Long Run Impact of Traumatic Experience on Attitudes toward Risk: Study of Korean War and Its Impact on Risk Aversion*

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Abstract

A number of previous studies show that short run impact of traumatic experience on risk attitudes. The direction of impact is mixed, as short run emotional effect dominates measured alterations in risk attitudes. This paper studies the long run impact of traumatic event on risk attitude formation, after the short run emotional effect dissipates by investigating if early childhood exposure to a war affects risk attitudes, using a survey data from South Korea. We use hypothetical lottery questions in the survey, conducted on approximately 8,000 individuals in South Korea. South Korea went through a devastating civil war from 1950 to 1953 that eventually left two Koreas divided until today. Unlike short-run impact studies, we find that a long run impact, mainly from the change in the shape of respondents' innate utility function is limited to a specific age group. We find that CRRA risk aversion parameter is significantly affected by the war for respondents who had early childhood exposure to the war. A corroborative analysis of South Korean presidential election survey from 2007 also shows that political conservativeness of the same age group of respondents is significantly affected by the war.

Keywords: Risk aversion, Conflict, War, Childhood trauma.

JEL Classification: C81, D03, D80, D81.

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1. Introduction

Decision under uncertainty is prevalent in many settings of economic decision making hence, risk preference measurement is fundamental in many economic models concerning insurance, asset valuation and contract. Risk attitudes are determined by many channels including cognitive abilities, emotions and parental behavior (Trimpop et al., 1999, Zaleskiewicz, 2001, Benjamin et al., 2005, Loewenstein et al., 2001). Economic decision making is influenced and determined by socioeconomic background, but studies of whether the underlying preferences such as risk attitudes should be affected by a traumatic experience in a long run is surprisingly rare. There are attempts to estimate short run impact of traumatic experience on risk aversion. Cassar et al. (2011) specifically analyzes how 2004 Asian tsunami affected risk attitudes using experiment on 334 Thai subjects. They show that, using interval regression method, subjects who experienced the disaster are more risk averse. Cameron and Shah (2010) use experimental data from Indonesia to show that subjects previously exposed to floods and earthquakes exhibit more risk aversion that the subjects who do not, mainly because subjects who are exposed perceive that they are already exposed to a greater risk to natural disasters. Psychological study by Sacco et al. (2003) finds an indirect effect of traumatic event on risk aversion; after 9/11 terrorist attack, the experiment on Italian subjects show that their risk aversion increase. In the short run, Eckel et al. (2009) finds that short-term stress may be attributable to an increase in risk-seeking behavior for the experimental subjects who are exposed to Hurricane Katrina immediately after the disaster. Li et al. (2011) also finds that Chinese subjects after a month of unprecedented snowstorm and two months after a major earthquake display more risk aversion in a loss domain and simultaneously less risk aversion in a gain domain.

In this paper, we study if exposure to major conflict alters individual risk aversion in a long run for a specific age group only and if the direction of long run impact increases or decreases risk aversion. We structurally estimate if exposure to Korean War changes risk preferences of the adult South Korean population using hypothetical lottery questions from longitudinal survey of approximately 8,000 individuals. We construct a dummy variable that indicates if subjects experienced war in their early childhood using a survey dataset called Korean labor and income panel study (KLIPS), an annual representative longitudinal panel survey of individuals from

5,000 households in South Korea.[1] We exploit the uniqueness of a large-scale civil war that swept the nation and a large survey dataset to control for the war exposure and other individual characteristics including gender, age, education level, marital status and annual income.

Some argue that risk attitudes are mainly hereditary and not due to environmental effects, consistent with behavioral genetics view of risk taking (Zhong et al, 2009). Block and Robins (1993) also argue that personality formed in childhood is not retained in adulthood. This would imply that individual utility function is not fundamentally altered by even an extreme external shock once short-run emotional shock dissipates. However immigrant children born in domestic country seems to have risk attitudes more similar to the natives than their parents' home country (Bonin et al., 2006). Based on the nationally represented household data from Sierra Leone, Bellows and Miguel (2009) indicates that exposure to war violence has significant impact on political and economic behaviors.

There are numerous studies that analyze the long run impact of early exposure to war on physical and mental health outcomes. Kesternich et al. (2012) shows that through hunger, persecution and absence of the father, the Second World War had a detrimental health effect such as increased incidence of diabetes, heart conditions, depression, using Survey of Health, Aging, and Retirement in Europe in 2009. Akresh et al. (2011) studies the impact of Nigerian civil war (1967-1970) using the Nigerian Demographic and Health Survey of 2003 and 2008 to show that there is significant long run impact of the war on reduction of stature for respondents exposed to the war between birth and adolescence. Cassar et al. (2011) shows that direct fighting experience during Tajik civil war (1992-1997) has positive effect on trust, reciprocity and a sense of fairness, using surveys and experimental evidence.

To summarize our findings, we show that CRRA risk aversion parameter of respondents who were 4 to 8 years of age at 1950, when Korean War impact on civilians was at its height (Lee, 2011), increases by 0.17. After controlling for individual heterogeneity including gender, age, education, marital status and income, war impact on risk attitudes for respondents who were older than the 4 to 8 age group was insignificant. We performed the identical analysis for respondents who were 9 to 12 at 1950 and found that risk parameter is unaffected for the age

[1] For more information about KLIPS, see http://www.kli.re.kr/klips/en/about/introduce.jsp.

group. As a corroborative analysis, we used 2007 Presidential Election Panel Study (PEPS) of South Korea, conducted on approximately 3,500 adult population of South Korea, to study if the identical age group has behavioral discrepancy. Running the identical analysis on the respondents from the different dataset, we found that the self-assessed degree of conservatism and voting for conservative candidates both increase for the 4 to 8 age group in 1950 and respondents who are older than them do not have statistically significant discrepancy in their voting behavior.

