The Price of the East Asian Miracle:

Generational Cultural Shift and Elderly Suicide*

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Abstract

The suicide rates of the elderly in East Asia are among the highest in the world today. A sharp increase in elderly suicides has come after several decades of rapid economic growth in this region. We argue that this phenomenon can be partly explained by the shift in culture between generations. Elderly support in East Asia is traditionally provided by the children. This social contract between generations becomes more difficult to sustain with the decay of traditional culture in the younger generation – a consequence of compressed economic growth. Exploring administrative data in South Korea, we implement a difference-in-differences design to show that the generational shift in adhering to traditional culture (proxied by Confucianism and East Asian Buddhism) in a district is positively associated with the suicide rates of the elderly but not with those of other age groups. This pattern is robust to various checks including using historical Confucius schools and temples as instruments for cultural shift. To shed light on the mechanism, we turn to individual surveys and document that cultural shift decreases support from children and increases severe depression of the elderly. Our findings also shed light on the evolution of elderly suicide in other East Asian economies.

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1 Introduction

In recent decades, the fastest growing economies were in East Asia. The rapid economic growth led to a dramatic improvement in living standards. At the same time – and perhaps paradoxically – suicide rates (usually measured by the number of suicides per 10,000 individuals) among the elderly in this region have also risen sharply. For instance, the suicide rate for those aged 65 or over was around 75 in South Korea, five times higher than in 1990 (The Economist 2013). As of 2011, the elderly suicide rates in South Korea, China, Hong Kong, and Japan are among the highest in the world (see Appendix Figure A.1), twice to four times that of OECD average. The unprecedented surge in elderly suicides in this region has puzzled many. Why are more and more elderly in East Asia killing themselves as their economies get richer? This paper argues that cultural shift – the change in believing in traditional culture – across generations plays an important role in explaining this phenomenon. Combining administrative data and national representative surveys from South Korea, we document the role of cultural shift on elderly suicide at the district-level using different empirical strategies. To understand the mechanism, we investigate the link between cultural shift and family behavior at the individual level using survey data, in contrast with several alternative interpretations. We also discuss the implications of our findings on elderly suicide in other East Asian economies such as China and Japan.

Why does cultural shift matter? In our conceptual framework, the parents and the children were in a traditional social contract, according to which the parents could count on the support of their children at the old age. Traditional culture shapes what the parents expect to get as well as what the children are expected to deliver and therefore facilitates the enforcement of the contract.[1] However, such a social contract becomes more difficult to sustain when culture among the child generation shifts away from traditional values (e.g., compressed economic development can lead to big cultural shift across generation). In this framework, the importance of traditional culture among the parental generation and that among the child generation have opposite effects on the suicide decision of the parents. Ceteris paribus, the importance of traditional culture among the parental generation increases the expectation of the parents to get elderly support from their children and hence increases the probability of suicide if their children do not provide support. In contrast, the importance of traditional culture among the children generation increases the cost for the children to default from the social contract and hence decreases the suicide probability. As a result, we expect to see a higher suicide rate in regions with bigger shift away from traditional culture for the child generation (compared with that for the parental generation).

There are at least two major empirical challenges to link cultural shift and elderly suicide. First, it is not easy to measure the importance of traditional culture and its shift across generations. Second, cultural shift is clearly not exogenous and is likely to be correlated with

[1] This channel is closely related to the arguments in Greif (1994, 2006). See more in the discussions on relationship to existing literature.

other district-level characteristics such as economic development.

For the first challenge of measuring cultural shift, South Korea provides an ideal laboratory for two reasons. First, one can measure the importance of traditional culture in a reasonable way by exploring information on religions recorded in censuses. The traditional religions in South Korea are East Asian Buddhism and Confucianism, both emphasize the virtues of filial piety.[2] Survey data show that believing in traditional religions is indeed associated with stronger beliefs in that children should provide care to their parents in South Korea (discussed in Section 3.2). Second, there is rich variation in cultural shift over time and across space in South Korea along with the takeoff of the economy. Our baseline analysis focuses on the district-level variations in 2005 for which we can match death records with data on generational cultural shift.[3] When examining the share of individuals believing in traditional culture across generations, we find a large change between the generation who grew up when South Korean economy took off around 1965 – those born between 1955 and 1970 – and their parent generation who grew up when the economy was stagnant – those born between 1925 and 1940. Specifically, the share of believing in traditional culture is 35% among those born between 1925 and 1940 and decreases to 27% for those born between 1955 and 1970 and the change varies great across districts.[4] Considering that the shares across generations in a district are correlated and that a higher initial level is likely to be associated with a bigger change, we measure *"cultural shift"* by the change in the shares (i.e., share for the parental generation minus share for the child generation) normalized by the share for the parental generation. We also use the two shares separately and the change level for robustness checks.

We address the second challenge of endogeneity by exploring a second source of variation, namely age. Age affects a person's "treatment" status in the following sense. Those who are relatively young are less affected by a given level of cultural shift because they can still support themselves. Likewise, a given level of cultural shift is likely to be more detrimental to the well-being of those who are old and in need of support from their children. As a result, our prediction is specific to certain cohorts within a district. In the case of 2005, we expect to find that cultural shift matters particularly for those aged 65-80. Given that our prediction for 2005 is specific for those aged 65-80, we can compare the effect of cultural shift across

[2]Throughout this paper, "Buddhism" should be understood as the way it was introduced and practiced in China and South Korea, where it was redefined to support filial piety. Early Buddhism in India did not have a strong tradition of filial piety.

[3]The cultural shift measure – specifically, information on religion – is available in the 1995 and 2005 censuses while the death records are available every year since 1997. See Section 3 on data structure. We discuss the results for 2000 and 2010 in Section 4.4. We also discuss the concern of migration in Section 3.2.

[4]For the alternatives to traditional religion, the most salient difference is for the share in not believing in any religions (38% report not believing in any religion among those born between 1925 and 1940 but 45% for those born between 1955 and 1970). The share in believing in Protestantism and Catholicism is relatively stable, around 25% for both. Those aged above 80 in 2005 experienced relatively small shift while those aged below 65 also experienced large shift. This pattern of cultural shift across generations is consistent with the conjecture that the economic environment in which an individual grows up affects the likelihood of deviating from the traditional culture. See Section 3.2 for more discussions.

cohorts within a district. This is analogous to a difference-in-differences analysis where we can isolating the effects of many other district-level characteristics.

The difference-in-differences strategy provides support for the link between cultural shift and elderly suicide: a one standard deviation increase in the generational cultural shift is associated with a 15% higher suicide rate for those aged 65-80 but not for other age groups in 2005. This strategy is valid unless other district-level characteristics happen to increase suicide rates and the effect is particularly large for those aged 65-80. This seems not likely. We also employ death rates from diseases such as cancers and respiratory diseases to conduct a placebo test and find they are not affected by cultural shift. If other district-level characteristics happen to affect those aged 65-80 more, we would expect to see a similar pattern on other diseases.

This finding is robust to various checks such as different functional forms of suicide rates and excluding major metropolitan cities to minimize the concern of migration. As a complementary strategy, we further explore two instruments for cultural shift, namely the number of historical Buddhist temples and Confucius schools. The idea is that culture is more persistent (i.e., less likely to shift from traditional values) in districts with more institutions to indoctrinate traditional culture. This strategy delivers similar estimates to that from difference-in-differences analysis. Moreover, results using suicide data from South Korea in 2000, 2005 and 2010 show that the effect of cultural shift on the generation (those aged 65-80 in 2005, hence slightly younger in 2000 and older in 2010) becomes more important over time between 2000 and 2010, consistent with the importance of age.

To understand the mechanism, we turn to individual-level analysis based on Korean Longitudinal Study of Ageing, which started in 2006. We first examine whether our baseline finding applies to severe depression of the elderly (note that individual-level analysis is not possible for suicides for obvious reasons). Limited by the identifiers available in the survey, the definition of cultural shift varies slightly which also serves as an additional check of our measurement of the cultural shift. This alternative data also show a positive link between generational cultural shift and severe depression of the elderly, showing that our baseline finding on suicide can be generalized to severe depression. When investigating the link between cultural shift and support from the children, we find that the cultural shift significantly decreases frequent contact from the children. The impact on financial assistance is also negative but is weaker than that on frequent contact. Moreover, we find that support from the children has a sizable effect on elderly depression. These results from district-level and individual-level analysis support the interpretation that the cultural shift decreases support from the children, which consequently affects elderly depression and suicide.

We also discuss a few alternative explanations. First, our results on the role of cultural shift might capture the role of economic status shift. Using college education to proxy economic status, we find that education shift is likely to generate an opposite finding: better education of the young relative to the old in a district is associated with lower elderly suicide

rates, more consistent with more resources make the young able to provide support. Second, our results may be mechanically driven by a mechanical effect that the young live far away from the parents and hence cannot provide support. We do not find it to be the case exploring living arrangement information in the individual data. Third, our finding might capture some characteristics of a specific generation: those growing up in a more traditional society might get disillusioned for reasons not related to generational cultural shift. Our analysis always control for cohort fixed effects. In addition, we run a horse race between culture gap and the level of believing in traditional culture in the old cohorts and find that our baseline finding is not driven by the level of believing in traditional culture. Finally, state policies such as pension availability might also be different across districts. Using individual-level information, we show that cultural shift is not significantly correlated with pension or poverty benefit status, implying that the baseline finding is not driven by state policies. These results show that the baseline finding appears most consistent with the cultural shift interpretation.

Our study contributes to a few lines of research in economics and sociology. In economics, our framework is closely related to the literature on how cultural beliefs shape the organization of society, notably the work by Aver Greif. Greif (1994, 2006) provide fruitful theoretical and historical discussions to understand the role of culture beliefs "that capture people's expectations with respect to actions that others will take". Similar to his framework, cultural beliefs shape the behavior of the young and the old in a social contract via the expectation channel. We contribute to this framework by documenting the *change* in cultural beliefs across generations and how the change affects the enforcement of an important social contract.

A growing body of empirical work has documented the importance of culture in economic development. Alesina and Giuliano (2013) provides a thorough overview of existing studies.[5] While our findings provide new evidence to this literature, we depart from the existing research by focusing on cultural change rather than variation in culture per se. Our findings also add to a different literature investigating factors that affect elderly wellbeing including suicide (e.g., Case and Deaton (2015)) by providing a new perspective.

In sociology, inspired by Dirkheim (1897), a large literature has documented factors that can affect suicide, where religion is investigated in different contexts (e.g., Pescosolido and Georgianna (1989)). Again, our focus is not on religion per se but use of it as a proxy to measure culture*change* across generation. Auxiliary results using surveys imply no significant correlation between traditional culture per se and attitudes toward suicide in South Korea.

Our findings also shed some light on evolution of elderly suicide problem in other East Asian economies. In particular, China's economy took off around 15 years after South Korea. Without better state policies such as pension reform, a similar problem of elderly suicide may

[5] As well explained by the authors, empirical studies often do not disentangle culture-as-values (or preferences) from culture-as-beliefs (about the consequences of one's actions). We do not attempt to disentangle them with data. While the pattern on dramatic cultural change across generations along with compressed economic development appears more consistent with culture-as-beliefs, one may argue that it is correlated with value changes. For instance, Giuliano and Spilimbergo (2014) document that macroeconomic environment affects preferences for redistribution.

become more and more important for China in the near future, as illustrated by recent media reports.[6] In contrast, the problem for Japan will be less of a concern because those affected most by Japan's takeoff (15 years before South Korea) have existed from the population. In other words, what we document is a social problem in dramatic economic transition rather than different equilibria as a result of different culture.

The rest of the paper is organized as follows. Section 2 discusses the conceptual frame on why cultural shift matters and what drives cultural shift, which also explains why we can deal with the endegeneity of cultural shift. Section 3 discusses the background and district-level data, after which Section 4 reports the empirical results for elderly suicide using different methods. Combining individual-level and district-level data, Section 5 presents further evidence to understand the mechanism. Section 6 concludes the paper and discusses the implications for China and Japan.

