THE LASTING WELL-BEING EFFECTS OF EARLY ADULTHOOD MACROECONOMIC CRISES

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This paper studies the effects of macroeconomic crises experienced in early adulthood on subjective well-being (SWB) later in life. Using repeated cross-sectional survey data of over 100,000 individuals from 38 countries around the world combined with historical data on macroeconomic circumstances, I find that having experienced a macroeconomic crisis at ages 18–25 is detrimental to SWB. This result is in line with earlier literature that focuses on other individual-level outcomes. However, the analysis presented in this paper reveals that outcomes related to individual's earnings, employment status, family life, and religion cannot fully explain the lasting effect of macroeconomic crises on well-being. Results on heterogeneous responses show that the negative effect is largest for females and for individuals with low educational attainment.

1. INTRODUCTION

Previous literature has shown that recessions experienced in early adulthood have lasting effects on a variety of individual-level outcomes. Giuliano and Spilimbergo (2014) find that preferences on redistribution are different for those individuals who have experienced a macroeconomic crisis in early adulthood. Bianchi (2013) shows that, among employed individuals with a college degree, job satisfaction is higher if an individual has graduated during a recession. Malmendier and Nagel (2011) report that experienced past recessions are also associated with individuals' risk taking later in life. Furthermore, a number of studies have found that labor market outcomes are less favorable for those cohorts that graduated from college or university during a bad economy (see, e.g., Oyer, 2006; Kahn, 2010; Oreopoulos *et al.*, 2012). Maclean and Hill (2015) show that individuals' self-esteem is also affected by the macroeconomic circumstances at school graduation.

However, so far there is no analysis on the lasting effects of macroeconomic crises experienced in early adulthood on individuals' happiness and life satisfaction.

This study fills this gap in the literature by examining the lasting well-being effect of a crisis experienced at ages 18–25. This paper contributes to the existing literature by providing estimates of the very long-term (extending over 20 years) effects of macroeconomic events on subjective well-being (SWB). A novelty of this paper is that it utilizes international differences in the timing of past macroeconomic crises to analyze their lasting effects on individuals' SWB. Using repeated cross-section data of over 100,000 individual respondents to the World Values Survey (Inglehart *et al.*, 2014; EVS, 2015) combined with historical data on macroeconomic circumstances allows us to compare the early adulthood experiences between multiple birth cohorts in multiple countries.

Macroeconomic crises can have immediate and long-term effects on young adults' SWB due to biological, psychological, and economic reasons. During the years of early adulthood, the human brain is still in the process of developing, and because of this developmental plasticity, individuals who face unfavorable environments can also experience enduring suffering in the course of their lives (Steinberg, 2014). When it comes to individual psychology and personality, Krosnick and Alwin (1989) have theorized that during the impressionable years of 18–25, individuals' values, attitudes, and worldviews are formed and that they change very little in later years of adulthood. These characteristics, in turn, affect how individuals feel about their lives and circumstances. According to the life-course model of well-being presented by Layard *et al.* (2014), early-life circumstances can affect adult well-being both directly, as described by the above theories, or indirectly through their impact on other adult outcomes.[1]

From this set up three questions arise. First, does a macroeconomic crisis experienced in early adulthood affect well-being later in life? Second, if there are effects, are these what Layard *et al.* (2014) call direct effects or are they explained by observed outcomes later in life? Third, if there are well-being effects, is there any evidence indicating that individuals may recover from them?

Results from empirical economic research suggest that macroeconomic crises may have long-term effects on SWB. Using cross-country panel data, Hovi and Laamanen (2021) find that the negative long-run effects of GDP decreases on average national SWB are large as compared to the effects of economic growth. At the individual level, economic turmoil leads to individuals facing unemployment, falling income, or both. Clark *et al.* (2016) show that a negative change in individual's income is associated with effects on SWB even years after the change. Micro literature has also found that experiences of unemployment can scar individuals to the extent that their well-being does not return to its initial level even after re-employment (Clark *et al.*, 2001, 2008).

Individual-level studies focusing on negative economic circumstances and events in early adulthood support the notion of well-being effects later in life. For example,

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[1]The life-course model of well-being presented in Layard *et al.* (2014) focuses on the well-being impacts of ind2019ividual's childhood characteristics and family background, whereas my analysis is about the impacts of macroeconomic events experienced in early adulthood. However, in both cases, the distinction between direct and indirect effects is a useful one.

adverse economic conditions at school leaving may have cumulative impacts on individuals' opportunities, resources, and experiences in later adulthood (Maclean and Hill, 2015). As a result, bad early experiences in the labor market may have lasting impacts on individual well-being (Bell and Blanchflower, 2011). Experiences of unemployment are especially detrimental for young adults because of their negative effect on mental health (see, Mossakowski, 2009; Bell and Blanchflower, 2011; Strandh *et al.*, 2014). Clark and Lepinteur (2019) focus specifically on the impacts of unemployment experiences in early adulthood and find significant scarring effects.

When it comes to psychological mechanisms, De Neve *et al.* (2018) note that one of the psychological channels through which macroeconomic downturns can impact individuals' SWB is an increase in uncertainty and negative economic expectations. If such impacts are long lasting, then early adulthood macroeconomic crises can also have long-run effects on well-being. A similar mechanism is the fear of becoming unemployed in the future induced by past negative economic circumstances (Knabe and Rätzel, 2011).