2. Data

2.1 Korean War

Korean War lasted for three years in Korean peninsula between South Korea, supported by 16 allied countries led by the United States, and North Korea, supported by China and Soviet Union. Approximately 1 million soldiers from either side participated in the war. By the time the war ended in 1953, resulting in division of Korea, nearly 2 million civilians were wounded or killed during the war. As the population of Korea was about 30 million in 1950, the war was a devastating experience for Koreans at the time. During the war, more than 120,000 guns were lost, more than 100 tons of grains were lost, and more than 250,000 South Korean students were brought to the war (Kim, 1996). As per the civilian damage approximately 22,000km or 63% of landline communication system was destroyed; approximately 1.2 million war refugees had to temporarily leave home in South Korea; and more than 4,000 schools were completely destroyed (Kim, 1996).

Korean War is distinctive in that although the war lasted for 3 years, the majority of war damage by civilians was concentrated on the first 9 months of the war, following the unexpected invasion of North Korea (Lee, 2011). Therefore, the characteristic of Korean War makes it an ideal event to study long run impact of the war. In this paper, we use two measures of civilian damage by the war. The first measure is number of wounded and killed civilians that provides an estimate of per province damage by the war (See Table 1). Table 2 shows the second measure of

war damage by year, number of police injuries and death during the war.[2] Data presented in Table 2 is quite consistent with Lee, that 1950 was the year that caused the most civilian damage.

2.2 Sample

The KLIPS is a longitudinal survey of individuals aged 15 or older from approximately 5,000 households in Korea. The KLIPS is taken annually at a face-to-face meeting when possible. The first wave is conducted in 1998 for 13,321 individuals in 5,000 households and consists of household survey and individual survey. Hypothetical lotteries are included in 7th and 10th waves. We use 7th wave of KLIPS for our main analysis, as Kim and Lee (2012) found that repeat exposure to identical hypothetical lottery questions in a longitudinal survey drastically increases probability of inconsistent answers and deviations from expected utility theory. The 7th wave is conducted on 11.661 individuals from 4,762 households.

We removed respondents who did not personally participate in the interviews because individual characteristics must match the person who answers the hypothetical risk questions. We kept adult population aged between 20 and 85 for our analysis. Gender, age, education, marital status, place of birth, and residence at 14 were gathered from individual survey; household income was gathered from household survey and was matched to the individual data using personal identification number.

For our corroborative analysis, we used 2007 PEPS. The PEPS is conducted by phone interviews on 3503 adult individuals of voting age. Six waves of phone interviews were conducted from April 2007 to December 2007. We use the 6th wave of the survey, the only post-election survey, as the last wave contains the information about the actual voting outcome on 2007 South Korean presidential election. There were ten candidates who finished the race and five of them gained more than 3 percent of the vote. Among the five, we treated voting for Lee Myung-Bak (LMB) and Lee Hoi-Chang (LHC)[3], the candidates from conservative parties as a dummy variable for conservative vote. Self-assessed conservatism index from the scale of 0 to 10, gender, age, education, place of residence, city size, place of birth and household income

[2] As primary duty of police force is to maintain order in areas that are not active war zones, their loss is a reasonable indicator of civilian damage during the war.

[3] LMB gained 48.7% of the vote and won the election and LHC gained 15.1% of the vote and was the second runner-up in the election.

information were all extracted from the same survey. City size dummy variable shows whether respondents live in metropolis, medium or small cities, or in a rural area. Religion dummy divides respondents into Buddhist, Catholic, Protestant, Confucian, Other and No religion. Education dummy variables indicate less than high school, high school diploma, college degree or graduate school degrees.

2.3. Lottery Questions in KLIPS

KLIPS contains a set of five hypothetical lottery choice questions. Respondents choose between a certainty payment of 100,000 Korean won (KRW) or a lottery payment, probability and payoff varying in each of the five questions, for a day's work. Table 1 summarizes the five hypothetical lottery questions; the first column shows identical certainty option and the second column summarizes risky option that offers different payoffs in different probabilities. For example, the first question asks respondents to choose between a payment of 100,000 KRW and an option of taking a lottery that pays out 50,000 KRW with probability of 0.5 and 150,000KRW with probability of 0.5. The order of questions is in the order of question number. For our main analysis we reconstructed KLIPS dataset such that each individual would have five observations per their responses to the five hypothetical lottery questions.

3. Structural Estimation Using Individual Choices

Under the assumption that lottery choices follow expected utility theory, Kim and Lee (2012) showed that power-expo utility function collapses to constant relative risk aversion (CRRA) utility function, as the variation in payoffs is not sufficiently great enough in KLIPS dataset.[4] Therefore, we use CRRA utility function and estimate risk aversion parameter γ for the main analysis:

$$\mathrm{U}(x) = \frac{x^{1-\gamma}}{1-\gamma}$$

[4] Power-expo utility function (Saha, 1993), $\mathrm{U(x)} = (1 - \exp(-\alpha x^{1-\gamma}))/\alpha$, reduces to CRRA when $\alpha = 0$. Kim and Lee (2012) shows that the parameter α is statistically insignificant. The result is expected, as α measures how respondents responses to varying amount of payoffs but KLIPS lottery questions does not seem to have sufficient variations in the amount of payoff (See Table 1).

