-in-difference method for regression. Suppose the interaction term coefficient between birth cohort and mortality is not significant. In that case, it verifies that the famine experience impacts the family's commercial insurance expenditure and willingness to buy instead of factors not observed in this paper.

Therefore, this paper selects a sub sample who born after the great famine, conducts the DID strategy, and controls the factors of income, gender, years of education and the number of family members. The birth cohorts selected in this

Table 5: Common Trend Test

Variables	(1) Commercial insurance expenditure	(2) Commercial insurance or not
deathrate	4.580	-0.000281
	(9.754)	(0.000677)
d2	-210.4	-0.00552
	(235.1)	(0.0354)
d3	-521.3*	-0.108***
	(295.9)	(0.0379)
d4	-646.9**	-0.138**
	(257.1)	(0.0547)
d5	-563.2***	-0.180***
	(214.6)	(0.0278)
d2*deathrate	-0.570	0.000689
	(10.86)	(0.00112)
d3*deathrate	7.996	0.00181
	(13.22)	(0.00121)
d4*deathrate	-0.481	-0.000241
	(10.88)	(0.00137)
d5*deathrate	5.624	0.000831
	(10.78)	(0.000866)
Observations	2,453	2,453
R-squared	0.070	0.058
	0.070	0.058

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

paper are five age groups: 1972-1976 (d_1), 1977-1981 (d_2), 1982-1986 (d_3), 1987-1991 (d_4) and 1992-1996 (d_5). Taking 1972-1976 (d_1) as the benchmark group, we also add the interaction terms ($di * deathrate$) into the regression model. The regression results are shown in Table 5. We find that the coefficients of the interaction terms $d4 * deathrate$ and $d5 * deathrate$ are not significant. The results show that the increase in commercial insurance expenditure is indeed the impact of the great famine.

5.2.2 Robustness Test for the Sample

Since there may be population migration between the Great Famine and the survey in 2010, the inconsistency between the survey location and the famine location may lead to misjudgment of the severity of the famine experienced by the householder. Therefore, we remove the cities with high population migration rates in the 2000 census and the scope of CFPS: Shanghai, Heilongjiang Province, and Xinjiang Uygur Autonomous Region, and reuse the DID strategy for the regression test again. The results show that the famine experience in adulthood (over 18 years old) positively increases the family's commercial insurance expenditure and willingness to buy. However, compared with the previous results, the significance and value of the interaction term coefficient decreased. There may be some reasons. The first reason is that the famine in the three provinces and cities from 1959 to 1961 had a minor impact; The second reason is that Shanghai and Heilongjiang Province are the regions with many households in the survey. After removing these three provinces and cities, the sample size decreased significantly, affecting the results' significance. However, the sign of the coefficient of interaction item remains unchanged and significant, which can still support the conclusion that the famine experience of the householders will significantly improve the expenditure and willingness to buy of the family's commercial insurance.

5.2.3 Examine the Channel

This paper further attempts to explain why householders who have experienced famine increase their family's commercial insurance expenditure and willingness to buy from two perspectives: individual health and risk preference.

First, from the perspective of individual health, Chen & Zhou (2007) found that the average height of the group born in the early year of famine (1959) is 3.03 cm lower than that of normal people who did not experience famine. Guangrong Ma (2011) found that individuals who experienced famine within one-year-old had worse health and higher obesity probability. Thus, we assume that famine may affect one's health level, so that the householder is not optimistic about their current or future health status and is more willing to buy commercial medical insurance as a guarantee to prevent the decline of health status in the future which may bring a huge burden to the family. The article of Xiaoquan Wang et al. (2015)