The results presented in this paper show that experiencing a macroeconomic crisis between the ages of 18 and 25 has a negative effect on SWB later in life which can last, on average, up to 20 years. I find that this well-being effect is not fully transmitted through outcomes related to earnings, employment status, family life, or religion. According to the results, low-educated females are most affected by the crisis. For this group the negative effect on happiness (life satisfaction) can last more than (up to) 20 years. Similarly, middle-educated females experience declines in well-being that may last up to 20 (10) years for happiness (life satisfaction). For low-educated males the negative effect on SWB is significant up to 10 years.

These results highlight the importance of macroeconomic developments that individuals face when entering adulthood. One implication of the results is that stabilization policies may have positive long-term impacts on the well-being of individuals. Based on the results presented in the paper, future studies should focus on further identifying the indirect channels through which the long-term relationship may operate to determine the most efficient policies in the aftermath of a severe macroeconomic crisis.

The paper is organized as follows. In Section 2, I describe the data sets and the empirical model used in the analysis. In Section 3, I present the estimation results, and in Section 4, I study the robustness of the results. Section 5 concludes.

2. Data and Methods

2.1. *Data*

I use the combined World Values Survey and European Values Study data (WVS, from here onwards). The WVS provides the best available data for testing the lasting effects of macroeconomic crises because it is the longest running international repeated cross-section study that has included all the relevant survey questions. The WVS includes two questions on individual well-being: happiness, measured on a scale from 1 to 4, and life satisfaction, measured on a scale from 1 to 10. Incorporating both measures into the analysis allows us to assess the lasting effects of past crises on different aspects of well-being. In addition to the SWB questions, the WVS collects

information on respondent's age, gender, relationship status, religious beliefs, educational level, number of children, employment status, and position in her country's income distribution. Following the earlier empirical literature, I use these attributes as control variables in the analysis conducted in the next section.

The WVS has been conducted since 1981, but the first questionnaires that include all of the above-mentioned questions are from 1989. Thus, the time period used in the analysis runs from 1989 to 2014. However, the WVS is not conducted annually, but in waves. There is on average 60 years between two questionnaires in a country. Each time the survey is conducted, about 1000 individuals are interviewed within a country. I combine the WVS data with Barro and Ursúa's (2008) data on real GDP per capita, which is based on the Angus Maddison's output time series for 40 countries. I augment this real GDP per capita series with data from the World Bank's World Development Indicators (WDI) to include the years 2007–2014. To include information about the economic development of Taiwan, I use the IMF's World Economic Outlook (WEO) data on real GDP growth for 2007–2014. The combined data include individuals from 38 countries. Two countries are excluded because of missing data in the WVS.[2] The use of historical output series allows us to link even the older respondents in the earliest waves of the WVS with the macroeconomic situation they faced in their youth.

To link the WVS respondents with the economic circumstances in their youth, I need information about the birth cohort of each individual. Most of the WVS surveys gather information not only on respondent's age, but also on respondent's birth year. For each individual I calculate the birth cohort as survey year minus the reported age. If this calculated birth cohort differs by more than one from the reported birth year, then the individual is excluded from the analysis. I include all individuals from those surveys where question about the birth year was not included and calculate their birth cohort as described above.

Because my focus is on examining the lasting effects of macroeconomic crises on well-being, I restrict the estimation sample to include only individuals who are older than 25 at the time of the survey. This is standard in studies that examine the long-run impacts of macroeconomic circumstances that take place at a certain age or at a certain life event (see, e.g., Kahn, 2010; Giuliano and Spilimbergo, 2014; Maclean and Hill, 2015).

2.2. *Baseline Specification*

Following Barro and Ursúa (2008), I define a crisis period as one where the cumulative real GDP per capita decline over the course of years is 10 percent or more. During a crisis period, the real GDP does not have to decline every year, but the overall decline in output has to be at least 10 percent from peak to trough.

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[2]For readability, I use the term "countries" to refer to the territorial bodies (mostly sovereign nations) for which there are distinct WVS data sets. These territorial bodies are: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Denmark, Egypt, Finland, France, Germany, Greece, Iceland, India, Indonesia, Italy, Japan, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Peru, the Philippines, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, the United Kingdom, the United States, Uruguay, and Venezuela. Sri Lanka cannot be included in the sample because the WVS questionnaires have not been conducted there. Portugal, although included in the WVS, does not have all the relevant individual-level variables needed for the analysis.

Figure A1 in the Online Appendix shows the crisis years for each country based on this definition. As in Giuliano and Spilimbergo (2014), I link each respondent to the macroeconomic history of her country by creating a dummy variable $shock_{ict}^{18-25}$ equal to one, if the individual lives in a country that experienced at least one crisis year when the individual was 18–25 years old. When the information about the birth country of the respondent is available, I exclude all immigrants from the analysis.

To assess the impact of these negative macroeconomic shocks on individual SWB, I use OLS to estimate

$$(1) \quad \begin{aligned} SWB_{ict} = \beta_0 + \beta_1 shock_{ict}^{18-25} + \beta_2 shock_{ct} \\ + \psi_c + \delta_t + \eta_{age} + \eta_{cohort} + \psi_c * cohort_{ict} + \gamma' X_{ict} + \epsilon_{ict}, \end{aligned}$$