2 Conceptual Framework and Empirical Strategies

2.1 Why Does Culture Shift Matter?

Appendix A.1 presents a simple model to illustrate why cultural shift can affect elderly suicide. Here, we briefly discuss the intuition. In our framework, the young choose to provide care for the old or default (i.e., not provide the care). The old choose whether to commit suicide. Both decisions are affected by culture, namely the importance of tradition.

Consider a continuum of families in a district that comprises of the young and the old. Tradition in a district serves as a sanction if the young deviate from the norms and do not provide care to the old. It is more costly for the young to default in a district where most of the young stick to traditional values and provide care to the old. This cost can be reputational (e.g., people find a young not providing care to the old is not trustworthy and are more reluctant to do business with him) or intrinsic (e.g., the young feel more guilty to default). In other words, the probability of default is decreasing in the importance of traditional values for the young's generation (T^Y).

For the old, tradition matters because it shapes their expectation: in a district where most of the old stick to traditional values, the old are more likely to expect care from the children. As a result, the old are more likely to commit suicide if he expects to be taken care of but the young default. The expectation of the old is a function of the importance of traditional values for the old (T^O), while the probability for the young to default is a function the importance of traditional values for the young (T^Y). As a result, the probability of committing suicide for the old is positively affected by the importance of traditional values for the old (T^O) and negatively affected by that for the young (T^Y).

Empirically, T^O and T^Y can be measured by the share of individuals believes in traditional

[6] See reports like "Suicide Among Elderly Increases" at China Daily (August 4, 2014); "Suicide Among China's Rural Elderly Grows Amid Urbanization" at Global Times (Oct. 2, 2014).

culture (Buddhism and Confucianism) by generation. Naturally, T^O and T^Y are positively correlated within a district. We will first examine the impacts of them separately with this caveat in mind. Then, we look at the effect of $T^O - T^Y$, which is expected to be positively correlated with suicide probability of the old. Furthermore, $T^O - T^Y$ is likely to be high in districts with a higher T^O due to the scale effect. To deal with this concern, we normalize $T^O - T^Y$ by T^O to capture the importance of the shift. This measure is what we call *cultural shift* throughout the paper. It is also conceptually meaningful, since it measures the magnitude of shift from the perspective of the old.

2.2 What Drives Cultural Shift?

Shift Across Generations Culture shift is clearly not exogenous. The takeoff of South Korea around 1965 plays an important role (see Appendix Figure A.2 for the trajectory of GDP per capita in South Korea since 1953) in our analysis. If both the old and the young grew up before 1965, cultural shift is likely to be small. This is the case for those aged over 80 in 2005, who were born before 1925. In contrast, if the old generation grew up under a traditional economy (e.g., those born between 1925-40)while the young generation (those born between 1955-70) experienced fast growth during their formative years, we expect a large culture gap between the two generations. The prediction is less clear if both generations experience fast growth. Appendix Table A.1 summarizes the pattern we expect to see empirically and we will examine whether this pattern holds in the data in Section 3.2.

The takeoff of South Korea provides time-series variation in cultural shift. Our empirical analysis relies on variation cross districts. Culture shift in a district is naturally correlated with many district characteristics. For instance, districts that developed faster around 1965 are expected to experience a larger shift. Those closer to major metropolitan cities are also likely to have a larger shift. How can we ensure that our analysis on the link between cultural shift and suicide is not driven by other district characteristics? This is the major empirical challenge. We can deal with this challenge because our framework delivers a very specific prediction explained next.

Main Prediction Culture shift does not directly imply elderly suicide. Another element is whether the parent generation needs support from the child generation, for which age becomes an important determinant. As summarized in Table A.1, those aged 65 and above are more likely to be in need of support than the younger. As a result of both experiencing a big cultural shift and being in need, those aged between 65-80 are the most vulnerable if we focus on the data in 2005.

Therefore, our framework predicts that the effect of cultural shift is particularly important for a specific age group. In 2005, this group are those aged between 65-80.

2.3 Empirical Strategies

Since our prediction is specific to one generation within a district, we can control for district fixed effects and compare the effect of cultural shift across generations within a district. This strategy is analogous to a difference-in-differences method and takes care of many district-level characteristics correlated with cultural shift. Such a method is valid unless that other district-level characteristics have a similar effect on suicide rates and are particularly important for the specific group affected by cultural shift more. In our analysis, we also allow for the effect of economic development to vary across generations. Section 4.1 presents the specifications and results.

A complementary strategy we employ is to find some arguably exogenous variation in cultural shift. Inspired by an increasing literature documenting the persistence effect historical institutions, we exploit the number of historical Buddhist temples and Confucius schools. The idea is that culture is more persistent (i.e., less likely to shift from traditional values) in districts with more institutions to indoctrinate traditional values. Section 4.3 discusses related results.

3 Data

3.1 Suicide: Data and Pattern

The individual death records are administrative data provided by Statics Korea and are available during 1997 and 2010. These data give us information on who die on which date for which reason. To get suicide rates, we match them with population censuses in 2000, 2005 and 2010. Figure 1 plots the number of suicide per 100,000 individuals (henceforth suicide rates) by 5-year age groups for these three years, which shows a notable increase for those aged 65 and above.

Moreover, there are wide variations in elderly suicide across regions in South Korea. Figure 2 plots the spatial distribution of suicide rates for those aged 65-79 in 2005, which panel (a) presents the values and panel (b) presents the rate relative to those aged 35-49. Wide variations are apparent in both cases. In our analysis, we link culture gaps with suicide rates.

It is worthwhile mentioning possible under-reporting of suicide. Like in most societies, suicide is associated with stigma in South Korea and there can be under-reporting. This problem may be less of a concern over time. This is one reason we need regional-variation rather than rely on time-series data. Then, the concern is whether under-reporting is correlated with gap culture in a district. Since our baseline difference-in-differences analysis is comparing different cohorts within a district and our finding is specific to one generation, this is unlikely to matter.

Table 1 presents the summary statistics for suicide rates and other variables.[7] As shown, the increase in elderly suicide rates between 2000 and 2010 is an important driver of the increase in overall suicide rates.

3.2 Culture and Cultural Shift

Data on Culture The data come from the 1995 and 2005 censuses, which report information on religion. Statistics Korea provide two forms of the data. The first is the summary statistics by district, sex and age (where aged 85 and above is taken as one group). For instance, for each district, we know the number of individuals believing in certain religion by age and by sex. We categorize Buddhism and Confucianism as traditional culture. In contrast, we categorize Protestantism, Catholicism and no religion as modern culture. With this data, we can calculate the share of individuals believing in traditional culture by cohorts (e.g., for every 15 years). This measure captures the value by residency district, which we can link with suicide rates by residency district A confounding factor for this measure is migration, which we will discuss next.

The second form is the 2% sample of the individuals from the two censuses. In 1995, we also know the district of birth for each individual and the district where he or she lived 5 years ago. In 2005, we only know where he or she lived 5 years ago. With the 1995 data, we can also calculate the value for those live in the birth district (natives) and compare it with that calculated for all residents to check how important the concern of migration is (discussed below).

A Detour: Culture and Attitudes Toward Elderly Care and Suicide Our analysis will focus on cultural shift rather than traditional culture per se. Nevertheless, it is useful to know whether traditional culture per se matters for elderly support and whether traditional culture per se affects suicide.

In Appendix Section A.2, we take a detour to show the relationship between culture and elderly care as well that between culture and attitudes toward suicide. The data come from Korean General Social Surveys in 2006 and 2009. The two main findings are that the belief in traditional culture is positively correlated with the belief in supporting the parents but is not correlated with attitudes toward suicide (reported in Table A.2 and discussed in Section A.2).

Within-cohort Persistence & Across-cohort Shift Two patterns appear in the censuses. The first is that culture is quite stable for a given cohort between 1995 and 2005. The second is that there are wide across-cohort changes with the take off of Korean's economy. Figures 3 and 4 below illustrate the two patterns.

[7] To deal with possible influence of outliers, for our key variable (suicide rates, culture gap and instruments), we exclude the observations with a value of more than three standard deviation away from the mean.

Figure 3 plots the share of individuals believing in traditional culture by cohorts, where each dot indicates the share for a district. If a dot is located above (or below) the 45-degree line, it indicates this district becomes more (or less) traditional in 2005 than in 1995. As shown, for each cohort, the dots are located closely to the 45-degree line, implying that the culture for a given cohort varies little over time. Interestingly, the two cohorts where the culture values vary slightly are the very old (born before 1925) (in panel (a)) and the relatively young (born in 1955 and 1970) (in panel (d)). In particular, the traditional values decreased slightly for the very old and increased slightly for the the relatively young over time. This change can reflect both individual change and compositional change. Given the stability of culture, we focus on the data from 2005 in our baseline analysis to link them with death records in 2005 and use the information from 1995 as a robustness check.

While culture is stable for a given cohort, there is wide variation across cohorts. As explained in the conceptual framework, we can define cultural shift as the relative change in believing in traditional culture. Specifically, for each generation j in district d, we define $CultureShift_{d,j} \equiv (Trad_{d,j} - Trad_{d,j+30})/Trad_{d,j}$, where $j + 30$ indicates the child generation.[8]

Figure 4 plots the distribution of cultural shift by cohorts, where panel (a) is based on data from the 1995 census and panel (b) based on that from the 2005 census. The distribution to the right of zero indicates a decrease in traditional culture. On average, there is little change for the very old (born before 1925), which is consistent with the fact that their generation and their child generation grew up in relatively traditional economy. However, the distribution of culture gap is significantly shift to the right for those born between 1925-40. This generation grew up in a traditional economy while South Korea took off when their child generation grew up. We also see a wide gap for those born later, implying little convergence of culture if both generations experienced fast economic growth in their formative years. These results confirm our hypothesis summarized in Appendix Table A.1.

Culture shift also has wide spatial variation. Figure A.3 plots cultural shift across district in the 2005 census for those born between 1925-40. Appendix Table A.3 reports the correlation between a few district characteristics and the shift measure for those born between 1925-40. As shown, a bigger shift is positively associated with initial level of traditional share in the district. It is also positively associated with higher GDP per capita. There are many other district characteristics that may be correlated with culture gap but are more difficult to measure. In our baseline analysis, we will control for district fixed effects to take these characteristics into considerations.

Discussion on Migration How does migration affect our analysis? This is not an issue for districts with little migration. For the districts with migration, the importance of this concern depends on whether the district is mainly a source or receiver of migration.

[8]The average age of having the first child is smaller than 30. However, there can be multiple children later in life. We take 30 years as an average. The results are similar if we use a 25-year gap.

This concern is more important for metropolitan districts with a lot of inflow migrants (e.g., Seoul). The concern is that individuals coming from other districts are counted when calculating the share of adhering to traditional culture. This introduced measurement error if these individuals hold different values from the locals. In contrast, this concern is less essential for districts where outflow migration dominates. For such districts, the value calculated based on the young generation living in the district reflect their relationship with the old generation.

With the help of the information in the 1995 census, we can check how important this concern is by examining the correlation between values calculated based on the natives only and that calculated for all residents. The results for two generations (which will be our focus in later analysis) are visualized in Appendix Figure A.4. As shown, the two measures are highly correlated with each other, with a correlational coefficient around 0.89-0.94, suggesting that this concern is unlikely to be critical for our analysis based on residency district.

In our analysis below, we also conduct two sets of checks regarding migration. First, as a robustness check, we will also exclude major metropolitan cities where the concern of migration is more important. There are seven metropolitan cities in South Korea (the center of these cities are indicated by the dots in Figure 2). These cities are at the same administrative level of provinces and govern different districts below them.[9] As reported in Table 1, 32% of the districts are governed under metropolitan cities. These results are presented in Section 4.2.

Second, when we exploit individual-data from elderly surveys, we will check whether living far away from parents (related to migration) is affected by cultural shift and whether how this decision affects our findings. These results are presented in Section 5.2.

4 Main Results

This section presents the main results using district-cohort data. We first present our baseline analysis using difference-in-differences (Section 4.1). Then, we present the results from several robustness checks regarding endogeneity and measurement (Section 4.2). Finally, we present the results from two instruments (Section 4.3).