Then a structural noise parameter μ is introduced, following Luce (1959) and Holt and Laury (2002). Denoting expected utility of option j = A (risk free cash) or B (lottery), the insensitivity of choice probabilities to payoff is captured by μ in the following probabilistic choice index in the form of a cumulative probability distribution function (Andersen et al. 2008):

$$\nabla \mathrm{EU} = EU_B^{1/\mu} / (EU_A^{1/\mu} + EU_B^{1/\mu})$$

As μ approaches zero, the probability of choosing the option with greater expected payoff approaches one. At the other extreme, as μ increases, the choice probability approaches 0.5; the choice becomes random and more and more inconsistent with expected utility theory.

We construct the following conditional log-likelihood, using choices made by survey respondents to the five hypothetical lottery questions:

$$\ln L(\gamma, \mu; y, \mathbf{X}) = \sum_i^N \sum_j^5 ((\ln(\nabla \mathrm{EU}) \,|\, y_i^j = 1) + (\ln(1 - \nabla \mathrm{EU}) \,|\, y_i^j = -1))$$

where i indexes individuals and j indexes lottery question. $y_i^j = 1$ (or -1) denotes that choice made by individual i for jth lottery question is option A (or B). We estimate risk parameter γ and structural risk parameter μ and allow heterogeneity by individual characteristics, denoted by vector of demographic characteristics **X**. **X** includes gender, age, education level, marital status, annual household income and dummy variables indicating early childhood exposure to Korean War.

We first included a dummy variable that indicates certain age group in 1950. The coefficient would represent how the age group has different risk attitudes from other age groups. We tried different age groups and found that risk aversion of age group between 4 and 8 in 1950 were the group most significantly affected by Korean War. Therefore, the indicator dummy for '*Early Childhood Exposure to Korean War*' represents the age group. Then we added an indicator variable for provinces whose injuries and casualties per population was greater than

0.05 as '*Risky Area*' and its interaction term with the age group dummy (See Table 1). Then, the coefficient on the interaction term would indicate how risk aversion parameter γ of the specific age group who were born in the most heavily affected area is different from other age groups and the coefficient on age group dummy would indicate how γ is different for the specific age group who were born in the relatively safer area from other age groups. We then include an interaction term between the age group dummy variable with injuries and casualty per province, based on the province of birth. The coefficient on this variable would show how each percentage increase in war injury and casualty ratio would have a different impact on γ, from other age groups. Finally, we create a measure called age-adjusted exposure to Korean War based on annual police loss data in Table 2 and our finding that long run impact of war on risk attitude occurs in age 4 to 8 age group (See Figure 1). We sum up the police loss for each year each birth year cohort is exposed to the war between 4 and 8. For example, 1944 birth cohort would be 6 in 1950, 7 in 1951, 8 in 1952 and 9 in 1953 and the cohorts' exposure to war between 4 and 8 is from 1950 to 1952. Therefore age-adjusted exposure to Korean War for 1944 birth cohort is the sum of police loss in 1950 through 1952 at 16,940. Table 4 shows summary statistics for the relevant variables.

As a corroborative analysis, we test if the idiosyncratic risk aversion translates to behavioral differences using PEPS data, controlling for individual heterogeneity used for the main analysis. We run the following linear probability model:

$$Voting\ Behavior_i = \beta_0 + \beta_1 Age_i + \beta_2 Age_i^2 + \gamma Age\ at\ 1951_i^{5\ to\ 9} + \boldsymbol{\delta X} + \varepsilon_i$$

where i denotes individual. We use self-assessed conservativeness and actual voting on conservative party candidates as dependent variables. Coefficients β_1 and β_2 measure the age impact on political behavior. The variable of interest is γ, which measures how early childhood exposure to Korean War, represented by respondents who were between 5 to 9 in 1951, affected their risk taking behavior. Vector $\boldsymbol{X}$ includes other individual characteristics such as gender, household income, city size dummy, religion dummy, hometown dummy and education level dummy variables.

4. Estimation Results

4.1 Results for Risk Aversion Parameter

Table 5 shows the estimates of relative risk aversion parameter γ and structural noise parameter μ as a function of individual characteristics. The models (1) to (4) are performed on the entire respondents and the identical sets of models (5) to (8) are performed after all potential movers are removed. KLIPS individual survey provides information about place of birth and residence at age 14 hence we only include respondents whose place of birth matches residence at age 14 for the second set of analysis. As the Table indicates, 1,439 respondents have different place at birth and residence at age 14, and those '*movers*' are excluded in models (5) to (8).

Model (1) estimates how the age group who experienced Korean War in their early childhood has different risk attitudes from other age groups.[5] The CRRA risk aversion parameter γ increases by 0.105 and the coefficient is significant at 1% level, after controlling for age heterogeneity, also a statistically significant coefficient at 0.003 per year. The result suggests that on top of respondents who are older being more risk averse, the age group who experienced the war in their early childhood are even more risk averse than the rest of them. The baseline γ is 0.473 and female, older, more educated an individuals are more risk averse than others. Structural noise parameter estimation also indicates that inconsistency in answering the hypothetical lottery questions increases for male, younger and more educated individuals. Marital income and annual income do not seem to have statistically significant effect on γ and μ.