where SWB_{ict} is the self-reported well-being of individual i in country c in survey year t, δ_t, ψ_c, η_{age}, and η_{cohort} control for year-, country-, age-, and birth-cohort specific fixed effects, respectively, $cohort_{ict}$ is the birth year of individual i, X_{ict} is a vector of individual specific control variables, and ϵ_{ict} is the error term.[3,4] To control for the current macroeconomic situation, I include variable $shock_{ct}$, a dummy equal to one if country c is experiencing a crisis during the survey year t. The individual-level control variables included in X are: number of children (if number of children is less than 8, otherwise zero), a dummy that equals one if the number of children is 8 or more, gender (1 if male), two dummies for highest educational level attained (middle education dummy gets value 1 if individual has completed secondary school education or has incomplete university-preparatory type schooling, high education dummy that gets value 1 if individual has attained a university-level degree or has some university-level education without a degree, and low education with incomplete secondary school as the reference group), five dummies for relationship status (married, living together as married, divorced, separated, widowed, and single/never-married as the reference group), five dummies for religious denomination (Muslim, orthodox, protestant, Roman Catholic, other, and no religious denomination as the reference group), seven dummies for employment status (part-time employed, self-employed, retired, housewife, student, unemployed, other, and full-time employed as the reference group), and nine dummies for income deciles (lowest decile as the reference group).

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[3]In the estimation, I use population weights reported in the WVS to make samples representative for each country-year specific population from which they are drawn. I scale the weights so that their average equals one in each country-year cell. For those country years without reported weights, each individual is weighted equally. As a robustness check, I have also tested the results using weights which consider the relative population differences between the sample countries. Using such weights, the estimated negative effects of early adulthood crises on happiness and life satisfaction are larger than the ones reported in the paper.
[4]In a repeated cross section with multiple countries, age-, year-, and cohort-specific fixed effects can be included as controls simultaneously. Thus, following Giuliano and Spilimbergo (2014) and Malmendier and Nagel (2011), I include the maximum number of age-, year-, and cohort dummies possible to control for their respective effects. This means that after controlling for age- and year fixed effects, I am able to include 86 cohort dummies into the model when using a sample with individuals from 88 different cohorts. I also find similar results for the baseline models when all cohort dummies are excluded from the model.

Cohort fixed effects control for the experiences that are shared globally and could affect SWB, such as the technological progress. In all specifications, I also control for nonlinear global age trends in SWB by including age dummies in the model. Because the coefficient of interest, β_1, is identified from the differences in experiences across birth cohorts within a country, I want to make sure that I am not estimating the effect of some omitted country-specific cohort trend. To rule out this possibility, I also include variables $\psi_c * cohort_{ict}$ into the model. Therefore, for each country, I control for a linear trend in birth cohort. I acknowledge that the method used does not guarantee the identification of causal effects. However, I have chosen to use expressions such as "affect" or "the effect of" when discussing the results found in this paper.

3. RESULTS

3.1. *Baseline Results*

Table 1 shows the results from estimating equation (1) with OLS with country-clustered standard errors. Although the dependent variables are measured on a discrete scale, I have chosen to use OLS to ease the interpretation and to keep the results comparable with the existing literature. I report the results from ordered probit estimations in Table A3 in the Online Appendix.

In Column 1 of Table 1, I regress happiness on the early adulthood shock dummy, the current shock dummy, and on those control variables that cannot be considered as possible outcomes of the early adulthood shock. Therefore, I only control for those individual-level variables that measure age, cohort, and gender. The variable of interest, $shock^{18-25}$, enters with a negative coefficient estimate, which is statistically significantly different from zero at the 5 percent level. To be more conservative, I test the significance of the coefficients using critical values from a $T(G\text{-}1)$ distribution with degrees of freedom based on the number of clusters ($G = 38$).[5]

In Column 2 of Table 1, I add controls for the number of children, education, religion, and relationship status. All these variables can be affected by a crisis experienced in early adulthood and, therefore, the happiness effect may be mediated through them. However, in Column 2, the estimated coefficient for $shock^{18-25}$ remains very similar in magnitude and still statistically significantly different from zero. This implies that the added controls do not mediate the effect of early adulthood macroeconomic crisis on happiness.

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[5]I have conducted two different robustness checks to address the small number of clusters. First, I have corrected the standard errors using Wild Bootstrap method suggested by Cameron *et al.* (2008). This exercise shows that the coefficient of interest is statistically significant at the 5 percent level in all models of Happiness in Table 1 and statistically significant at the 10 percent level in Column 4 for life satisfaction, but not significant in columns 5 and 6 where the potential mediator variables are introduced. Second, I have also tried clustering the standard errors at the level at which the explanatory variable varies, that is, country-cohort level. According to this robustness check, the coefficient of interest is statistically significant at the 1 percent level in Columns 1, 2, 3, and 4 of Table 1 and statistically significant at the 5 percent level in Columns 5 and 6. These results are not reported here but are available upon request.