Table 6: Robustness Test for the Sample

Variables	(1) Commercial insurance expenditure	(2) Commercial insurance expenditure	(3) Commercial insurance or not	(4) Commercial insurance or not
deathrate	-5.009*	-2.993	-0.000318	-2.11e-05
	(2.977)	(2.897)	(0.000432)	(0.000426)
D2	-194.5	-148.8	-0.0589***	-0.0580***
	(135.1)	(125.3)	(0.0203)	(0.0201)
D3	-91.03	13.85	-0.0605***	-0.0472***
	(107.8)	(102.1)	(0.0126)	(0.0124)
D4	-262.1**	-109.6	-0.0651***	-0.0419***
	(107.0)	(103.1)	(0.0153)	(0.0151)
D5	-410.5***	-211.2**	-0.116***	-0.0826***
	(103.5)	(104.1)	(0.0129)	(0.0133)
D2*deathrate	3.353	2.990	0.00156	0.00155
	(4.743)	(4.624)	(0.00107)	(0.00105)
D3*deathrate	0.685	1.392	0.000194	0.000335
	(3.739)	(3.721)	(0.000555)	(0.000548)
D4*deathrate	6.343	6.872	-0.000192	-9.21e-05
	(4.506)	(4.563)	(0.000623)	(0.000618)
D5*deathrate	9.556*	9.747*	0.00129**	0.00131**
	(5.652)	(5.697)	(0.000656)	(0.000660)
income		0.0160***		1.85e-06***
		(0.00508)		(5.38e-07)
gender		-77.06*		-0.0142*
		(46.74)		(0.00774)
retirement		-4.356		0.000776
		(6.545)		(0.000859)
edu		26.34***		0.00557***
		(5.794)		(0.000851)
Constant	466.0***	61.51	0.142***	0.0851***
	(90.06)	(90.60)	(0.0102)	(0.0129)
Observations	8,206	8,206	8,206	8,206
R-squared	0.002	0.025	0.014	0.037

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

provides a test method, that is: suppose these health factors are the main channel that famine experience affects the purchase behavior of commercial insurance. In that case, the impact of famine on commercial insurance expenditure will be significantly reduced or disappear after adding these health factors in the main regression of this paper. After adding the variables of individual height, BMI value ($weight/height^2(kg/m^2)$), and self-reported health status into the original main regression, we focus on whether the value and significance level of the coefficients of the core explanatory variable change. Table 7 shows that the significance of interaction item $D4 * deathrate$ and $D5 * deathrate$ has not changed. The degree of impact has not decreased, which is still significant at the significance level of 10% and 5%, respectively. It indicates that the health status of householders is not the main channel that famine experience affects the family's commercial insurance expenditure.

The second possible channel is risk preference. Personal preference is not invariable but will change with a series of factors. According to the endogenous preference hypothesis, natural disasters will affect individuals' endogenous preferences. For example, Malmendier Nagel (2011) believed that the Great Depression would affect the risk preference of those who experienced it at that time and make them more risk-averse. We also think that people who have experienced the Great Famine are deeply impressed by such a natural disaster. The challenging experience of the disaster makes people unwilling to take greater risks and increases the family's commercial insurance expenditure. Therefore, this paper attempts to test whether the samples in this paper are more risk-averse. The results of the regression are shown in Table 8. The first column represents the results of the participation in the financial market for the selected samples. We can see that the financial market participation is lower than that of individuals who have not experienced famine, which indicates that individuals who experienced famine have a greater risk aversion; The second column represents the participation in the bond market. The second column represents the participation in the bond market. We can see that the participation in the bond market of individuals who experienced famine in their youth is significantly lower, which is significant at the 10% level. These results prove the risk aversion hypothesis of famine sufferers that early famine sufferers are more reluctant to take risks and are more willing to increase their expenditure on family's commercial insurance.