4.1 Difference-in-Differences Estimation

To implement a difference-in-differences analysis, we fix the culture of two generations for each district. In particular. We focus on the first time an old generation experienced a big shift, namely those born between 1925-40 (aged 65-79 in 2005) vs. their child generation born between 1955-70.

[9]The seven cities are Seoul, Busan, Daegu, Daejeon, Gwangju, Incheon and Ulsan. Together with nine provinces, they constitute the 16 provincial units in South Korea.

Separating the Importance of Tradition for Old and the Young Following our discussion in Section 2, we first investigate the impacts of traditional values for the two generations separately using the following specification:

$$\begin{aligned} Suicide_{d(p),s,c} &= \alpha_1 Trad_{d,65-79} \times I\{c \in 65-79\} + \alpha_2 Trad_{d,35-49} \times I\{c \in 65-79\} \\ &\quad + \beta \mathbf{X}_{d,s,c} + \gamma_c GDPPer_d \times I_c + \lambda_d + \nu_{s,c} + \delta_{p,c} + \varepsilon_{d,s,c}, \end{aligned} \tag{1}$$

where $Suicide_{d(p),s,c}$ is the suicide rates in district (d) within a province (p), of sex (s) and of 5-year cohort (c). $Trad_{d,65-79}$ is the share of individuals believing in traditional culture for those aged 65-79 in 2005 while $Trad_{d,35-49}$ is the share of individuals believing in traditional culture for their child generation. $I\{c \in 65-79\}$ indicates whether a 5-year cohort aged 65-79 in 2005.

We include district fixed effects (λ_d) to control for the effects of district-specific characteristics that change slowly over time. We also control for province-cohort trends ($\delta_{p,c}$) and sex-cohort trends ($\nu_{s,c}$). Moreover, we allow that the effect of development (proxied by GDP per capita) varies by cohorts (captured by γ_c). Once district fixed effects are included, there are not many district-level variables to control for. $X_{d,s,c}$ includes average suicide rates for a district-gender cell and average death rate for a district-sex-cohort cell. The former control for the fact that a district may have higher suicide rates for all cohorts while the latter deal with the possibility that one cohort might have higher death rates for certain reason. It turns out that these controls are non-essential. All standard errors are clustered at the district level.

According to our hypothesis, we expect to $\alpha_1 > 0$ and $\alpha_2 < 0$. The results are presented in columns (1)-(3) of Table 2. Column (1) presents the results with the fixed effects, column (2) adds $X_{d,s,c}$, and column (3) presents the results after controlling for $GDPPer_d \times I_c$. The estimates are similar across specifications.

Since $Trad_{d,65-79}$ and $Trad_{d,35-49}$ are correlated in a district, it is not reasonable to interpret the coefficient independent of each other. Instead, column (4) of Table 2 shows the impact of $Trad_{d,65-79} - Trad_{d,35-49}$. As expected, the difference is positively associated with suicide rates for those aged 65-79 in 2005. Intuitively, this difference is more likely to be larger in districts with a higher initial share due to a scale effect. To deal with this concern, we normalize the difference by the initial level (defined as $Shift_d = \frac{Trad_{d,65-79} - Trad_{d,35-49}}{T_{d,65-79}}$). This normalization also captures the slope shift from the perspective of those aged 65-79.

We focus on the link between $Shift_d$ and suicide rates in our analysis below. To facilitate the interpretation of the magnitude, we report the standardized coefficient: the coefficient can be interpretative as the effect on suicide rates if cultural shift increases by one standard deviation.

Focusing on Culture Shift Replace the two separate measure of traditional values with the measure of shift:

$$\begin{aligned} Suicide_{d(p),s,c} &= \alpha_S Shift_d \times I\{c \in 65-79\} \\ &\quad +\beta \mathbf{X}_{d,s,c} + \gamma_c GDPPer_d \times I_c + \lambda_d + \nu_{s,c} + \delta_{p,c} + \varepsilon_{d,s,c}, \end{aligned} \tag{2}$$

The results are presented in columns (5)-(7) of Table 2, following the same specifications in columns (1)-(3). The estimates are very stable – one standard deviation increase in cultural shift is associated with 12.4 more suicides per 100,000, about 15% of the mean death rates for those aged 65-79 in 2005.

More flexibly, we can also examine the effect of cultural shift for generation by generation by the following specification:

$$\begin{aligned} Suicide_{d(p),s,c} &= \sum_{j=\{15-34,35-49,65-79,80+\}} \alpha_j Shift_d \times I\{c \in j\} + \beta \mathbf{X}_{d,s,c} \\ &\quad +\gamma_c GDPPer_d \times I_c + \lambda_d + \nu_{s,c} + \delta_{p,c} + \varepsilon_{d,s,c}, \end{aligned}$$

where $I\{c \in j\}$ indicates whether a 5-year cohort belongs to a specific age group in 2005. Those aged between 55-64 are left as the reference group.

The results across specifications are delegated to Appendix Table A.4. Figure visualizes the result in column (4) of Table A.4, where the solid line connects the estimates and the dashed lines indicate the 95% confidence intervals with standard errors clustered at the district level. As shown, the significant impact of cultural shift is restrict to those aged between 65-79 in 2005.

There is no similar impact on the young or the very old. The finding of no effect on the young is analogous to a parallel-trend test in standard difference-in-differences analysis. In our conceptual framework, this finding is consistent with the interpretation that they are still young and do not need support. There is a possibility that they may also adjust their expectation over time. One needs long time periods to investigate the importance of this possibility, which is beyond the scope of this study.

The effect of cultural shift is much smaller on the very old and is not significant. This finding is consistent with the fact that they are not subject to big cultural shift. However, another important explanation is survival bias: the very old already survive from the effect of culture gap. The factors affecting their decision of committing suicide may be more related to deteriorating health status. The concern of survival bias also implies that it is more reasonable to focus on the relatively young among the elderly rather than the very old.

4.2 Robustness Checks: Endogeneity and Measurement

Placebo Tests: Results for Other Causes of Death We also check whether deaths from other causes such as cancer or heart diseases respond to culture gap for those aged

65-79. Since these diseases are unlikely to be affected by cultural shift, one can consider them as placebo tests. If our baseline results were driven by heterogeneous effects of omitted variables, we would expect to find a similar pattern in terms of health outcomes.

Column (1)-(2) of Table 3A shows the results for deaths from cancers, using the same specifications in columns (5) and (7) of Table 2. As shown, cultural shift is not associated with higher or lower death rates due to cancers. Similarly, columns (3)-(4) present the results for deaths from respiratory diseases whereas columns (5)-(6) report the results for deaths from cardiovascular diseases. Once again, there is no similar pattern as that for suicide rates.

These results show that our baseline finding is specific to suicide rates. They suggest that our baseline results are unlikely to be driven by omitted variables that affect all types of deaths.

Measurement I: Functional Form of Key Variables We conduct several robustness checks on measurement. The first is on the functional form of suicide rates. We focus on suicide rate as the dependent variable because it is the most commonly used measure to proxy the important of the problem. Even though the rates vary greatly across districts and across cohorts, suicide is overall a rare event. To ensure that our findings are not driven by the functional form of suicide rates, we can also use the number of suicides as dependent variable while controlling for population size as well as its squared term. The results are presented in columns (1)-(3) of Table 3B, following the same specifications in columns (5)-(7) of Table 2.

The average number of suicides for those aged 65-79 is 1.81 in 2005. The estimate implies that a standard deviation increase in cultural shift increases elderly suicide by 0.25, around 14% of the mean, very close to our baseline finding.

A similar concern also applies to the functional form of cultural shift. As already shown in Table 2, using the traditional share for the old and the young separately or using their difference generates a similar pattern.

Measurement II: Migration As discussed in Section 3.2, the concern of migration matters more for metropolitan cities with big inflows of migrants. Therefore, we check whether our results hold excluding the districts governed by metropolitan cities.

Columns (4)-(6) of Table 3B present the results, which are similar to our baseline finding, suggesting migration is unlikely to be a critical concern in our analysis.

In the analysis of Section 5.2 based on individual-level data, we will also examine the correlation between cultural shift and living far away from parents, which also speak to the role of migration.

4.3 IV Results

Another strategy we use is to find arguably exogenous variations in cultural shift. Conceptually, in districts where keeping tradition is more important, one expect to see a smaller

cultural shift. Given this possibility, we exploit the institutions that are important for keeping tradition, namely Buddhist temples and Confucius schools. These institutions were established before the end of the Choson dynasty (1392-1897). We normalize the numbers by population in 2005. Figure 6 visualizes the relevance of these instruments. Panels (a) and (b) show the negative correlation between the number of Confucius schools and temples and culture gap.

It is important to consider exclusion restriction when using instrument variables. We are not arguing that these instruments are not correlated with other district characteristics. It is possible that number of Confucius schools is also associated with modern human capital. However, few variables we can think of that are correlated with these instruments would directly increase elderly suicides. Nevertheless, we would like to acknowledge that there are possible omitted variables not captured by this method. We take this method as supplementary to the baseline.

With the two instruments, Table 4 present the results from IV estimations focusing on those aged 65-79 in 2005. The controls include sex-cohort fixed effects, $X_{d,c,s}$ used in the previous analysis, and GDP per capita.

Columns (1)-(3) present the results using the number of Confucius schools per capita as an instrument. Column (1) shows the reduced-form result: one more Confucius exam school per 100,000 is associated with 1.27 fewer suicides per 100,000 for those aged 65-79 in 2005. Column (2) presents the first-stage result. More exam schools are significantly associated with smaller cultural shift. The F-statistic is around 245.7, showing that weak instrument is not a concern. Column (3) presents the IV estimate, around 13.8.

Columns (4)-(6) present the results using the number of temples per capita as the second instrument. The pattern is very similar to those in columns (1)-(3). The IV estimate is around 10.9.

Finally, column (7) reports the result including both instruments. The $p-$value from the over-identification test is around 0.5, showing that the results from these two instruments are comparable to each other. The magnitudes of the estimates from the two instruments are around 12.4, similar to that from difference-in-differences analysis. These results provide further support for our baseline finding.

4.4 Further Evidence from Over Time Change

According to our analysis, the impact of culture culture is changing over time due to the change in vulnerability. Consider those born between 1925-40 analyzed in our baseline, they were aged between 60-75 in 2000, 65-80 in 2005 and 70-85 in 2010. Before finally existing from the population, we expect that they became more vulnerable over time.

Table 5 confirms this pattern. It reports the impacts of cultural shift on those born between 1925-40 from 2000 to 2010, where the year of 2000 is left as a reference year. As shown, the impact is increased in 2005 and becomes even larger in 2010.

To be sure, this pattern also suggests that our finding is on a phenomenon in economic transition rather than an equilibrium in the long run. As the vulnerable generation finally disappear from the population, the problem can be relieved. This matters when we consider the implications for China and Japan. In particular, the timing of economic takeoff across these countries plays an important role.

5 Understanding the Mechanism

Our conceptual framework argues that cultural shift matters because it affects the probability of default of the young generation. To understand whether this is a relevant mechanism, one needs individual data on family interactions. To this end, We exploit detailed information from the Korean Longitudinal Study of Aging (2006). The survey covers around 10,000 individuals aged 45 and above, of which 60% are aged between 45-64, 35% aged between 65-80 and 5% above 80. Since only limited individuals are aged above 80, we categorize the individuals into two groups: the elderly (aged 65 and above) and the rest. The advantage of this data is that it provides useful information on health status (including depression), family interactions, urban or rural status, and pension availability etc.

There are two limitations of the data. One is that it only provides 15 provincial-level identifier.[10] We use province-urban to calculate the culture gap. In South Korea, urban is a district-level characteristics. For instance, the districts governed by metropolitan cities are always urban. As a result, we have 25 province-urban cells for calculating cultural shift and also cluster our standard errors at this level. In addition, we control for fixed effects for the 999 survey blocks whose identifier are not provided to make cohorts more comparable. Since a survey block is a subunit of a district, including the block fixed effect is more conservative than including district fixed effects.