TABLE 1
SWB and Macroeconomic Shocks

	(1)	(2)	(3)	(4)	(5)	(6)
	Happiness	Happiness	Happiness	Satisfaction	Satisfaction	Satisfaction
Shock[18–25]	−0.037**	−0.035**	−0.035**	−0.079**	−0.073*	−0.071*
	(0.014)	(0.014)	(0.013)	(0.036)	(0.036)	(0.035)
Current shock	−0.289***	−0.282***	−0.274***	−0.685***	−0.653***	−0.592***
	(0.073)	(0.077)	(0.060)	(0.235)	(0.239)	(0.166)
Male	−0.032**	−0.051***	−0.041***	−0.071*	−0.119***	−0.111***
	(0.013)	(0.013)	(0.010)	(0.039)	(0.041)	(0.024)
Middle education		0.082***	0.040**		0.288***	0.102*
		(0.027)	(0.018)		(0.085)	(0.052)
High education		0.132***	0.044**		0.517***	0.134**
		(0.031)	(0.017)		(0.096)	(0.051)
Number of children		−0.009*	−0.005		−0.029*	−0.008
		(0.006)	(0.004)		(0.015)	(0.011)
Number of children: 8 or more		−0.033	−0.005		−0.077	0.046
		(0.036)	(0.032)		(0.087)	(0.068)
Religion						
Muslim		0.046	0.057		0.073	0.124
		(0.042)	(0.043)		(0.123)	(0.117)
Orthodox		0.056	0.066		−0.054	−0.005
		(0.076)	(0.075)		(0.145)	(0.149)
Protestant		0.085***	0.079***		0.256***	0.230***
		(0.017)	(0.017)		(0.059)	(0.055)
Roman Catholic		0.060***	0.054***		0.182***	0.156***
		(0.014)	(0.012)		(0.049)	(0.043)
Other religion		0.050***	0.052***		0.129***	0.141***
		(0.013)	(0.013)		(0.041)	(0.035)
Marital status						
Married		0.246***	0.191***		0.681***	0.447***
		(0.022)	(0.014)		(0.050)	(0.037)
Living together as married		0.137***	0.102***		0.363***	0.215***
		(0.021)	(0.018)		(0.069)	(0.073)
Divorced		−0.017	−0.015		−0.034	−0.023
		(0.028)	(0.023)		(0.073)	(0.052)
Separated		−0.077***	−0.077***		−0.232***	−0.234***
		(0.026)	(0.025)		(0.074)	(0.073)
Widowed		−0.011	−0.026		0.141**	0.074
		(0.025)	(0.021)		(0.054)	(0.047)
Income decile						
2nd income decile			0.055*			0.202*
			(0.029)			(0.118)
3rd income decile			0.097**			0.390***
			(0.039)			(0.136)
4th income decile			0.149***			0.630***
			(0.030)			(0.151)
5th income decile			0.194***			0.836***
			(0.040)			(0.173)
6th income decile			0.222***			0.965***
			(0.050)			(0.193)
7th income decile			0.262***			1.144***
			(0.050)			(0.206)
8th income decile			0.264***			1.196***
			(0.055)			(0.214)
9th income decile			0.281***			1.277***
			(0.052)			(0.216)
10th income decile			0.314***			1.314***
			(0.047)			(0.204)
Employment status						
Part time employed			−0.005			−0.126***
			(0.015)			(0.035)

(Continues)

TABLE 1   (CONTINUED)

	(1)	(2)	(3)	(4)	(5)	(6)
	Happiness	Happiness	Happiness	Satisfaction	Satisfaction	Satisfaction
Self-employed			−0.006			−0.027
			(0.013)			(0.048)
Retired			−0.026*			−0.096**
			(0.013)			(0.047)
Housewife			0.024			0.044
			(0.016)			(0.062)
Student			0.057*			−0.185
			(0.029)			(0.120)
Unemployed			−0.178***			−0.586***
			(0.027)			(0.054)
Other employment status			−0.054**			−0.304***
			(0.025)			(0.063)
Age FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FEs	Yes	Yes	Yes	Yes	Yes	Yes
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes
(Country dummies)*cohort	Yes	Yes	Yes	Yes	Yes	Yes
Observations	104,328	104,328	104,328	103,808	103,808	103,808

Notes: All models estimated with OLS. The omitted category is single/never married full-time employed lowest income decile females with low education and no religious denomination. Country-clustered standard errors in parentheses. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Critical values are determined based on $T(38 − 1)$ distribution.

Source: Author's calculations using WVS and GDP data from Barro and Ursúa (2008), World Bank WDI, and IMF WEO.

Let us now examine whether experiencing a macroeconomic crisis in early adulthood affects happiness through labor market outcomes and earnings later in life. In Column 3 of Table 1, I add seven dummies for the current employment status and nine dummies for the current income rank of the individual as controls.[6] Inclusion of income and employment status dummies has expected effects on the coefficients of other control variables. For example, the positive effect of educational attainment is now much smaller. However, the coefficient estimate of the early adulthood macroeconomic shock is still statistically significant at the 5 percent level, and similar in magnitude. This indicates that the relationship between early adulthood macroeconomic crises and happiness does not operate through employment status or income rank in later life.

In Columns 4–6, I report the results for the same models as in the previous three columns, but with life satisfaction as the left-hand side variable. The absolute

[6]In the WVS surveys, the respondents are usually given a scale with 10 income brackets describing income before taxes and deductions. The brackets are based on an estimate of the survey country's current income distribution. Those individuals who have chosen not to answer questions about their income are excluded from the analysis. In WVS surveys, most country-years have 10 brackets (based on country's income deciles), but some have less. For those country-years that have fewer than 10 brackets I have scaled the income variable to match the 10-point scale. Thus, I include nine income decile dummies to the estimation equation, leaving the lowest decile as the reference group. The fact that I use income decile dummies in an analysis with multiple countries implies that these variables capture the effect of income rank on SWB. Thus, the income decile dummies do not capture the effect of absolute income on SWB, but rather the effect of individual's income relative to others in that specific country-year cell. For a discussion about income rank as the measure of relative income, see, for example, Mujcic and Frijters (2013).

values of the coefficients in the life satisfaction models are higher because of the different measurement scale. Macroeconomic shocks experienced at the ages 18–25 are associated with about 0.08 lower life satisfaction later in life according to Column 4. When I add control variables the absolute value of the coefficient decreases slightly, and in Columns 5 and 6 the coefficient estimate is only significant at the 10 percent risk level. It appears that a small portion of the negative effect of early adulthood crisis experience is transmitted through lower income rank of the individual.