In models (2) and (3), we introduce '*Risky Area*' dummy variable and its interaction term with '*Early Childhood Exposure to Korea War*' dummy variable. Then, coefficient on '*Risky Area*' dummy measures the impact of early childhood exposure to Korean War for respondents who lived in an area with injury and casualty rate of less than 0.05 on risk aversion. Likewise, coefficient on the interaction term measures the same impact for respondents who have early childhood exposure to Korean War for respondents who relatively have higher chance of injury and death. Model (3) includes a dummy variable that indicates respondents older than the war exposure group. Effects of other personal characteristics are similar to model (1) in magnitude

[5] The 4-8 in 1950 age group are respondents who were born between 1942 and 1946. They were between the ages of 4 to 7 and 8 to 11 during the entire duration of the Korean War. At the time of survey in 2004, they were between 58 and 62.

and significance. The result indicate that respondents who were in relatively safer area are more risk averse but curiously enough, respondents who were in relatively riskier area do not have different risk attitudes from the rest, as the coefficients have no statistical significance. Coefficient for the dummy indicator variable for older than war exposure group in model (3) implies that idiosyncratic response by war exposure group is not common for everyone who is older than certain age group. The increasing trend of risk aversion only stands out for the war exposure group.

The primary difference between two sets of models with and without movers occurs in the interaction term between '*Risky Area*' and '*Early Childhood Exposure to Korean War*'. Model (6) and (7), after excluding potential movers, the curious result in models (2) and (3) is rectified and more intuitive results are presented. Here, respondents who had early childhood exposure to Korean War in a relatively risky area are more risk averse and the ones who were in a relatively safer area are not more risk averse than the rest. Therefore what seems to be a strange result in models (2) and (3) may be from people whose place of birth were different from their residence during the Korean War. After excluding potential movers model (5) indicates that early childhood exposure increases risk aversion, as their estimate of relative risk aversion parameter is greater by 0.072; model (6) indicates that among the respondents who experienced the war in early childhood, specifically only the ones who were likely residing in relatively riskier areas are more risk averse and in much greater magnitude than model (5), as their estimate of relative risk aversion parameter is greater by 0.174; and model (7) shows that risk attitudes discrepancy is not common for all older population, as relative risk aversion estimate of the group who are older than the exposed age group is insignificant. Structural noise parameter estimates are similar in magnitude and direction for the models excluding movers. Estimates of relative risk aversion parameters in models excluding movers suggest that older and male individuals are more risk averse than others. Education level, marital status and income level heterogeneity do not affect risk attitudes.

In model (4) and (8), we estimate relative risk aversion parameter of the interaction term between the early childhood exposure dummy variable with actual injury and casualty ratio per total population. For example, if a respondent was between 4 and 8 in 1950 and the respondent was born in Gangwondo, the interaction term will be 0.115 for the respondent (See Table 2). In

model (4), the coefficient on the interaction term suggests that a percentage increase in injury and casualty ratio of the likely place of residence at Korean War increases risk aversion of the respondents by 0.021. For example, among respondents who experienced the war in their early childhood relative risk aversion parameter of respondents in Gangwondo (injury and casualty ratio of 0.115) is expected to be greater by 0.244 than respondents in Jejudo (injury and casualty ration of 0.001). Model (8), an identical analysis without potential movers, suggests that the difference is slightly smaller at 0.204. The magnitude and direction of relative risk aversion parameter and structural error term of other individual heterogeneity are similar to other models including and excluding potential movers, respectively.

We then use age-adjusted exposure to Korean War to measure the magnitude of exposure to the war based on previous results that long run impact of Korean War exposure to risk attitudes are significant for age group 4 to 8. Model (1) and (2) in Table 6 is analogous to Models (2) and (3) in Table 5. Both models in Table 6 show that age-adjusted exposure to Korean War increases risk aversion of respondents. In model (2), as in model (3) of Table 5, risk aversion of age group that is older than exposed group seems unresponsive to the war. In both models, other relative risk aversion parameters and structural noise parameters are also similar to Table 5.

Table 7 presents similar analysis including and excluding movers but with different definitions for early childhood exposure to Korean War. In this Table, we treat early childhood exposure as age 9 to 12 in 1950, to illustrate the unique variability in risk aversion for age 5 to 9 group and to provide an example of other age range at exposure who does not behave differently from other age groups.[6] Model (1) to (3) in Table 5 are analogous to model (1), (2) and (4) in Table 4 respectively; model (4) to (6) in Table 5 are analogous to model (5), (6) and (8) in Table 4 respectively. The relative risk aversion parameter estimates suggest that experiencing Korean War between 9 and 12 does not significantly alter risk attitudes. Throughout the models, early coefficients on childhood exposure dummy variables are statistically insignificant.

[6] The 9-12 in 1950 age group are respondents who were born between 1938 and 1941. They were between the ages of 9 to 12 and 12 to 15 during the entire duration of the Korean War. At the time of survey in 2004, they were between 63 and 66.

4.2 Results for Behavioral Impact of the Increase in Risk Aversion

In our primary analysis, we present that population who were exposed to the height of Korean War between the ages 4 to 8 are more risk averse than others. Table 8 summarizes the result of our corroborative analysis using a different survey dataset, PEPS that provide information about political decision making and voting behavior. The survey offers the precise age and other demographic characteristics as in KLIPS; hence we can run an identical analysis. We define early childhood exposure to Korean War as 4 to 8 year olds in 1950 at the height of the war, as in our main analysis. We control for other demographic characteristics including age, gender, household income, education level, birthplace, religion, and city sizes.