Another limitation is that the survey only interviews those aged above 45. To ensure our shift measure is comparable to those in the baseline, we define generational shift as the cultural shift for those aged 70-80 vs. those aged 45-55 in 2006. Since the way we calculate the shift is conceptually similar to the baseline but differs due to the data limitation, one can also take this as an additional robustness check of our baseline measure of culture gap.

We take four steps to understand the mechanism. First, we examine whether cultural shift affects depression of the elderly. Second, we investigate whether cultural shift affects how the children treat their parents. Third, we link child support with elderly depression. Finally, we discuss a set of alternative explanations.

5.1 Evidence from Elderly Depression and Family Interactions

The analysis is similar to the difference-in-differences in the baseline. Now, the outcomes such as elderly depression are measured at the individual level while the cultural shift is measured

[10] Jeju island is excluded from these surveys.

at the province-urban level.

Culture Shift and Elderly Depression We first examine whether culture gap matters for elderly depressing using the following specification:

$$Depress_{i,s,k(p)} = \alpha' Shift_{k(p,urban)} \times Elderly_{i,s,k} + \theta_s Elderly_{i,s,k} + \gamma \mathbf{X}_{i,s,k} + \lambda_k + \varepsilon_{i,s,k}, \quad (3)$$

where $Depress_{i,s,k(p)}$ whether an individual i of sex s in a survey block k (within a province p) is depressed. Depression measured by CES-D10 score ranged from 0 to 30. Those with a score above 10 can be considerably slightly depressed. We consider different degrees of depression: depression (above 10), severe depression (above 17) and extreme depression (above 23).[11]

$Shift_{k(p,urban)}$ is the shift measured from the 25 province-urban cells. λ_k indicates survey block fixed effects. Analogous to the sex-cohort trends in the district-level analysis, we also allow for the effects of flexible sex-elderly trends ($Elderly_{i,s,k}$) here. $\mathbf{X}_{i,s,k}$ is a set of individual characteristics that may affect depression including disability, number of chronological diseases, number of pain, activities of daily living (ADL) fixed effects and family income per capita.

Columns (1)-(2) of Table 6 report the results for light depression, where cultural shift does not seem to matter. However, cultural shift becomes important for severe and extreme depression. As shown in columns (3)-(4) for severe depression, a one standard deviation increase in culture shift increases the probability of severe depression by about 1.3-1.9 percentage points, around 30%-40% of the mean. The effect is also sizable for extreme depression.

Consistent with the public health literature, we also find that the number of chronological diseases and pain (e.g., pain in the head or in the back) matters for depression. The magnitude of the effect of one standard deviation increase in culture gap is comparable to that of an extra pain. Table A.5 further shows that cultural shift is not positively associated with worse physical health conditions. If anything, cultural shift is associated with more physical independence.

Culture Shift and Support from the Children Similar to the analysis on depression, we now investigate how different types of support from the children are affected by cultural shift. There are two types of support interviewed in the survey: contact (including visit and phone calls) vs. financial support. Of course, contact can also be associated with some financial assistance.

We focus on the answers regarding the first children. This is because 97% of the individuals asked have one child (or more), so that it is reasonable to compare them. Moreover, when coming to the answers to the second, third and other children, more information is missing.

[11] The thresholds for severe and extreme depression are chosen based on the distribution of depression: about 4%-5% of individuals report a score above 17 and about 1%-2% above 23.

Columns (1)-(2) of Table 7A show that frequent contact (defined as at least once a day) is significantly decreased by cultural shift. A one standard deviation increase in cultural shift decreases the probability of frequent by about 1.6 percentage points, around half of the mean. Columns (3)-(4) show that contact once or more a month is also decreased by culture shift but the effect is weaker. The pattern on financial support is similar (column (5)-(6)): cultural shift also weakly decreases the probability of providing financial support.

How does different type of support affect elderly depression? Table 7B presents the link between support from the children and elderly depression. These estimates are not very precise. But all of them are of the same direction and of similar magnitude: all types of support help relieve depression.

Together with the district-level analysis in the baseline, these results all suggest one interpretation of the mechanism behind our findings: cultural shift decreases support from the children, which affects elderly depression and suicide. Can alternative explanations explain our findings? We consider a few alternatives below.

5.2 Alternative Explanations

For any alternative factor to explain our findings, it has to satisfy two conditions. First, it is positively associated with suicide. Second, the positive link is particularly important for the (relatively young) elderly. We consider four important alternative explanations. The aim is to check whether our main finding is driven by other factors correlated with cultural shift. In addition, we may uncover the role of other important factors in elderly suicide.

Alternative I: Generational Shift in Economic Status The first important alternative interpretation is the role of generational shift in economic status. It is conceivable that economic status changes dramatically across generations with the takeoff of South Korea and that higher economic status is associated with less importance of traditional values.

Indeed, we find evidence in both dimensions. Based on the 2005 census data, the average share of individuals with college education for the generation born between 1925-40 was only 7.2% and increased to be 36.1% for those born between 1955-70. It is also true that the share of individuals with college education in a district is indeed negatively correlated with the share of individuals believing in the traditional culture (e.g., the correlational coefficient is around -0.2 for the generation born between 1925-40, significant at 1% level.).

However, for education shift to explain the elderly suicide, one has to assume that a higher achievement of the young generation make the old generation more depressed and more likely to kill themselves. Without the channel of cultural shift that affects the young's choice of taking care of the old, this seems not likely. If economic status is the only factor, we expect that better economic status of the young makes them more able to provide care, which should be correlated with fewer elderly suicides.

Empirically, we examine the effect of education achievement and shift using similar spec-

ifications as studying cultural shift. Column (1) of Table 8A replicates the baseline result in column (1) of Table 2: the importance of traditional culture for the young is negatively correlated with elderly suicide rates while that for the old is positively correlated with elderly suicide rates. If such a pattern is purely driven by education achievement, we expect to see an opposite pattern once we replace the share of individual believing in traditional culture with the share with college education. As shown in column (2), this is not the case, suggesting that the baseline pattern cannot be explained away by economic status (proxied by education).

Following the definition of cultural shift, education shift is defined as $EduShift_d = \frac{College_{d,35-49} - College_{d,65-79}}{College_{d,65-79}}$.[12] Column (3) reports the result on education shift. As shown, better achievement of the young has a mitigating effect on elderly suicide. This is more consistent with the possibility that better economic status of the young makes them more able to provide care or that the elderly feel more fulfilled.

These results also speak to the motivation of our study. Our hypothesis on cultural shift provides an explanation for the paradoxical phenomenon of elderly suicide in East Asian countries with specular economic performance. This is not to say that compressed economic development is necessarily evil. Economic development definitely has its bright side, as illustrated by these results. On the other hand, the link between cultural shift and elderly suicide highlights the price of a dramatic economic transition that falls disproportionally across generations.

Alternative II: Mechanical Effect of Living Far Away A second alternative interpretation is the role of some mechanical constraints of providing support. For instance, if districts with a larger shift are closer to metropolitan cities, migration opportunities are more abundant. As a result, more individuals live far away from their parents and cannot provide support due to the mechanical effect of being far away. It is worthwhile noting that such hypothesis does not necessarily generate the same prediction specific to one generation as our hypothesis does. Therefore, our baseline analysis with district fixed effect already speaking to this concern.

On top of this, we further exploit living arrangement information provided by the elderly survey, which reports how far the children live from their parents in terms of traveling by public transportation. Similar to the previous analysis, we focus on answers regarding the first child to maximize the information availability. We define living far away as a dummy indicating whether the first child lives two hours away by public transportation.

As reported in columns (1)-(2) of Table 8B, cultural shift does not have a different effect on the probability that children live far away for the elderly and the young. Therefore, this concern is unlikely to explain our baseline finding.

Columns (3)-(6) further check whether child's living far away directly affected elderly depression. As shown, there is no significant correlation between the two variables. Moreover,

[12] We reverse the order in the numerator because a higher share with college education should be associated with less importance in tradition.

our baseline finding holds after considering the effect of being far away.

These results show that our baseline finding is unlikely to be explained by a mechanical effect of living far away from parents.

Alternative III: The "Lost Generation" Another alternative explanation is that our finding reflects a generational effect: those growing up in a more traditional society might get disillusioned for reasons not related to generational cultural shift. Our analysis controls for cohort fixed effects. But still, the variation in traditional values within the most vulnerable generation may matter.

To check whether our results are driven by the variation in the most affected generation per se (those born in 1925-40), we run a horserace between cultural shift and the level of believing in traditional culture for this generation. As shown in Appendix Table A.3, these two measures are positively correlated.

Table 8C presents the results. Columns (1)-(3) report the results in the district-level analysis and columns (4)-(6) for individual analysis. Without the cultural shift measure, the level also exhibits a positive effect. However, the level effect is clearly dominated by the gap effect once both are included, implying that our findings are specific to cultural shift rather than the level per se.

Alternative IV: State Policies Finally, our results may reflect the role of certain state policies such as pension. Do districts with bigger cultural shift also have different state policies? Taking advantage of the individual data, we can examine whether pension status or poverty benefit is associated with cultural shift or not. On average, only 9.7% of these aged 45 and above have pension and only 2.6% enjoy poverty benefit, consistent with the fact that the state plays little role in supporting the elderly.

As shown in columns (1)-(4) Table 8D, neither pension nor poverty benefit is affected by cultural shift, implying that our findings are unlikely to be driven by state policies.

Note that this finding does not say that pension matters little in elderly welfare. In fact, it shows that lack of state policies is an important factor for our findings. In addition, as shown in column (5), pension status has a mitigating effect on severe depression for the elderly, even though this effect does not affect our finding on cultural shift. Column (6) further shows that our baseline result regarding extreme depression also holds while controlling for pension status.

6 Discussion and Conclusion

Employing various sources of micro data and different empirical methods, we document that elderly suicide and elderly depression in South Korea can be partly explained by generational cultural shift – a consequence of compressed economic modernization. We also document the link from culture gap to family behavior to shed light on the mechanism.

Our study contributes to the understanding of elderly suicide in South Korea. As discussed, this logic is likely to apply to other East Asian economies like China.

Our study also provides a new perspective to existing research on culture and development. We describe the evolution of culture gap and provides evidence on its role in affecting elderly welfare. This opens new avenues of research on other consequences of cultural change.

In this section, we endeavor to take our analysis to the near future and to countries like China and Japan. If our results capture an important factor underlying elderly suicide in East Asia, we expect to see that the implications of our finding should also be consistent with what we observe in China and Japan. Limited by data, these discussions are merely suggestive.

Table A.6 presents different generations affected by cultural shift due to the compressed development in Japan (that took off around 1950), South Korea (that took off around 1965) and China (that took off around 1980).

For Japan, the generation comparable to that in our baseline analysis of South Korea are those born between 1910-25 (aged 85-100 in 2010). In contrast, for China, the generation are those born between 1940-55 (aged 55-70 in 2010).

Based on our analysis, we expect to see that the effect of cultural shift matters more in the next decade for China (without reform in state policies). In contrast, this problem is less of a concern for Japan as the most vulnerable cohorts exit from the population. This observation is also consistent with media attention on elderly suicide in Japan ten to fifteen years ago. Now, the attention is shifted to South Korea and China.[13]

[13]However, South Korea provides a more ideal laboratory to study cultural shift among these three countries because of its diversification in values. One needs to think carefully on how to measure culture when extend this study to other countries.