Taken together, the result that the control variables are significantly associated with current well-being of the individual and the result that the estimated effect of early adulthood crisis experience on well-being remains similar after including these controls imply that the control variables are not impacted by the crisis experience. Although not reported here, I have further investigated the relationship between early adulthood crisis and each of the control variables, and the results largely confirm this conclusion.[7] It should be noted, however, that the result found here may be specific to data set, and also, to the variables used. In the case of employment status, the macroeconomic crisis in early adulthood may have caused unemployment experiences in the past that can have a scarring effect on SWB later in life. Clark and Lepinteur (2019) show that such scarring effects are difficult to capture by measures of current employment status. Furthermore, in the case of income, the variable measuring current income rank may not be very effective in capturing the losses in lifetime earnings and wealth.[8] Based on previous studies by MacLean and Hill (2015) and De Neve et al. (2018) it is also possible that mediators related to self-esteem or negative economic expectations may impact the relationship between early adulthood macroeconomic crises and SWB. However, the role of these mediators cannot be evaluated using this data set.

When assessing the magnitude of the results I find that a one standard deviation increase in the early adulthood shock variable is associated with a decrease of 0.02 standard deviations of happiness and 0.01 standard deviations of life satisfaction among respondents within a country. Furthermore, the effect of the early adulthood shock is 20 percent and 12 percent of the effect of being unemployed for happiness and life satisfaction, respectively. Although I assess the effect based on

[7]I have regressed each of the potential mediators on the right-hand side variables in Column 1 of Table 1. Income has been treated as a continuous variable and for the number of children I have experimented with coding the individuals with 8 or more children as having 8, 9, 10, 11, and 12 children. In these analyses, I found some impacts on the religious denomination of the individual, but these effects do not transmit into large changes in well-being because they are not associated with changes in the non-religious category.

[8]Unfortunately, the WVS does not include any questions about individuals' wealth. However, in many surveys, the WVS has included a question about individuals' financial satisfaction. This variable, together with the income decile dummies, can be used to capture some of the differences in individuals' wealth (for an empirical analysis on the relationship between financial satisfaction and wealth see, e.g., Hansen et al., 2008). When I include this variable in the analysis, the sample sizes decrease to 94,495 and 93,637 for happiness and life satisfaction, respectively. The inclusion of the financial satisfaction variable decreases the estimated coefficient of $shock^{18-25}$ from −0.035 to −0.030 and from −0.077 to −0.046 in the models for happiness and life satisfaction, respectively. The effects after including financial satisfaction are statistically significant at the 5 percent level for happiness and at the 10 percent level for life satisfaction. This implies that the negative effect of a macroeconomic crisis experienced in early adulthood is not fully transmitted through lower income and lower financial satisfaction later in life. These results are not reported here but are available upon request.

differences between individuals at a point in time, it should be kept in mind that for an individual the cumulative losses in SWB can be much larger over time.

Together, these results on happiness and life satisfaction show that experiencing a macroeconomic crisis in the early adulthood is negatively associated with individual's well-being later in life. Moreover, the results indicate that, at best, only a small fraction of the negative SWB effect of early adulthood crisis operates through outcomes concerning number of children, educational attainment, relationship status, religious denomination, employment status, or one's position in the income distribution. In conclusion, early adulthood macroeconomic crises can have a direct effect on SWB from which it is difficult for an individual to recover or they can affect well-being later in life via other outcomes than the ones controlled here. By looking at the results presented in Table 1, I am not able to distinguish between the two proposed channels. To form a clearer picture on the mechanisms, I will analyze SWB effects for different subgroups in the following sections.

3.2. *Heterogeneous Effects*

In this section, I examine which groups of individuals are most affected by the early adulthood crisis experience. I study the SWB effect for males and females and for individuals with low, middle, and high educational attainment. Previous studies have shown that graduating from high school during a recession can differently affect the labor market outcomes of females and males (Genda *et al.*, 2010; Hershbein, 2012). Furthermore, Glewwe and Hall (1998) and Corbacho *et al.* (2007) have shown that the effects of macroeconomic crises on income, consumption, and unemployment spells are often most pronounced for low-educated households. Nevertheless, the lasting effects of early adulthood macroeconomic crises on SWB of these different groups have not yet been studied.

To study the different associations between SWB and early adulthood macroeconomic crises with the WVS data, I include interaction variables in equation (1). I interact the male dummy and the education-level dummies with the variable $shock^{18-25}$. This allows us to examine the magnitude of the SWB effect for individuals with different educational attainment and gender. I also control for the heterogeneous well-being effects of a macroeconomic shock at the survey year by interacting the male dummy and the education-level dummies with the current shock variable.

Results from estimating the model with interaction terms are reported in Table 2. In Columns 1 and 4 of Table 2, I report the same baseline results as in Columns 1 and 4 of Table 1, but I have added controls for education level and the interaction terms. The estimated coefficient for $shock^{18-25}$ now captures the SWB effect of an early adulthood crisis for females with low education, which is the reference category. This group is hit hardest by the early adulthood crisis experience, with 0.11 lower happiness and 0.22 lower life satisfaction compared to individuals with same education level and gender that have not experienced a macroeconomic crisis in early adulthood.