Model (1) and model (2) take self-assessed conservativeness as dependent variable. Respondents are asked to assess their own conservativeness from scale of 0 to 10. We add a dummy variable indicating that respondent is older than the early exposure to war group in model (2). The results indicate that the degree of conservativeness increases with age, decreases with its quadratic term and increases with annual income for both model (1) and model (2). Model (1) γ estimate suggests that early childhood exposure to Korean War increases their conservativeness by 0.687. Model (2) γ estimate suggests that 4 to 8 age group in 1950 is more conservative by 0.813 but older individuals are not any more conservative than already controlled by age. This also explains why Korean War Veterans Association is one of the most conservative political lobby group in Korea.

In model (3) and model (4) we analyze behavioral impact of early childhood exposure to the war. The dependent variable is a dummy variable that indicates actual voting for conservative party candidates. As with self-assessed conservativeness, probability of conservative party candidate support increases with age, decreases with age squared and increases with household income in both models. Estimate of γ in model (3) suggests that early childhood exposure to Korean War increases probability of conservative candidate support by 0.013. γ in model (4) shows that the exposure increases the conservative candidate support probability by 0.082 but as in model (2), respondents who are older than the control group do not behave differently from what is already controlled by age. The corroborative analysis, run identical to the main analysis, strongly confirms that early childhood exposure to Korean War (4 to 8 at the height of the war in

1950) increases risk aversion and shows a strong risk-taking behavioral translation of the change risk attitudes.

5. Conclusion

Risk attitudes pertain to almost all area of economic decision making, as it is related to economic decision making under uncertainty. Some view the risk attitudes as a fundamental value that is genetically determined; others view it as something that can be altered by environmental factors. We exploit unique circumstances of South Korea where a substantial proportion of population experienced a major civil war and a large survey dataset to estimate long run impact of childhood trauma on risk attitude formation. Our primary analysis shows that early childhood experience of the Korea War sizably increases risk aversion. The results suggest that risk aversion parameter of population who were between 4 and 8 at the height of the war and who were likely to have been living in relatively riskier area increases by 0.17. A short run surge in risk aversion may be attributable to a sudden increase in perceived likelihood of war or emotional response as the fear of negative event increases. Emotional effects of major negative shock may result in increase in risk loving behavior, as previously shown by Li et al. (2010) and Eckel et al. (2009). However, in our dataset, the war ended 51 year prior to the time of the survey and we can assume that it is likely that such emotional effect may have dissipated in large part. At the same time, our analysis indicates that risk attitudes of age group who had early childhood exposure to the war are altered. Therefore we can reasonably assume that the estimated relative risk aversion parameter is a long run impact of childhood trauma on risk attitudes; in this case, the channel through which the war affected risk attitudes is through changing the shape of the utility function.

This study not only shows that early childhood trauma alters risk attitudes, most likely by affecting the shape of the utility function but also suggest age range at which a negative shock affects risk aversion. We confirm the age group of 4 to 8 by presenting surprisingly similar behavioral evidence using a measure of war exposure implied by the result, and a completely different survey dataset. By running an auxiliary analysis with identical control variables we show that age group 4 to 8 during the negative shock has increased tendency to vote for conservative party. Future studies may suggest a neurological link between corresponding brain development of the age group and risk attitude formation.

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Table 1: Injuries and Casualties from Korean War per Population by Provinces

	Province	Number of Injuries and Casualties	Population	War Injuries and Casualties per Population
Risky Area	Gangwondo	130,777	1,137,191	0.115
	Seoul	129,908	1,446,025	0.090
	Jeollanamdo	193,788	3,027,938	0.064
	Chungcheongbukdo	70,003	1,147,590	0.061
Safe Area	Gyeonggido	128,740	2,739,149	0.047
	Jeollabukdo	91,861	2,041,356	0.045
	Chungcheongnamdo	75,409	2,038,081	0.037
	Gyeongsangbukdo	97,851	3,156,484	0.031
	Gyeongsangnamdo	72,301	3,143,522	0.023
	Jejudo	325	254,503	0.001

Source: Population data from 1949 Census of South Korea. War damage data from Kim (1996), p.85.

Table 2: Police Injuries and Casualties from Korean War by Year

Year	Death	Injury	Kidnap	Missing	Total
1950	1,067	3,364	52	6,494	10,977
1951	1,388	2,729	302	518	4,937
1952	469	474	42	43	1,026
1953	209	193	7	29	438

Source: Kim (1996), p.67.

Table 3: Hypothetical Lottery Questions

Question Number	Option A (Safe Choice)	Option B (Risky Choice)	Gap in Expected Payoff (Option A - Option B)
1	100,000	1/2 of 150,000, 1/2 of 50,000	0
2	100,000	1/2 of 200,000, 1/2 of 0	0
3	100,000	2/5 of 200,000, 3/5 of 0	20,000
4	100,000	3/5 of 200,000, 2/5 of 0	-20,000
5	100,000	1/5 of 500,000, 4/5 of 0	0

Source: Kim and Lee (2012)
Notes: All units are in Korean Won. The questions were asked in the order of the question number. Each question was asked for the payment option for a day's work.