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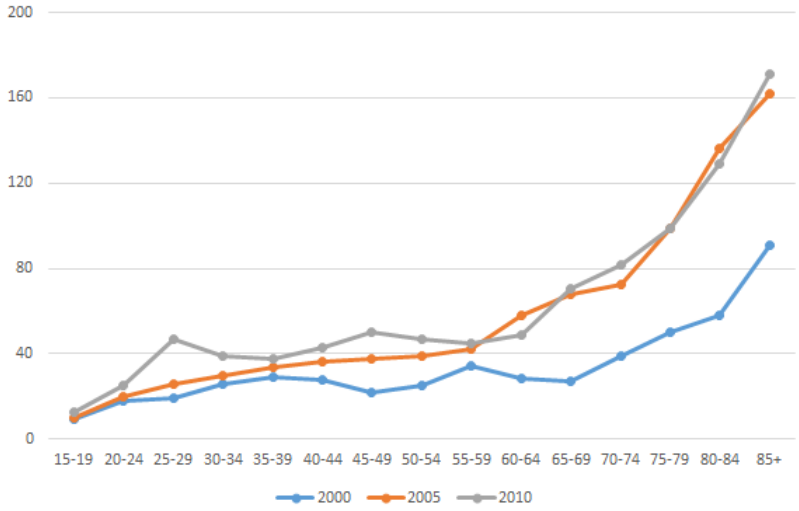
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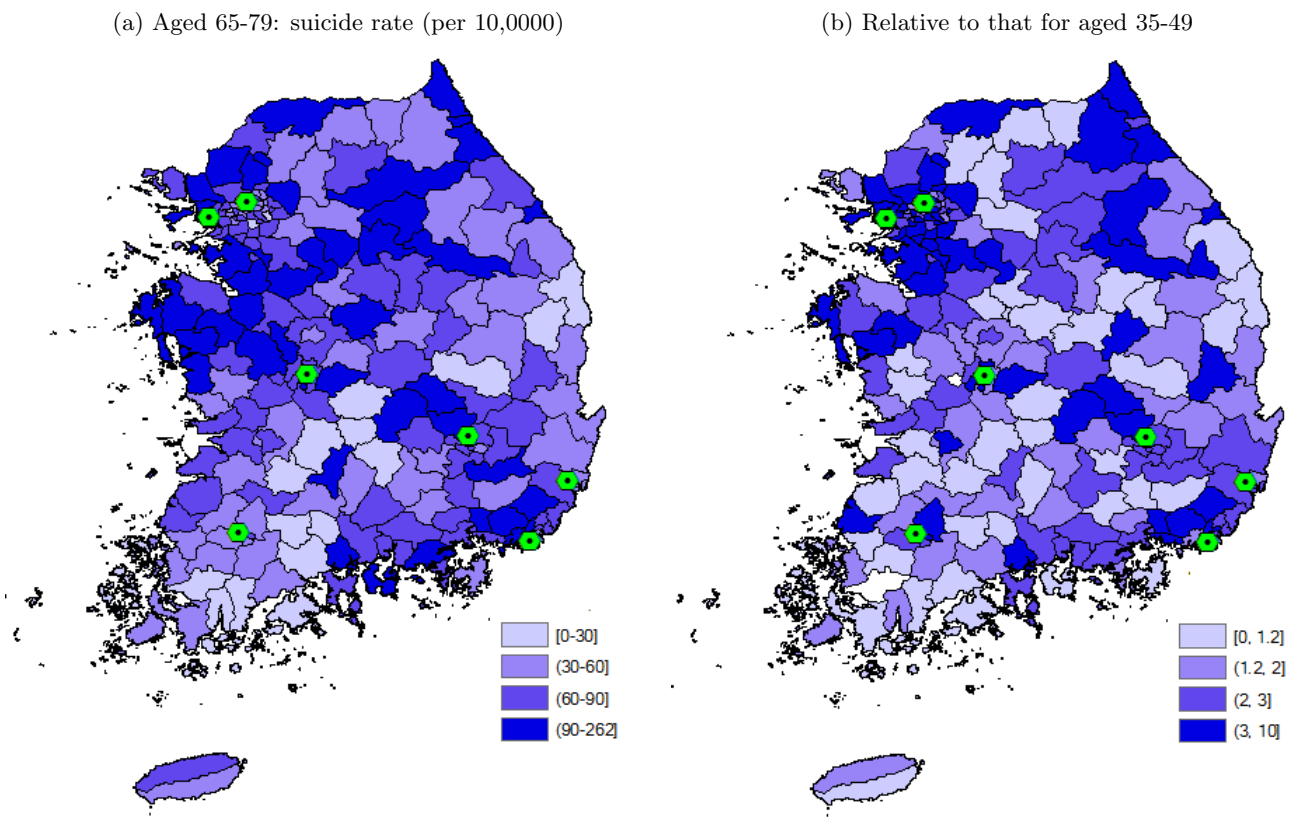
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Figure 1: Suicide Rates by Age Group in 2000-2010



Notes: Source: This figure plots suicide rates by 5-year age groups from three censuses. It shows a notable increase for the elderly.

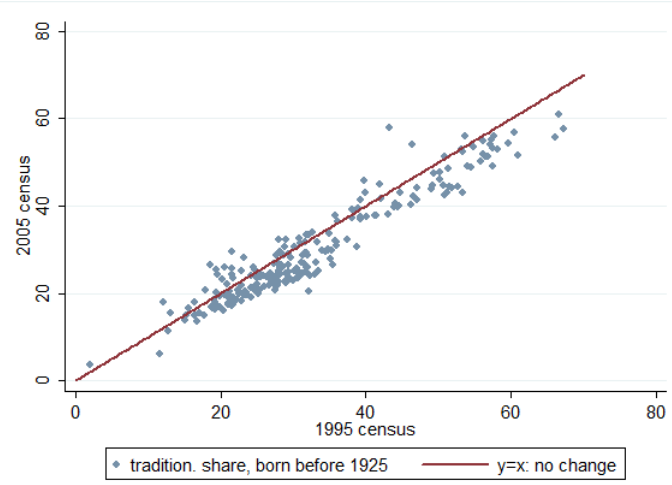
Figure 2: Spatial Pattern of Elderly Suicide in 2005



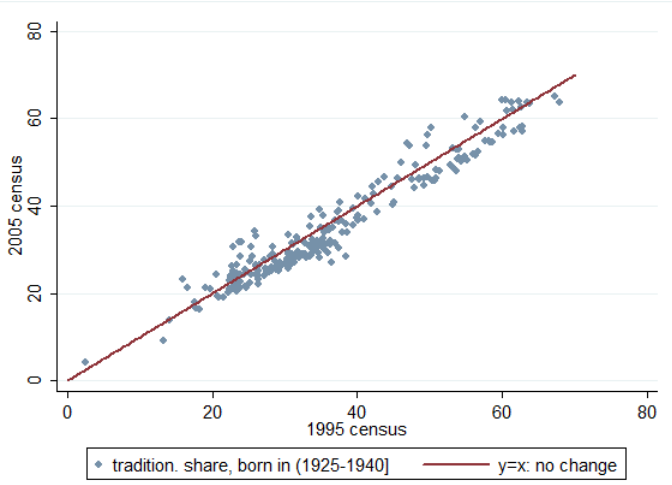
Notes: Panel (a) shows the absolute suicide rate for those aged 65-79 in 2005. Panel (b) shows its ratio relative to the suicide rate for those aged 35-50.

Figure 3: Traditional Culture in Censuses 1995 and 2005

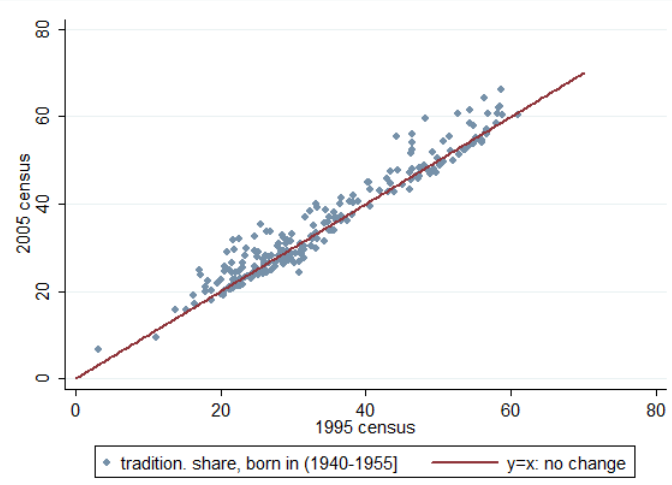
(a) Born bef. 1925



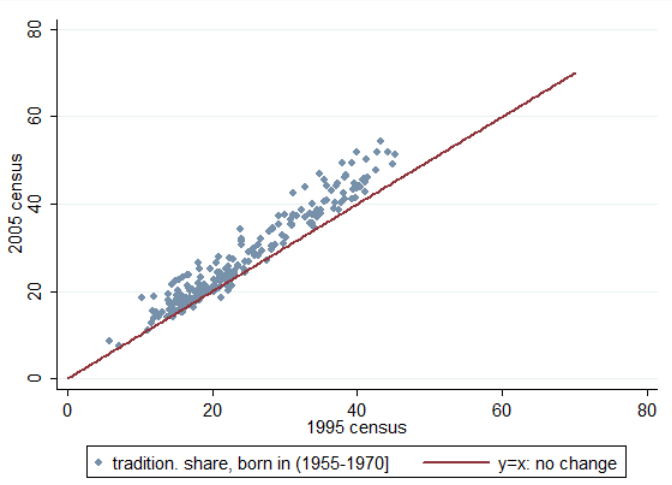
(b) Born in 1925-40



(c) Born in 1940-55



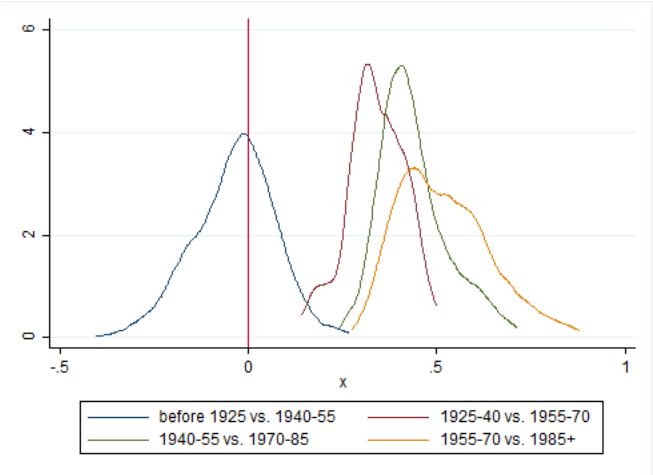
(d) Born in 1955-70



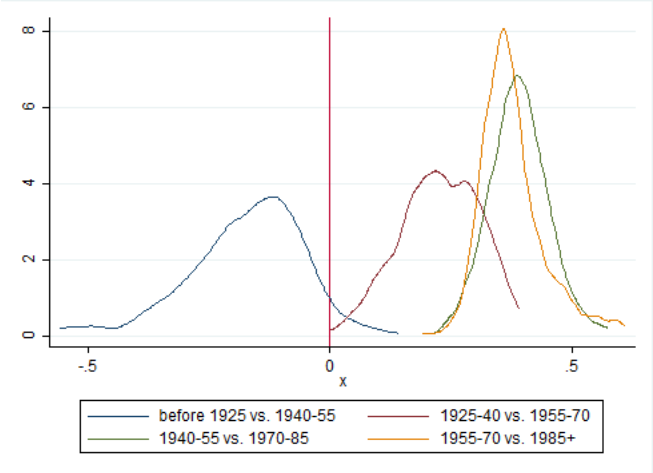
Notes: This figure shows a strong persistence of values for a given cohort across two censuses. If the dot is located above (or below) the 45 degree line, it implies that the district becomes more (or less) traditional in 2005 than in 1995.