In all columns of Table 2, the coefficient of $Male * shock^{18-25}$ is positive and statistically significant at the 5 percent level. This indicates that, on average, the lasting negative effect of experiencing a macroeconomic crisis in early adulthood

TABLE 2
SWB AND MACROECONOMIC SHOCKS, INTERACTIONS

	(1)	(2)	(3)	(4)	(5)	(6)
	Happiness	Happiness	Happiness	Satisfaction	Satisfaction	Satisfaction
Shock[18–25]	−0.107***	−0.104***	−0.095***	−0.218***	−0.209***	−0.179***
	(0.019)	(0.020)	(0.020)	(0.072)	(0.074)	(0.065)
Male*shock[18–25]	0.053**	0.056**	0.053**	0.136**	0.144**	0.146**
	(0.026)	(0.021)	(0.023)	(0.058)	(0.055)	(0.056)
Middle education*shock[18–25]	0.054	0.052*	0.043*	0.071	0.064	0.029
	(0.033)	(0.030)	(0.024)	(0.101)	(0.091)	(0.072)
High education*shock[18–25]	0.119**	0.109**	0.089**	0.250	0.224	0.141
	(0.050)	(0.043)	(0.034)	(0.174)	(0.152)	(0.114)
Current shock	−0.264***	−0.265***	−0.254***	−0.552**	−0.551**	−0.475**
	(0.059)	(0.058)	(0.047)	(0.268)	(0.266)	(0.217)
Male*Current shock	−0.118	−0.121*	−0.096	−0.319	−0.324	−0.224
	(0.073)	(0.071)	(0.058)	(0.286)	(0.281)	(0.237)
Middle education*Current shock	0.080	0.088	0.065	0.058	0.075	−0.022
	(0.066)	(0.059)	(0.045)	(0.191)	(0.174)	(0.126)
High education*Current shock	0.092	0.098	0.043	0.251	0.262	0.026
	(0.144)	(0.128)	(0.098)	(0.377)	(0.335)	(0.232)
Male	−0.041***	−0.053***	−0.046***	−0.099***	−0.123***	−0.126***
	(0.010)	(0.010)	(0.009)	(0.029)	(0.029)	(0.024)
Middle education	0.069***	0.063***	0.025*	0.279***	0.266***	0.097**
	(0.020)	(0.018)	(0.014)	(0.064)	(0.060)	(0.044)
High education	0.108***	0.105***	0.025	0.469***	0.464***	0.110*
	(0.021)	(0.019)	(0.015)	(0.071)	(0.064)	(0.058)
Number of children		−0.009	−0.005		−0.027**	−0.008
		(0.005)	(0.004)		(0.013)	(0.010)
Number of children: 8 or more		−0.028	−0.002		−0.066	0.052
		(0.036)	(0.031)		(0.083)	(0.067)
Employment status dummies	No	No	Yes	No	No	Yes
Income dummies	No	No	Yes	No	No	Yes
Relationship dummies	No	Yes	Yes	No	Yes	Yes
Religion dummies	No	Yes	Yes	No	Yes	Yes
Age FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FEs	Yes	Yes	Yes	Yes	Yes	Yes
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes
(Country dummies)*cohort	Yes	Yes	Yes	Yes	Yes	Yes
The effect of shock[18–25] for:						
low-educated females	−0.107***	−0.104***	−0.095***	−0.218***	−0.209***	−0.179***
p-value	0.000	0.000	0.000	0.004	0.008	0.009
low-educated males	−0.053*	−0.048*	−0.042*	−0.082	−0.065	−0.032
p-value	0.080	0.068	0.091	0.440	0.506	0.715
middle-educated females	−0.053*	−0.052*	−0.052**	−0.147***	−0.145***	−0.150***
p-value	0.099	0.061	0.047	0.005	0.002	0.000
middle-educated males	0.000	0.004	0.001	−0.011	−0.001	−0.004
p-value	0.980	0.845	0.956	0.857	0.987	0.945
high-educated females	0.012	0.005	−0.007	0.032	0.015	−0.038
p-value	0.792	0.881	0.821	0.791	0.877	0.607
high-educated males	0.065**	0.061**	0.047**	0.168	0.159*	0.108
p-value	0.024	0.016	0.027	0.104	0.087	0.111
Observations	104,328	104,328	104,328	103,808	103,808	103,808

Notes: All models estimated with OLS. Lower panel reports the test result for the SWB effect of an early adulthood macroeconomic shock for each gender-education group. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Country-clustered standard errors in parentheses. Critical values determined based on $T(38 − 1)$ distribution.

Source: Author's calculations using WVS and GDP data from Barro and Ursúa (2008), World Bank WDI, and IMF WEO.

is smaller for males. Adding control variables does not seem to decrease the relative difference in the SWB effect between males and females. In fact, in Columns 2 and 5, adding controls for relationship status, number of children, and religious denomination slightly increases the estimated coefficient for the male interaction, while also causing the estimated coefficient for the early adulthood shock dummy to move toward zero. This is in line with Maclean *et al*. (2011) and Hershbein (2012) who find that leaving school in an economic downturn is negatively associated with the marital status of males. Adding controls for income decile and employment status in Columns 3 and 6 has only a small impact on the difference between the SWB effect of males and females. Thus, the difference in the lasting SWB effect between males and females cannot be explained by differences in the observed outcomes related to family life, religion, employment status, or income rank.

In Table 2, the estimated coefficients for the education interactions reveal that the SWB of individuals with higher educational attainment is more resilient to early adulthood macroeconomic shocks. The difference in the happiness effect between low-educated and middle-educated individuals, captured by the coefficient of $Middle education * shock^{18-25}$, is statistically significant at the 10 percent level in Columns 2 and 3. For low-educated and high-educated individuals, the difference is statistically significant at the 5 percent level in all models of happiness. In models of life satisfaction, the differences are positive but not statistically significant. The addition of control variables decreases the coefficient estimates of the education interactions in models' happiness and life satisfaction. However, the control variables are not able to fully explain the differences in the happiness effect between individuals with different levels of educational attainment.