Table 4: Summary Statistics of Relevant Variables

	Including Movers*	Excluding Movers
Parameter/Variable	Sample Mean	Sample Mean
Male	0.45 [0.50]	0.44 [0.50]
Age	44.76 [15.23]	45.17 [15.32]
High School Graduates	0.33 [0.47]	0.33 [0.47]
College Graduates	0.32 [0.47]	0.30 [0.46]
Married	0.71 [0.45]	0.71 [0.45]
Annual Income (in millions KRW)	31.97 [35.51]	31.43 [35.10]
Early Childhood Exposure to Korean War (Age 4-12)	0.12 [0.32]	0.12 [0.33]
Early Childhood Exposure to Korean War (Age 4-8)	0.06 [0.24]	0.06 [0.24]
Early Childhood Exposure to Korean War (Age 9-12)	0.05 [0.22]	0.06 [0.23]
Risky Area	0.33 [0.47]	0.33 [0.47]
Risky Area X Early Childhood Exposure to Korean War (Age 4-12)	0.03 [0.18]	0.04 [0.19]
Risky Area X Early Childhood Exposure to Korean War (Age 4-8)	0.02 [0.13]	0.02 [0.13]
Risky Area X Early Childhood Exposure to Korean War (Age 9-12)	0.02 [0.12]	0.02 [0.13]
Early Childhood Exposure to Korean War (Age 4-12) X Casualty Ratio per Total Population	0.005 [0.02]	0.006 [0.02]
Early Childhood Exposure to Korean War (Age 4-8) X Casualty Ratio per Total Population	0.003 [0.01]	0.003 [0.01]
Early Childhood Exposure to Korean War (Age 9-12) X Casualty Ratio per Total Population	0.002 [0.01]	0.003 [0.01]
People Older Than Early Childhood Exposure to War Group (Age 4-8)	0.16 [0.36]	0.17 [0.37]
Number of Observations:	8,486	7,047

Notes: Standard deviations are in square bracket.

Table 5: Maximum Likelihood Estimations of Risk Parameter and Noise Parameter of Respondents Who Had Early Exposure to Korean War (Age 4-8)

	Including Movers*				Excluding Movers			
Parameter/Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
γ	0.473***	0.472***	0.474***	0.503***	0.486***	0.491***	0.488***	0.526***
	(0.077)	(0.077)	(0.077)	(0.090)	(0.082)	(0.082)	(0.082)	(0.097)
Male	-0.099***	-0.102***	-0.099***	-0.106***	-0.120***	-0.120***	-0.120***	-0.125***
	(0.027)	(0.027)	(0.027)	(0.027)	(0.028)	(0.029)	(0.028)	(0.029)
Age	0.003**	0.003**	0.003**	0.002	0.003**	0.003**	0.003**	0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
High School Graduates	0.072**	0.072**	0.071**	0.068**	0.036	0.032	0.035	0.027
	(0.034)	(0.034)	(0.034)	(0.035)	(0.037)	(0.037)	(0.037)	(0.037)
College Graduates	0.092**	0.092**	0.092**	0.083*	0.058	0.057	0.059	0.048
	(0.045)	(0.044)	(0.044)	(0.045)	(0.046)	(0.046)	(0.046)	(0.048)
Married	0.025	0.024	0.025	0.031	0.050	0.050	0.050	0.056
	(0.049)	(0.049)	(0.049)	(0.048)	(0.050)	(0.050)	(0.050)	(0.049)
Annual Income (in millions KRW)	-0.001	-0.003	-0.002	0.005	-0.009	-0.011	-0.010	-0.003
	(0.039)	(0.038)	(0.039)	(0.043)	(0.038)	(0.038)	(0.038)	(0.042)
Early Childhood Exposure to Korean War	0.105***	0.078*		0.099*	0.072*	0.029		0.052
	(0.038)	(0.046)		(0.051)	(0.042)	(0.050)		(0.055)
Risky Area		0.012		0.012		0.002		0.002
		(0.023)		(0.022)		(0.024)		(0.024)
Risky Area X War		0.105		0.104		0.174**		0.173**
		(0.070)		(0.071)		(0.076)		(0.076)
Early Childhood Exposure to Korean War X Casualty Ratio per Total Population			2.139***				1.788**	
			(0.700)				(0.768)	
People Older Than Early Childhood Exposure to War Group				0.046				0.051
				(0.047)				(0.051)
μ	0.260***	0.261***	0.260***	0.260***	0.261***	0.263***	0.261***	0.261***
	(0.044)	(0.044)	(0.044)	(0.043)	(0.048)	(0.048)	(0.048)	(0.047)
Male	0.108***	0.106***	0.108***	0.104***	0.095***	0.094***	0.095***	0.091***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)	(0.020)	(0.019)	(0.019)
Age	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
High School Graduates	0.068***	0.068***	0.068***	0.067***	0.054**	0.053**	0.054**	0.052**
	(0.021)	(0.021)	(0.021)	(0.021)	(0.023)	(0.023)	(0.023)	(0.023)
College Graduates	0.071***	0.071***	0.071***	0.070***	0.056**	0.057**	0.057**	0.056**
	(0.025)	(0.025)	(0.025)	(0.025)	(0.027)	(0.027)	(0.027)	(0.026)
Married	-0.011	-0.011	-0.011	-0.011	0.001	0.001	0.001	0.0004
	(0.027)	(0.027)	(0.027)	(0.027)	(0.028)	(0.028)	(0.028)	(0.028)
Annual Income (in millions KRW)	0.023	0.023	0.022	0.025	0.024	0.024	0.024	0.026
	(0.028)	(0.027)	(0.027)	(0.029)	(0.032)	(0.031)	(0.032)	(0.033)
Wald Test Statistics	26.98***	33.25***	28.13***	34.03***	23.60***	33.36***	25.16***	35.03***
Log Pseudolikelihood	-16,653	-16,650	-16,652	-16,648	-13,698	-13,694	-13,696	-13,692
Number of Observations:	42,430	42,430	42,430	42,430	35,235	35,235	35,235	35,235

Note: Movers are defined as respondents whose place of birth is different from their area of residence when 14. Standard deviations are reported in squared bracket and standard errors are reported in parenthesis. *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level.