Figure 4: Culture Shift Across Cohorts

(a) Based on 1995 Census

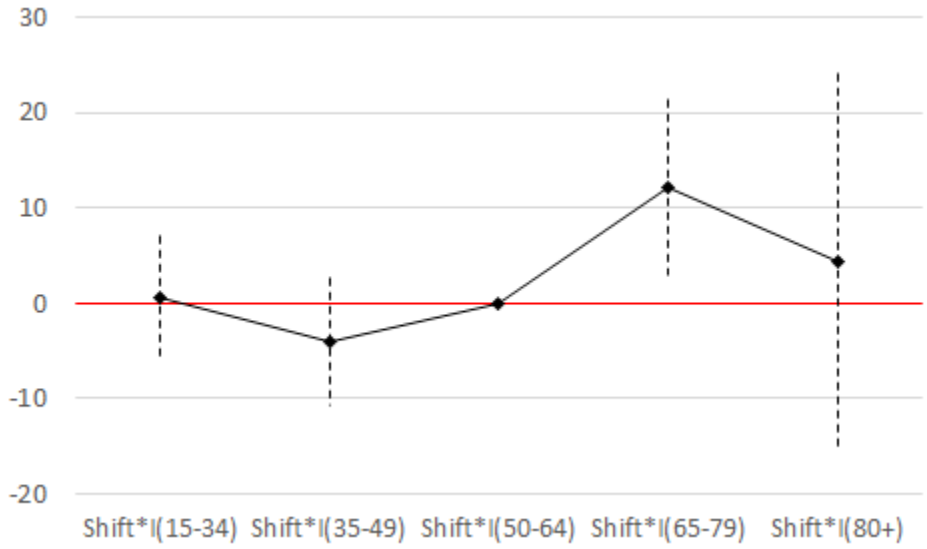


(b) Based on 2005 Census



Notes: This figure plots the distribution of cultural shift for different generations. It shows that for those born after 1925, the child generation is much less traditional than the parental generation. This is not the case for the very old (those born before 1925).

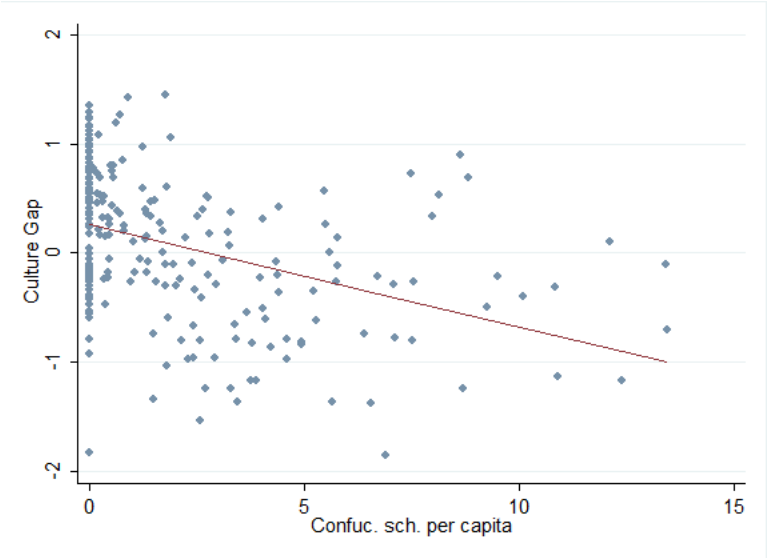
Figure 5: Impacts by Generation



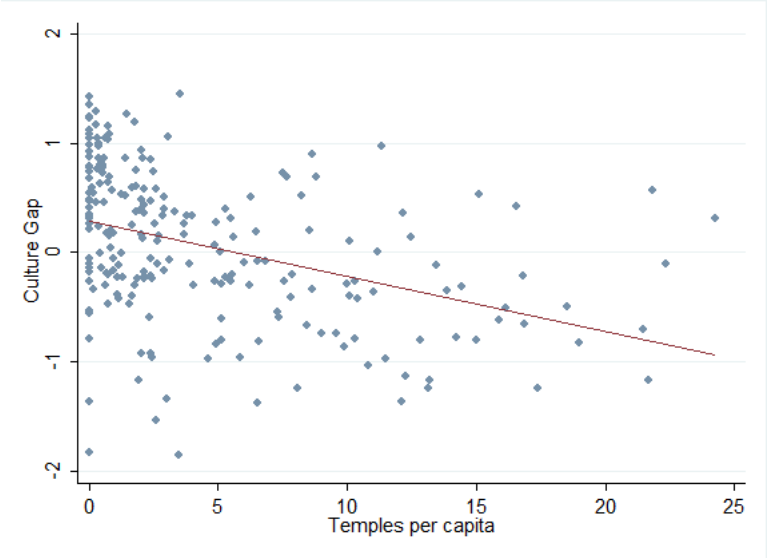
Notes: This figure visualizes the result in column (4) of Appendix Table A.4. It plots the impact of cultural shift generation by generation. The solid line connects the estimates and the dashed lines indicate the 95% confidence intervals with standard errors clustered at the district level. Those aged 50-64 are left as the comparison group.

Figure 6: Relevance of Instruments

(a) Confucius Schools per vs. Culture Gap



(b) Temples per vs. Culture Gap



Notes: This figure plots the correlation between the two instruments and cultural shift. The intuition is that districts with more historical institutions to indoctrinate traditional values experience smaller cultural shift.

Table 1: Summary Statistics

	Obs.	Mean	Std.	Min.	Max.
(1) Baseline: District-Sex-Cohort (5-year) in 2005					
Suicides per 100, 000 (all)	6793	47.20	66.83	0	378.07
Suicides per 100,000 (born in 1925-40)	1366	73.44	74.94	0	375.09
Culture Gap by district (for those b. in 1925-40)	230	0.23	0.08	0	0.39
GDP per capita in 2005 (mill. won)	230	19.51	11.40	5.51	99.31
Metropolitan Cities	230	0.32	0.47	0	1
All Deaths per 100,000	6793	2264.94	4238.60	0	31578.95
Male	6793	0.49	0.50	0	1
(2) District-Sex-Cohort (5-year) in 2000					
Suicides per 100,000 (all)	6868	27.02	49.77	0	384.62
Suicides per 100,000 (born in 1925-40)	1379	36.15	58.11	0	375.94
(3) District-Sex-Cohort (5-year) in 2010					
Suicides per 100,000 (all)	6798	52.74	67.96	0	383.14
Suicides per 100,000 (born in 1925-40)	1272	91.73	98.78	0	383.14
(4) Instruments					
Confucius Schools per 100,000	230	2.57	3.88	0	24.65
Temples per 100,000	230	5.14	6.60	0	30.75
(5) Individual from Elderly Survey (2006)					
Slight Depression (score >10)	10005	0.18	0.38	0	1
Severe Depression (score >17)	10005	0.04	0.20	0	1
Extreme Depression (score >23)	10005	0.01	0.11	0	1
Gap by Prov.-Urban (for those b. in 1930-40)	25	0.02	0.27	-0.65	0.45
Contact 1+ a day	6474	0.03	0.18	0	1
Contact 1+ a month	6474	0.47	0.50	0	1
Financial Support	6474	0.58	0.49	0	1
Has Pension	10078	0.10	0.30	0	1
Has Poverty Benefit	10078	0.03	0.16	0	1

Notes: This table reports the summary statistics for the main variables in the paper.

Table 2: Difference-in-Differences Results (D.V. Suicide Rates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean suicide rates (65-79)	73.4	73.4	73.4	73.4	73.4	73.4	73.4
Trad. Share 35-49 * Aged 65-79	-2.471**	-2.387**	-2.263**				
	(1.135)	(1.130)	(1.117)				
Trad. Share 65-79 * Aged 65-79	2.367***	2.284**	2.181**				
	(0.883)	(0.880)	(0.865)				
Trad. Share Diff. * Aged 65-79				2.155**			
				(0.848)			
Culture Shift (std) * Aged 65-79					13.415***	12.826***	12.437***
					(4.138)	(4.175)	(4.094)
District FE	Y	Y	Y	Y	Y	Y	Y
Province FE*Cohort FE	Y	Y	Y	Y	Y	Y	Y
Male*Cohort FE	Y	Y	Y	Y	Y	Y	Y
Death (d,c,s), Suicide (d,s)		Y	Y	Y		Y	Y
GDP Per*Cohort FE			Y	Y			Y
Observations	6,793	6,793	6,793	6,793	6,793	6,793	6,793
R-squared	0.326	0.338	0.339	0.339	0.292	0.338	0.339

Notes: This table reports the estimates from a difference-in-differences analysis. "Trad. Share Diff." indicates the difference between "Trad. Share 65-79" and "Trad. Share 35-49". "Culture Shift" is "Trad. Share Diff." normalized by "Trad. Share 65-79". Columns (5)-(7) report the impact of one standard deviation increase in "Culture Shift". Standard errors in parenthesis are clustered at the district level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3A: Robustness I – Placebo Using Other Causes of Death (D.V. Death Rates)

Deaths Rates from	(1) Cancer	(2) Cancer	(3) Respir.	(4) Respir.	(5) Cardio.	(6) Cardio.
Culture Shift (std) * Aged 65-79	5.147	-2.913	-3.445	-8.333	17.767	1.947
	(12.970)	(12.147)	(10.822)	(10.370)	(25.279)	(23.327)
District FE	Y	Y	Y	Y	Y	Y
Province FE*Cohort FE	Y	Y	Y	Y	Y	Y
Male*Cohort FE	Y	Y	Y	Y	Y	Y
Death (d,c,s), Suicide (d,s)		Y		Y		Y
GDP Per*Cohort FE		Y		Y		Y
Observations	6,639	6,639	6,641	6,641	6,601	6,601
R-squared	0.892	0.900	0.825	0.832	0.911	0.923

Notes: This table shows that cultural shift does not affect deaths from different diseases differently across generations. Standard errors in parenthesis are clustered at the district level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3B: Robustness II – Measurement Concerns

D.V.	(1) #Suicide	(2) #Suicide	(3) #Suicide	(4) Rates	(5) Rates	(6) Rates
Mean D.V (65-79)	1.81	1.81	1.81	73.3	73.3	73.3
Culture Shift (std) * Aged 65-79	0.253***	0.253***	0.249***	14.354***	13.798***	11.846***
	(0.089)	(0.090)	(0.090)	(4.638)	(4.598)	(4.432)
Pop.	0.000***	0.000***	0.000***			
	(0.000)	(0.000)	(0.000)			
Pop. Squared	0.000	0.000	0.000			
	(0.000)	(0.000)	(0.000)			
District FE	Y	Y	Y	Y	Y	Y
Province FE*Cohort FE	Y	Y	Y	Y	Y	Y
Male*Cohort FE	Y	Y	Y	Y	Y	Y
Death (d,c,s), Suicide (d,s)		Y	Y		Y	Y
GDP Per*Cohort FE			Y			Y
Excluding Big Cities				Y	Y	Y
Observations	6,793	6,793	6,793	4,644	4,644	4,644
R-squared	0.587	0.588	0.589	0.290	0.303	0.307

Notes: Columns (1)-(3) show that our baseline results are not driven by the functional form of suicide rates. Column (4)-(6) show that the baseline results hold when excluding the major metropolitan cities where migration is a concern for measuring cultural shift. Standard errors in parenthesis are clustered at the district level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: IV Results

	(1) Reduced form	(2) First stage	(3) IV1	(4) Reduced form	(5) First stage	(6) IV2	(7) Both
D.V.	Suicide rates	Cul. Shift	Suicide rates	Suicide rates	Cul. Shift	Suicide rates	Suicide rates
Culture Shift (std)			13.82**			10.86*	12.36**
			(6.521)			(6.523)	(6.106)
ConfuSch. per	-1.273**	-0.092***					
	(0.598)	(0..006)					
Temples per				-0.545*	-0.050***		
				(0.327)	(0.003)		
Male*Cohort FE	Y	Y	Y	Y	Y	Y	Y
X(d,c,s)	Y	Y	Y	Y	Y	Y	Y
GDP per capita	Y	Y	Y	Y	Y	Y	Y
F-stat		245.7			244.0		
Over-id							0.517
Observations	1,319	1,319	1,319	1,319	1,319	1,319	1,319
R-squared	0.281	0.195	0.273	0.280	0.194	0.277	0.275

Notes: This table reports IV results using two instruments. The F-statics show that neither of them is likely to be weak. Standard errors in parenthesis are clustered at the district level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: The Impacts Over Time 2000-2010 (for those born between 1925-40)
D.V.: Suicide Rates

	(1)	(2)	(3)
Culture Shift (std) * 2005	7.083*	6.915	7.950**
	(4.091)	(4.220)	(4.008)
Culture Shift (std) * 2010	7.140	6.862	10.885**
	(4.869)	(5.013)	(4.619)
Province FE*Cohort FE	Y	Y	Y
Sex*Cohort FE	Y	Y	Y
District FE		Y	Y
Death (d,c,s), Suicide (d,s)			Y
Observations	3,984	3,984	3,984
R-squared	0.195	0.268	0.302