To further assess the estimated effects for individuals with different levels of educational attainment and gender, I have tested the effect of experiencing a macroeconomic shock at 18–25 for each of the six gender-education groups in the lower panel of Table 2. I report the sum of the coefficients of the shock variables that are relevant for each group. I also report the *p*-value from an *F*-test of the sum of the coefficients that are relevant for each group. These tests show that crisis experiences are associated with lower levels of happiness at the 1 percent risk level and at the 10 percent level for low-educated females and low-educated males, respectively. In addition, early adulthood crisis experiences are associated with lower happiness levels among middle-educated females. In terms of life satisfaction, the results for females are very similar. It seems that low- and middle-educated females are suffering the negative consequences of early adulthood crisis experiences. In contrast, early adulthood crisis experience is not statistically significantly associated with life satisfaction among low- and middle-educated males.

There are two possible explanations for the observed difference between males and females. First, the direct effect of early adulthood macroeconomic crisis on well-being later in life could be much larger for females than it is for males. Second, for females, the early adulthood crisis experience can have a larger impact on other outcome variables than the ones included in Columns 3 and 6 of Table 2. The relative importance of these two proposed channels can be assessed by looking at the coefficient estimates of Current shock ($shock_{ct}$) and its interaction with male dummy. These coefficients capture the effect of a macroeconomic crisis at survey year for all low-educated individuals who are older than 25. It can be observed

that the negative SWB effect of a macroeconomic crisis at the survey year is not stronger for females. Although not reported here, similar results are obtained if the analysis is conducted using individuals younger than 26. Thus, it is unlikely that the direct effect of a macroeconomic crisis on SWB is larger for females than for males. It is more plausible that experiencing a crisis in early adulthood has a heterogeneous impact on other outcomes later in life.

Finally, let us turn to the results presented in the lowest row in the lower panel of Table 1. These results provide evidence for a positive happiness effect of early adulthood crisis for high-educated males. This result is in line with Bianchi (2013), who finds that among educated individuals those who have graduated during economic downturns are more satisfied with their jobs. This result is also in line with Giuliano and Spilimbergo (2014), who find that experiencing a macroeconomic shock in early adulthood affects individuals' perceptions about the key determinants of success in life. Giuliano and Spilimbergo (2014) show that individuals who have experienced a crisis in early adulthood see luck as a more crucial determinant for success than hard work. It is possible that those who have experienced a crisis place higher value on the benefits that high education has brought into their lives. These benefits, of course, are not similar for all high-educated individuals and may differ between females and males.

3.3. *Results on Dynamic Effects*

The results reported thus far have shown the average SWB effect of experiencing a crisis in early adulthood among all age groups over 25. I have assumed that the association between early adulthood macroeconomic crisis and SWB is similar for individuals who have experienced a crisis in the previous year and individuals who have experienced it, for example, 20 years ago. To relax this assumption, some studies that focus on other outcome variables allow for dynamic effects by including dummy variables measuring the years elapsed from the experience (see, e.g., Oreopoulos *et al.*, 2012 and Bucciol *et al.*, 2015).

In the SWB literature, the dynamic effects of changes in individuals' circumstances are usually studied using longitudinal individual level data (see, e.g., Clark *et al.*, 2008). However, with cross-section data, which is linked to historical output data, the dynamic effect can be evaluated by studying the differences between birth cohorts within a country. The latter approach has two advantages. First, it allows for the examination of the effects over a much longer time span. Second, it allows us to assess the effects of experienced circumstances that individual faced at a specific age, even if individual-level data from that age is not available. However, when using between variations, it is crucial that global age- and cohort fixed effects are controlled. Fortunately, this can be done with international repeated cross-section data. In what follows, *dynamic effects* will refer to these estimated effects that are identified from differences between individuals.

I start the analysis by calculating the number of years passed from the early adulthood crisis experience for those individuals who have experienced a crisis at the ages of 18–25. For such individuals, I define the age at 18–25 which is last coded as a crisis year. Then I subtract this age from individual's age at survey year. For example, for a 40-year-old individual for whom the last crisis year during early

adulthood was when she was 23 years old, I code the number of years passed as 17. If a country has experienced a crisis in the years when the individual was 22–27 years old, then for that individual the last year coded as crisis is when she was 25 (the highest age in the 8-year range interval).

In Columns 1 and 4 of Table 3, I have augmented the baseline model from Columns 1 and 4 in Table 1 with two dummy variables $shock^{18-25} * D_{10-19}$ and $shock^{18-25} * D_{>19}$. The former equals one if the individual has experienced a crisis at the ages of 18–25 and there is 10–19 years from that experience. The latter equals one if the individual has experienced a crisis in early adulthood and there is more than 19 years from that experience. The effect of an early adulthood macroeconomic crisis for individuals whose crisis experience took place less than 10 years ago is captured by the coefficient of $shock^{18-25}$. If more than 9 years but less than 20 years have passed since last crisis year in early adulthood, the effect is calculated as the sum of the coefficients of $shock^{18-25}$ and $shock^{18-25} * D_{10-19}$. When more than 19 years have passed since the last crisis year, the effect is calculated as the sum of the coefficients of $shock^{18-25}$ and $shock^{18-25} * D_{>19}$. The well-being trends among those individuals who have not experienced a crisis in early adulthood are controlled by the age fixed effects.