Table 6: Maximum Likelihood Estimations of Risk Parameter and Noise Parameter of Respondents Who Had Early Exposure to Korean War Using Age-adjusted Exposure to War (Age 4-8)

Parameter/Variable	Model 1	Model 2
γ	0.474***	0.509***
	(0.077)	(0.090)
Male	-0.100***	-0.105***
	(0.027)	(0.027)
Age	0.003**	0.002
	(0.001)	(0.002)
High School Graduates	0.073**	0.068*
	(0.035)	(0.035)
College Graduates	0.094**	0.084*
	(0.045)	(0.046)
Married	0.026	0.033
	(0.049)	(0.048)
Annual Income (in millions KRW)	-0.003	0.005
	(0.038)	(0.042)
Age-adjusted Exposure to Korean War	0.062**	0.078***
	(0.024)	(0.029)
People Older Than Early Childhood Exposure to War Group		0.050
		(0.048)
μ	0.260***	0.259***
	(0.044)	(0.043)
Male	0.107***	0.105***
	(0.018)	(0.018)
Age	-0.002***	-0.002***
	(0.001)	(0.001)
High School Graduates	0.068***	0.067***
	(0.021)	(0.021)
College Graduates	0.071***	0.070***
	(0.025)	(0.025)
Married	-0.010	-0.011
	(0.027)	(0.027)
Annual Income (in millions KRW)	0.022	0.024
	(0.027)	(0.028)
Wald Test Statistics	25.69***	26.60***
Log Pseudolikelihood	-16,653	-16,652
Number of Observations:	42,430	42,430

Note: Age-adjusted exposure to Korean War was divided by 10,000 for computational convenience. Standard deviations are reported in squared bracket and standard errors are reported in parenthesis. *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level.

Table 7: Maximum Likelihood Estimations of Risk Parameter and Noise Parameter of Respondents Who Had Early Exposure to Korean War (Age 9-12)

	Including Movers*			Excluding Movers		
Parameter/Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
γ	0.469***	0.468***	0.479***	0.483***	0.484***	0.494***
	(0.079)	(0.080)	(0.078)	(0.083)	(0.084)	(0.083)
Male	-0.100***	-0.103***	-0.104***	-0.120***	-0.121***	-0.124***
	(0.027)	(0.027)	(0.027)	(0.029)	(0.029)	(0.029)
Age	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
High School Graduates	0.065*	0.068**	0.064*	0.030	0.033	0.028
	(0.035)	(0.035)	(0.035)	(0.037)	(0.037)	(0.038)
College Graduates	0.084*	0.083*	0.081*	0.051	0.051	0.048
	(0.045)	(0.045)	(0.045)	(0.047)	(0.047)	(0.046)
Married	0.022	0.018	0.022	0.048	0.045	0.048
	(0.050)	(0.050)	(0.050)	(0.051)	(0.051)	(0.051)
Annual Income (in millions KRW)	0.0003	-0.003	0.004	-0.009	-0.012	-0.005
	(0.040)	(0.038)	(0.041)	(0.039)	(0.037)	(0.040)
Early Childhood Exposure to Korean War	-0.011	-0.038		-0.023	-0.055	0.492
	(0.052)	(0.059)		(0.055)	(0.063)	(0.927)
Risky Area		0.012			0.004	
		(0.022)			(0.024)	
Risky Area X War		0.105			0.112	
		(0.110)			(0.113)	
Early Childhood Exposure to Korean War X Casualty Ratio per Total Population			0.671			0.492
			(0.919)			(0.927)
μ	0.262***	0.264***	0.264***	0.264***	0.265***	0.265***
	(0.045)	(0.045)	(0.045)	(0.049)	(0.049)	(0.049)
Male	0.107***	0.106***	0.105***	0.095***	0.094***	0.092***
	(0.018)	(0.018)	(0.018)	(0.020)	(0.020)	(0.019)
Age	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
High School Graduates	0.067***	0.068***	0.066***	0.053**	0.054**	0.052**
	(0.021)	(0.021)	(0.021)	(0.023)	(0.023)	(0.023)
College Graduates	0.069***	0.069***	0.068***	0.054**	0.054**	0.053**
	(0.025)	(0.025)	(0.025)	(0.027)	(0.027)	(0.027)
Married	-0.013	-0.014	-0.013	0.0001	-0.001	-0.001
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Annual Income (in millions KRW)	0.023	0.023	0.025	0.024	0.023	0.026
	(0.028)	(0.027)	(0.029)	(0.032)	(0.031)	(0.033)
Wald Test Statistics	21.79***	23.38***	22.29***	22.70***	23.96***	23.03***
Log Pseudolikelihood	-16,661	-16,659	-16,661	-13,702	-13,699	-13,701
Number of Observations:	42,430	42,430	42,430	35,235	35,235	35,235