Notes: This table reports the effect of cultural shift over time for the same generation – those born in 1925-40. Because they turn more vulnerable over time (before exiting from the population), the effect of culture gap becomes more important. Standard errors in parenthesis are clustered at the district level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: Culture Shift and Elderly Depression

	(1)	(2)	(3)	(4)	(5)	(6)
	depression (>10)		severe (>17)		extreme (>23)	
Mean D.V.	0.179		0.043		0.013	
Culture Shift (std) * Elderly	-0.002	-0.001	0.013**	0.019***	0.006*	0.011***
	(0.009)	(0.011)	(0.005)	(0.005)	(0.003)	(0.003)
Disability		0.077***		0.029**		-0.001
		(0.018)		(0.013)		(0.007)
# Chronic. disease		0.044***		0.012**		0.005*
		(0.006)		(0.005)		(0.002)
# Pain		0.039***		0.016***		0.005***
		(0.003)		(0.002)		(0.001)
Family income per		-0.016***		-0.002		0.002
		(0.004)		(0.002)		(0.003)
Survey Block FE	Y	Y	Y	Y	Y	Y
Sex*Elderly	Y	Y	Y	Y	Y	Y
ADL FE		Y	Y	Y	Y	Y
Observations	9,988	9,129	9,988	9,129	9,988	9,129
R-squared	0.258	0.348	0.185	0.276	0.147	0.217

Notes: This table reports the effect of cultural shift on different degrees of elderly depression. ADL is a scale variable indicating the need of physical assistance. Standard errors in parenthesis are clustered at province-urban level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7A: Culture Shift and Support from the Children

	(1)	(2)	(3)	(4)	(5)	(6)
	contact/meet 1+ a day		contact/meet 1+ a month		cash/in kind	
mean	0.034		0.471		0.584	
Culture Shift (std) * Elderly	-0.016**	-0.016*	-0.034	-0.035	-0.023	-0.027
	(0.007)	(0.008)	(0.025)	(0.027)	(0.026)	(0.025)
Disability		0.005		-0.047*		-0.018
		(0.010)		(0.027)		(0.027)
# Chronic. disease		0.000		0.001		0.012
		(0.004)		(0.006)		(0.008)
# Pain		-0.001		-0.007*		0.001
		(0.002)		(0.004)		(0.005)
Family income per		-0.006		0.004		-0.016*
		(0.004)		(0.008)		(0.009)
Survey Block FE	Y	Y	Y	Y	Y	Y
Sex*Elderly	Y	Y	Y	Y	Y	Y
ADL FE		Y		Y		Y
Observations	6,461	5,908	6,461	5,908	6,461	5,908
R-squared	0.334	0.344	0.352	0.370	0.421	0.436

Notes: This table reports the effect of cultural shift on support from the children. It shows that frequent contact is affected most. ADL is a scale variable indicating the need of physical assistance. Standard errors in parenthesis are clustered at province-urban level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7B: Support from the Children and Elderly Depression

	(1)	(2)	(3)	(4)	(5)	(6)
	severe	extreme	severe	extreme	severe	extreme
	0.043	0.013	0.043	0.013	0.043	0.013
1+ contact/meet a day	-0.016	-0.018*				
	(0.020)	(0.009)				
1+ contact/meet a month			-0.013*	-0.007*		
			(0.006)	(0.004)		
cash/in kind support					-0.015	-0.007
					(0.009)	(0.005)
Survey Block FE	Y	Y	Y	Y	Y	Y
Sex*Elderly	Y	Y	Y	Y	Y	Y
ADL FE, Health Conditions	Y	Y	Y	Y	Y	Y
Observations	5,881	5,881	5,881	5,881	5,881	5,881
R-squared	0.349	0.281	0.350	0.281	0.350	0.281

Notes: This table shows that support from the children matters for elderly depression. ADL is a scale variable indicating the need of physical assistance. Standard errors in parenthesis are clustered at province-urban level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8A: Alternative I – Shift in Economic Status

	(1)	(2)	(3)	(4)
Culture Shift (std) * Aged 65-79				9.644**
				(4.245)
Trad. Share 35-49 * Aged 65-79	-2.263**			
	(1.117)			
Trad. Share 65-79 * Aged 65-79	2.181**			
	(0.865)			
College Share 35-49 * Aged 65-79		0.196		
		(0.385)		
College Share 65-79 * Aged 65-79		0.661		
		(0.552)		
Education Shift (std) * Aged 65-79			-11.544***	-9.037**
			(3.689)	(3.787)
District FE	Y	Y	Y	Y
Province FE*Cohort FE	Y	Y	Y	Y
Male*Cohort FE	Y	Y	Y	Y
Death (d,c,s), Suicide (d,s)	Y	Y	Y	Y
GDP Per*Cohort FE	Y	Y	Y	Y
Observations	6,793	6,793	6,793	6,793
R-squared	0.339	0.339	0.339	0.340

Notes: This table shows that our baseline results cannot be explained by shift in education status. If anything, education shift mitigates elderly suicide. Standard errors in parenthesis are clustered at the province-urban level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8B: Alternative II – Mechanical Effect of Living Far Away

	(1)	(2)	(3)	(4)	(5)	(6)
D.V.	child live far		severe depression		extreme depression	
Mean D.V.	0.387		0.043		0.013	
Culture Shift (std) * Elderly	0.010	0.010		0.019**		0.009**
	(0.033)	(0.033)		(0.007)		(0.004)
Child Living Far			-0.004	-0.004	0.004	0.004
			(0.007)	(0.007)	(0.005)	(0.005)
Culture Shift (std) * Living Far			-0.003	-0.004	0.002	0.001
			(0.008)	(0.009)	(0.006)	(0.006)
Survey unit FE	Y	Y	Y	Y	Y	Y
Sex *Elderly	Y	Y	Y	Y	Y	Y
ADL FE, Health Conditions		Y	Y	Y	Y	Y
Observations	5,895	5,894	5,854	5,854	5,854	5,854
R-squared	0.402	0.405	0.349	0.350	0.281	0.282

Notes: Columns (1)-(2) show that cultural shift does not affect the probability of living far away from parents differently across generations. Columns (3)-(6) show that our basline results hold after controlling for the possibility of living far way. Standard errors in parenthesis are clustered at the province-urban level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8C: Alternative III – The Lost Generation

	(1)	(2)	(3)	(4)	(5)	(6)
	Suicide Rate: District			Extreme Depression: Individual		
Culture Shift * Aged 65-79	12.437***		11.445***			
	(4.094)		(4.311)			
Traditional Share * Aged 65-79		8.846	3.596			
		(5.473)	(5.667)			
Gap * Elderly				0.011***		0.010***
				(0.003)		(0.003)
Traditional Share * Elderly					0.044	0.033
					(0.034)	(0.027)
Province FE*Cohort FE	Y	Y	Y			
Sex*Cohort FE	Y	Y	Y			
District FE	Y	Y	Y			
Death (d,c,s), Suicide (d,s)	Y	Y	Y			
GDP Per*Cohort FE	Y	Y	Y			
Survey Block FE				Y	Y	Y
Sex*Elderly				Y	Y	Y
ADL FE, Health Conditions				Y	Y	Y
Observations	6,793	6,793	6,793	9,129	9,129	9,129
R-squared	0.339	0.338	0.330	0.217	0.216	0.217

Notes: This table shows that the effect of cultural shift is not driven by the level of traditional culture for the elderly generation per se. Standard errors in columns (1)-(3) are clustered at the district level and those in columns (4)-(6) are clustered at province-urban level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8D: Alternative IV – Culture Shift vs. State Policies

	(1)	(2)	(3)	(4)	(5)	(6)
D.V.	any pension	any pension	poverty benefit	poverty benefit	severe depression	extreme depression
Mean D.V.	0.097	0.097	0.025	0.025	0.043	0.013
Culture Shift (std) * Elderly	-0.026	-0.026	0.001	-0.000	0.018***	0.011***
	(0.021)	(0.023)	(0.005)	(0.005)	(0.005)	(0.003)
Any Pension					-0.014**	-0.001
					(0.005)	(0.004)
Survey Block FE	Y	Y	Y	Y	Y	Y
Sex *Elderly	Y	Y	Y	Y	Y	Y
ADL FE, Health Conditions		Y		Y		Y
Observations	10,061	9,193	10,061	9,193	9,129	9,129
R-squared	0.180	0.202	0.241	0.261	0.276	0.217

Notes: This table shows that cultural shift is not correlated with state policies such as pension status. It also shows that few elderly have access to pension. Standard errors in parenthesis are clustered at province-urban level: * significant at 10%; ** significant at 5%; *** significant at 1%.

A Appendix

A.1 A Conceptual Framework

Why does cultural shift matter for suicide? We present a simple conceptual framework to illustrate the mechanism. Consider a continuum of families in a district that comprises of the young and the old.

The Young's Choice of Providing Care The young choose to provide care ($c = 1$) or not ($c = 0$). The utility for the young is as follows:

$$U^Y(c) = \beta V^O(c) - ce + c\varepsilon - (1-c)R(T^Y)$$

where V indicates the utility of the old. β captures the altruistic possibility.

The cost of providing care has two components: aggregate cost e and individual-level cost ε following a distribution $F(\cdot)$.

R indicates reputation effect of not providing care. How to measure the importance of reputation costs? We use the importance of traditional culture (for the young cohorts). If most of the young in a district believe in traditional culture, it is more costly to default.

The young choose to default iff

$$U^Y(1) - U^Y(0) = -e + \varepsilon + \beta[V^O(1) - V^O(0)] + R(T^Y) < 0$$

i.e.,

$$\varepsilon < e - R(T^Y) - \beta[V^O(1) - V^O(0)]$$

Thus, the probability of default is:

$$P \equiv F[e - R(T^Y) - \beta[V^O(1) - V^O(0)]$$

With economic modernization, R becomes less important, e.g., because modern societies have other channels to signal types. There can be regional variations in R, which is our empirical focus.

Modernization can also affect e, which is increased due to high opportunity costs such as working in the cities.

The Old's Choice of Suicide The old choose suicide iff his utility is smaller than what he expects to get plus an individual-level shock. His expectation is affected by the traditional culture for his generation in a district, i.e., $E(T^O)$.

$$V^O(c) < E(T^O) + \eta$$

where η follows a distribution $G(\cdot)$.

For simplicity, we assume $V(1) > E(T^O) + \underline{\eta}$, then we can focus on the case where the young default. The probability $V^O(0) < E(T^O) + \eta$ is $1 - G[V^O(0) - E(T^O)]$. As a result, the probability of suicide becomes:

$$F[e - R(T^Y) - \beta[V^O(1) - V^O(0)] \bullet \{1 - G[V^O(0) - E(T^O)]\}$$

Therefore, we expect a positive effect of T^O but a negative effect of T^Y on suicide probability.

A.2 Culture and Attitudes Toward Elderly Care and Suicide

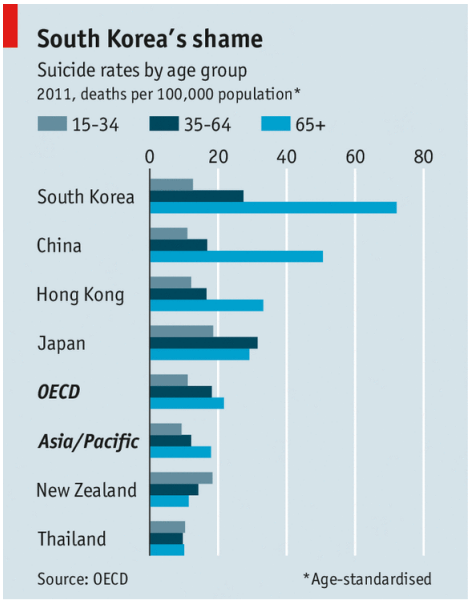
This section examines the correlation between traditional culture and attitudes toward supporting the parents and attitudes toward suicide.