Table 7: Results of Controlling Health Status

Variables	(1) Commercial insurance expenditure	(2) Commercial insurance expenditure	(3) Commercial insurance expenditure	(4) Commercial insurance expenditure
deathrate	-4.627	-4.569	-4.788	-4.728
	(2.954)	(2.952)	(2.963)	(2.964)
D2	32.00	27.56	33.97	28.70
	(154.3)	(154.3)	(154.2)	(154.3)
D3	114.2	107.7	116.0	108.4
	(104.7)	(104.8)	(104.7)	(104.9)
D4	-107.8	-115.2	-106.7	-117.6
	(105.8)	(106.3)	(105.8)	(106.6)
D5	-237.1**	-249.8***	-253.0***	-266.0***
	(93.17)	(93.84)	(94.03)	(94.94)
D2*deathrate	-3.909	-3.578	-3.902	-3.585
	(5.731)	(5.726)	(5.745)	(5.735)
D3*deathrate	-1.601	-1.549	-1.797	-1.720
	(3.787)	(3.788)	(3.785)	(3.784)
D4*deathrate	8.329*	8.311*	7.880*	7.924*
	(4.492)	(4.496)	(4.477)	(4.482)
D5*deathrate	13.33**	13.12**	12.79**	12.71**
	(5.323)	(5.309)	(5.286)	(5.283)
income	0.0200***	0.0201***	0.0202***	0.0203***
	(0.00622)	(0.00620)	(0.00622)	(0.00620)
gender	-106.2**	-124.1**	-131.8***	-129.0***
	(52.52)	(48.31)	(48.21)	(49.33)
edu	21.17***	21.84***	23.34***	24.12***
	(7.134)	(7.193)	(7.164)	(7.288)
BMI	22.55***	15.73***		
	(6.285)	(3.594)		
health	-42.99***		-47.07***	
	(15.96)		(16.02)	
height	-2.245**			0.619**
	(0.918)			(0.300)
Constant	85.05	-201.1*	237.1**	40.01
	(108.1)	(112.9)	(107.6)	(97.77)
Observations	9,581	9,581	9,581	9,581
R-squared	0.044	0.044	0.043	0.043

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: The Relationship between the Famine and Financial Investment

	(1)	(2)
Variables	Financial Market Participation	Bond Market Participation
deathrate	0.000265	0.000328
	(0.000961)	(0.000320)
D2	0.0577	0.0128
	(0.0486)	(0.00959)
D3	0.0736**	0.0103*
	(0.0317)	(0.00572)
D4	-0.0118	0.0208**
	(0.0365)	(0.00931)
D5	-0.0658**	0.0137**
	(0.0306)	(0.00654)
D2*deathrate	-0.00330*	-0.000524
	(0.00195)	(0.000383)
D3*deathrate	-0.00485***	-0.000442
	(0.00125)	(0.000299)
D4*deathrate	-0.00310**	-0.000693*
	(0.00132)	(0.000362)
D5*deathrate	-0.00215**	-0.000465
	(0.00107)	(0.000302)
Constant	0.172***	0.000567
	(0.0446)	(0.00522)
Observations	3,089	3,093
R-squared	0.060	0.005
	(7.134)	(7.193)
BMI	22.55***	15.73***
	(6.285)	(3.594)
health	-42.99***	
	(15.96)	
height	-2.245**	
	(0.918)	
Constant	85.05	-201.1*
	(108.1)	(112.9)
Observations	9,581	9,581
R-squared	0.044	0.044

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6 Conclusion

This paper studies the impact of traumatic memories on the family's commercial insurance expenditure. Taking the Great Famine in China from 1959 to 1961 as a natural experiment, this paper uses the cross-sectional data of CFPS in 2010 and conducts the difference-in-difference (DID) strategy to establish the regression model. The results show that those who experienced more severe famine in the youth and adulthood period significantly increased the expenditure on commercial insurance. Besides, experiencing famine in adulthood significantly increases the probability of purchasing commercial insurance. Specifically, for individuals experiencing famine in their youth, each 1% increase in famine severity was associated with an increase in family commercial insurance expenditure of ¥83.23; for individuals experiencing famine in their adulthood, each 1% increase in famine severity was associated with an increase in family commercial insurance expenditure of ¥130.9. And the probability of purchasing commercial insurance increases by 1.36% for each 1% increase in famine severity.

Furthermore, we carry out the common trend test and sample robustness test to test the robustness of the results. Besides, We further examine the channels of the impact of famine experience on commercial insurance expenditure. We find that individual health status is not the main reason for the increase in commercial insurance expenditure; more likely, the experience of famine makes individuals more risk-averse, which in turn increases the cost of commercial insurance.

This paper studies the long-term impact of traumatic memories on people. It helps us better understand the impact of early traumatic memories on future commercial insurance expenditure behavior. There may exist other possible channels that cause the increase in family's commercial insurance expenditure, for example, traumatic memories may affect one's willing to give birth. Therefore, we hope to explore the internal mechanism of the impact of traumatic memories on family's commercial insurance expenditure more directly and carefully in the future.

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