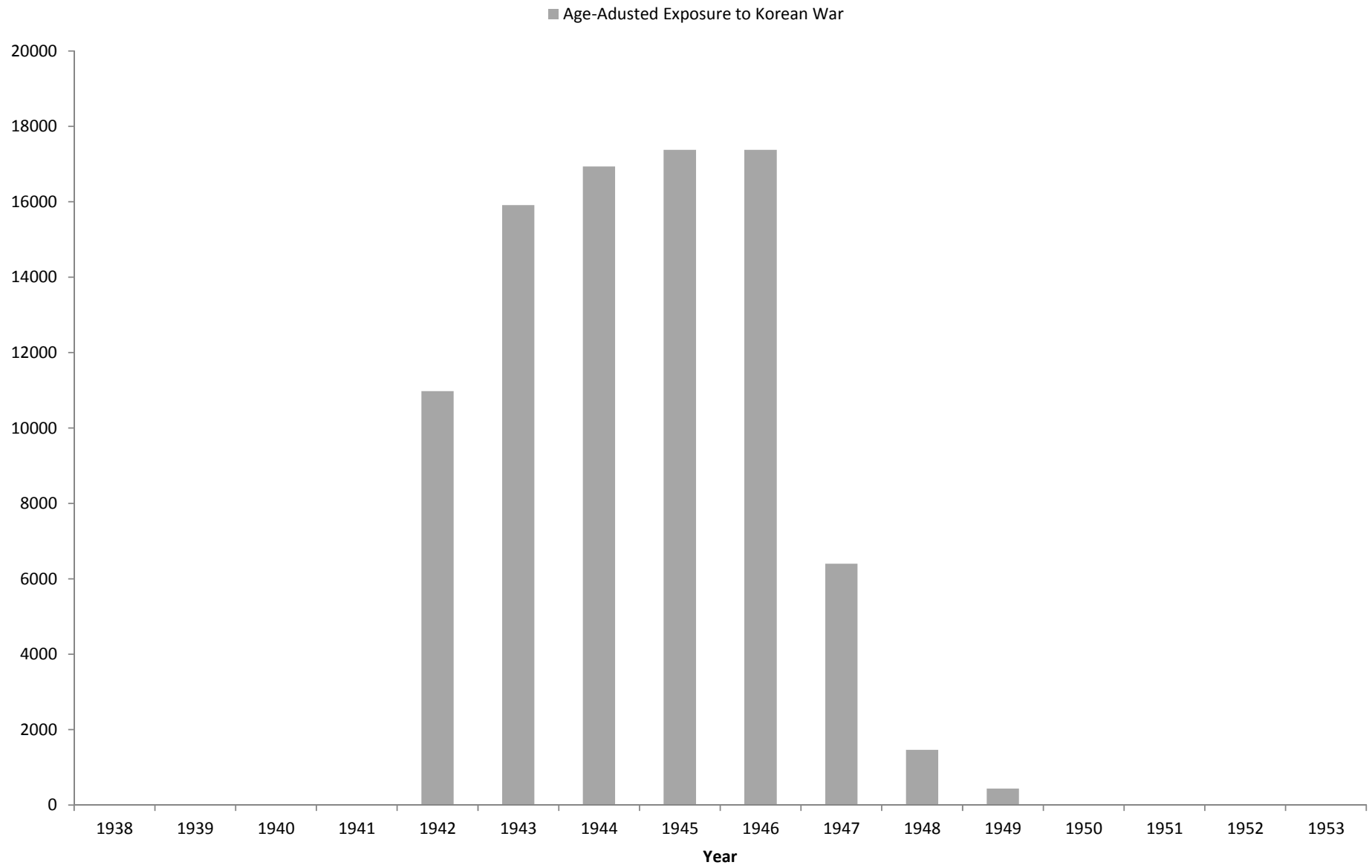
Note: Movers are defined as respondents whose place of birth is different from their area of residence when 14. Standard deviations are reported in squared bracket and standard errors are reported in parenthesis. *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level.

Table 7: Conservative Political Stance for Respondents Who Had Early Exposure to Korean War (Age 4-8)

		Dependent Variable: Degree of Conservativeness (0-10, 10 being the most conservative)		Dependent Variable: (Actual Voting for Conservative Candidates (LHC&LMB))	
Parameter/Variable	Sample Mean	Model 1	Model 2	Model 3	Model 4
Age	43.09 [14.07]	0.110*** (0.024)	0.126*** (0.032)	0.018*** (0.004)	0.016*** (0.005)
Age Squared		-0.001*** (0.0003)	-0.001*** (0.0004)	-0.0001*** (0.00004)	-0.0001* (0.00006)
Female	0.51 [0.50]	-0.122 (0.106)	-0.123 (0.106)	-0.002 (0.016)	-0.002 (0.016)
Monthly Household Income (in millions of KRW)	3.93 [2.00]	0.064** (0.029)	0.065** (0.029)	0.013*** (0.004)	0.013*** (0.004)
Early Childhood Exposure to Korean War	0.07 [0.25]	0.687*** (0.029)	0.813*** (0.028)	0.095*** (0.035)	0.082* (0.043)
People Older Than Early Childhood Exposure to War Group	0.07 [0.25]		0.304 (0.391)		-0.033 (0.060)
City Size Dummy		*Yes*	*Yes*	*Yes*	*Yes*
Religion Dummy		*Yes*	*Yes*	*Yes*	*Yes*
Hometown Dummy		*Yes*	*Yes*	*Yes*	*Yes*
Education Level Dummy		*Yes*	*Yes*	*Yes*	*Yes*
Degree of Conservativeness	3.47 [3.06]				
Voting for Conservative Candidate	0.37 [0.48]				
Adjusted R^2		0.052	0.052	0.107	0.107
Number of Observations:	3,415	3,415	3,415	3,415	3,415

Note: We absorbed the analysis by region. Standard deviations are reported in squared bracket and standard errors are reported in parenthesis. *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level.

Figure 1: Age-Adjusted Exposure to Korean War



Note: Age-adjusted exposure to Korean War is the sum of number of total police damage per year for each cohort is 4 to 8.