The data come from Korean General Social Surveys started in 2003. Each wave of the surveys interviews around 1,600 individuals on different topics. More questions on family support are asked in 2006 while more on suicide are asked in 2009. Major demographic information on the individuals are reported in the surveys such as age, gender, and religion. With these information, we examine the correlation between traditional culture (believing in Buddhism or Confucianism) and attitudes toward supporting the elderly and attitudes toward suicide. To improve the comparability of individuals, we control for gender fixed effects, age fixed effects and survey block fixed effects.

Column (1) in Table A.2 reports the correlation with strongly believing that sons should support their parents. Column (2) reports the correlation with the probability of contacting the mother at least once a day and column (3) for that for the father. In all the cases, believing in traditional culture is positively correlated with more support toward the parents.

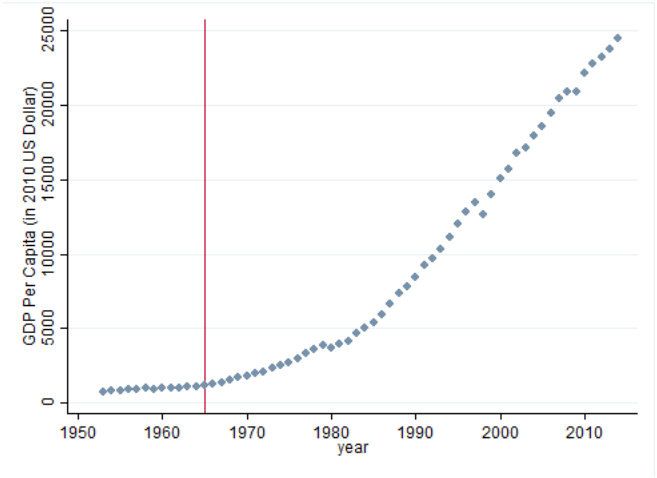
Columns (4)-(7) report the correlations with attitudes toward suicide including (i) whether people have right to commit suicide, (ii) whether people can discuss suicide, (iii) whether suicide is a sin, and (iv) whether one has ever thought about suicide. As shown, believing in traditional culture is not significantly correlated with any of these attitudes.

Figure A.1: Elderly Suicide Across Countries in 2011



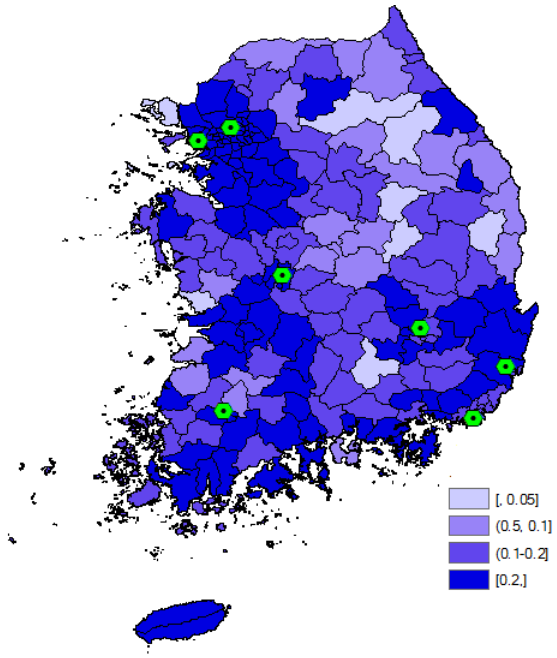
Notes: Source: Economist (2013). This figure shows that elderly suicide rates in East Asia is much higher than other regions.

Figure A.2: GDP Per Capita



Notes: This figure plots GDP per capita in South Korea since 1953. South Korea took off around 1965.

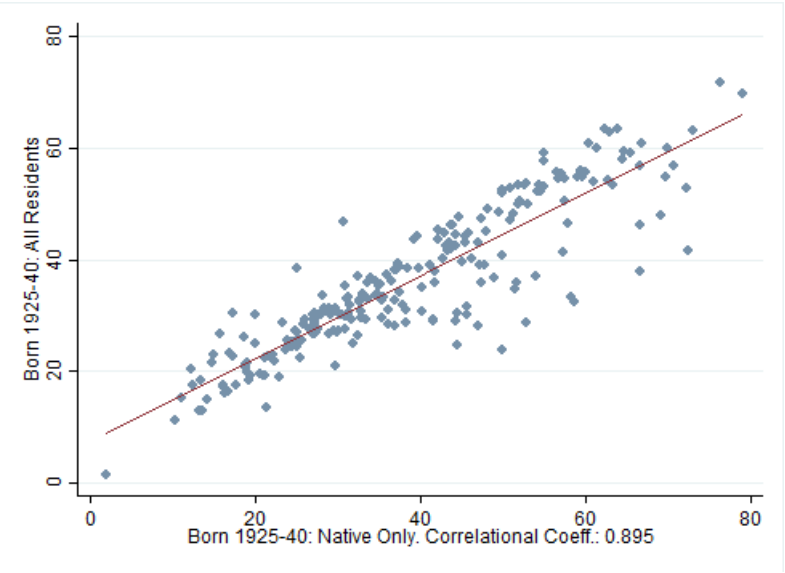
Figure A.3: Spatial Variation in Value Shift



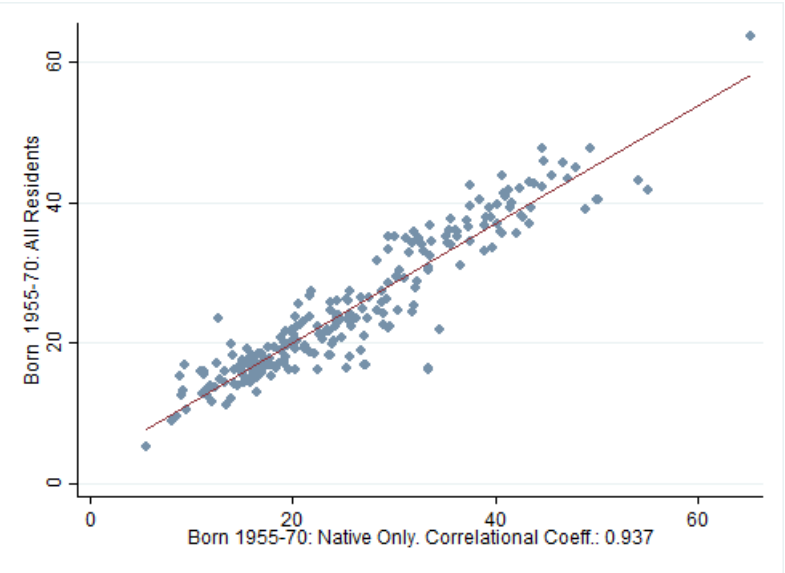
Notes: This figure plots the spatial distribution of cultural shift and shows a wide variation across districts.

Figure A.4: Values of Natives vs. Residents in the 1995 Census

(a) Born in 1925-40



(b) Born in 1955-70



Notes: This figure plots the values calculated based on natives only vs. those based on all residents. They are highly correlated with each other.

Table A.1: Value Shift by Generations

(1) Birth Year	(2) Korea Development	(3) Tradition (Own)	(4) Child Cohort	(5) Tradition (Child)	(6) Culture Shift	(7) Age in 2005	(8) In Need
before 1925	slow	high	**(1940-55]**	high	small	80+	Y
(1925-40]	slow	high	(1955-70]	low	**large**	[65,80)	**Y**
(1940-55]	slow	high	(1970-85]	low	large	[50,65)	N
(1955-70]	fast	low	1985+		ambigu.	[35,50)	N
(1970-85]	fast	low				[20,35)	
1985+	fast	low				below 20	

Notes: This table illustrates the two sources of variation we explore. The first is cultural shift and the other is age. Those marked in bold grew up in a more traditional economy.

Table A.2: Traditional Culture vs. Family Values & Suicide

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
KGSS Year	2006	2006	2006	2009	2009	2009	2009
	Sons Should Support Parents	Contact Monther Daily	Contact Father Daily	Suicide Right	Suicide Discussion	Suicide Sin	Suicide Thought
Mean	0.278	0.271	0.184	0.308	0.404	0.687	0.129
Traditional	0.055**	0.043*	0.039**	0.031	-0.009	0.021	0.005
	(0.027)	(0.023)	(0.020)	(0.030)	(0.029)	(0.031)	(0.022)
Age FE	Y	Y	Y	Y	Y	Y	Y
Sex FF	Y	Y	Y	Y	Y	Y	Y
Block FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,605	1,605	1,605	1,599	1,599	1,599	1,599
R-squared	0.244	0.453	0.457	0.215	0.097	0.214	0.191

Notes: This table shows that believing in traditional culture is positively correlated with believing in supporting parents but not significantly correlated with attitudes toward suicide. Standard errors in parenthesis are clustered at the survey block level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.3: Correlations with Culture Shift (D.V.: Shift for those b. 1925-40)

	(1)	(2)	(3)	(4)
Traditional Share b. in 1925-40	0.004***			0.004***
	(0.001)			(0.001)
GDP per capita 2005		0.001*		0.001
		(0.000)		(0.000)
Distance to Nearest Metropolitan City			-0.005***	-0.005**
			(0.002)	(0.002)
Province FE	Y	Y	Y	Y
Observations	230	230	226	226
R-squared	0.543	0.483	0.491	0.550

Notes: This table reports the correlation between district characteristics and cultural shift. A bigger shift is positively associated with a higher initial level of traditional share in the district. It is also positively associated with higher GDP per capita and being closer to metropolitan cities.

Table A.4: Difference-in-Differences Results (D.V. Suicide Rates)

	(1)	(2)	(3)	(4)	(5)
	vs. those aged 50-64				vs. all others
Culture Shift * Aged 15-34	-0.025	0.141	-0.054	0.531	
	(3.281)	(3.334)	(3.332)	(3.333)	
Culture Shift * Aged 35-49	-4.108	-3.875	-3.984	-4.022	
	(3.396)	(3.438)	(3.421)	(3.443)	
Culture Shift * Aged 65-79	13.077***	12.972***	12.352***	12.231***	
	(4.686)	(4.714)	(4.727)	(4.694)	
Culture Shift * Aged 80+	4.894	4.743	3.798	4.325	
	(9.772)	(9.817)	(9.920)	(10.065)	
	-0.025	0.141	-0.054	0.531	
Culture Shift * Aged 65-79					12.437***
					(4.094)
Province FE*Cohort FE	Y	Y	Y	Y	Y
Sex*Cohort FE	Y	Y	Y	Y	Y
District FE		Y	Y	Y	Y
Death (d,c,s), Suicide (d,s)			Y	Y	Y
GDP Per*Cohort FE				Y	Y
Observations	6,793	6,793	6,793	6,793	6,793
R-squared	0.292	0.326	0.338	0.340	0.339

Notes: This table reports the estimates from a difference-in-differences analysis generation by generation. Those aged 50-64 are left as a comparison. Standard errors in parenthesis are clustered at the district level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.5: Objective Measures of Health

	(1) ADL	(2) Independent	(3) Disability
	0.178	0.952	0.065
Culture Shift * Elderly	-0.070**	0.017*	-0.008
	(0.033)	(0.009)	(0.009)
Survey Block FE	Y	Y	Y
Sex*Elderly	Y	Y	Y
Observations	10,061	10,061	10,061
R-squared	0.128	0.148	0.140

Notes: This table shows the results on some measures of health conditions. A higher ADL value indicates more need of assistance (or less independence). If anything, cultural shift is associated with better health conditions. Standard errors in parenthesis are clustered at the province-urban level: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.6: Timing of Takeoff – Japan, South Korea and China

		Japan	Korea	China
Economies took off around:		1950	1965	1980
young growing up in fast development		1940-55	1955-70	1970-1985
the vulnerable cohort		1910-25	1925-40	1940-1955
the vulnerable cohort turns:				
	65	1975-1990	1980-2005	2005-2020
	75	1985-2000	1990-2015	2015-2030
	80	1990-2005	1995-2020	2020-2035
exit		after 2005	after 2020	after 2035

Notes: This table describes the evolution of the problems in Japan, South Korea and China, which is affected by the timing of economic takeoff in these countries.