Results reported in Columns 1 and 4 of Table 3 imply that, on average, the negative well-being effect of an early adulthood macroeconomic crisis dissipates over time. Using the estimated coefficients, I have tested the statistical significance of the average SWB effect of early adulthood macroeconomic crisis for individuals with different number of years passed from the crisis. First, the average effect before 10 years have passed is not statistically significant based on the insignificance of the coefficient estimate of $shock^{18-25}$. Second, testing the sum of the coefficients $shock^{18-25}$ and $shock^{18-25} * D_{10-19}$ implies that the average effect is negative and statistically significantly different from zero for those individuals who have 10–19 years from the last crisis year. For life satisfaction, the negative effect is statistically significant only for those individuals who have less than 10 years from the last crisis year. To save space, these test results are not reported in Table 3.[9]

Next, I will focus on the dynamic response to the early adulthood crisis for the different gender-education groups. In Columns 2 and 5 of Table 3, I replicate the results presented in Columns 1 and 4 of Table 2, but now I also allow for different dynamic effects for males and females, and for individuals with different levels of educational attainment. In the models estimated in Columns 2 and 5, I have also interacted education and gender dummies with age dummies. This is done to make sure that the estimated dynamic effects are not capturing some underlying difference in the age trends of males and females, and individuals with different levels of educational attainment.

In Columns 3 and 6 of Table 3, I add control variables for the number of children, relationship status, religious denomination, income decile, and employment

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[9]I have also conducted a robustness check on the dynamic effects for the sample of individuals who are older than 34. This sample does not include any individuals who have less than 10 years from the crisis experience. The results for this sample imply that the negative effect on happiness and life satisfaction is significant at the 5 percent level when 10–19 years have passed from their crisis experience and not significant when 20 years or more have passed from the crisis experience.

TABLE 3
SWB and Macroeconomic Shocks, Dynamic Effects

	(1)	(2)	(3)	(4)	(5)	(6)
	Happiness	Happiness	Happiness	Satisfaction	Satisfaction	Satisfaction
Shock$^{18-25}$	−0.072	−0.201***	−0.172**	−0.272***	−0.706***	−0.594***
	(0.077)	(0.063)	(0.071)	(0.096)	(0.257)	(0.201)
Shock$^{18-25}$*D$_{10-19}$	0.004	0.027	0.016	0.134	0.380	0.315
	(0.079)	(0.085)	(0.087)	(0.260)	(0.260)	(0.234)
Shock$^{18-25}$*D$_{>19}$	0.067	0.141*	0.119	0.305**	0.690**	0.599**
	(0.088)	(0.080)	(0.087)	(0.116)	(0.280)	(0.227)
Male*shock$^{18-25}$		0.041	0.040		0.322**	0.322**
		(0.036)	(0.040)		(0.155)	(0.127)
Male*shock$^{18-25}$*D$_{10-19}$		0.049	0.042		−0.210	−0.223
		(0.033)	(0.030)		(0.307)	(0.266)
Male*shock$^{18-25}$*D$^{>19}$		0.004	0.004		−0.232	−0.221
		(0.043)	(0.047)		(0.185)	(0.158)
Mid. educ.*shock$^{18-25}$		0.140*	0.122**		0.263	0.190
		(0.072)	(0.052)		(0.204)	(0.132)
Mid. educ.*shock$^{18-25}$*D$_{10-19}$		−0.058	−0.061*		−0.057	−0.058
		(0.038)	(0.036)		(0.087)	(0.072)
Mid. educ.*shock$^{18-25}$*D$^{>19}$		−0.099	−0.088		−0.308	−0.253
		(0.084)	(0.066)		(0.262)	(0.181)
High educ.*shock$^{18-25}$		0.179***	0.122***		0.692**	0.466**
		(0.063)	(0.039)		(0.329)	(0.197)
High educ.*shock$^{18-25}$*D$_{10-19}$		−0.047	−0.024		−0.498**	−0.393**
		(0.040)	(0.046)		(0.192)	(0.151)
High educ.*shock$^{18-25}$*D$^{>19}$		−0.057	−0.019		−0.557*	−0.393**
		(0.046)	(0.040)		(0.289)	(0.189)
Current shock	−0.290***	−0.266***	−0.252***	−0.673***	−0.504**	−0.424**
	(0.073)	(0.058)	(0.047)	(0.236)	(0.233)	(0.191)
Male*Current shock		−0.108	−0.095		−0.331	−0.256
		(0.072)	(0.059)		(0.267)	(0.221)
Mid. educ.*Current shock		0.076	0.059*		0.033	−0.045
		(0.049)	(0.032)		(0.154)	(0.104)
High educ.*Current shock		0.090	0.042		0.180	−0.032
		(0.133)	(0.094)		(0.315)	(0.195)
Male dummy	Yes	Yes	Yes	Yes	Yes	Yes
Education dummies	Yes	Yes	Yes	Yes	Yes	Yes
Controls for number of children	No	No	Yes	No	No	Yes
Employment status dummies	No	No	Yes	No	No	Yes
Income dummies	No	No	Yes	No	No	Yes
Relationship dummies	No	No	Yes	No	No	Yes
Religion dummies	No	No	Yes	No	No	Yes
Age FEs	Yes	Yes	Yes	Yes	Yes	Yes
(Age dummies)*Male	No	Yes	Yes	No	Yes	Yes
(Age dummies)*Middle education	No	Yes	Yes	No	Yes	Yes
(Age dummies)*High education	No	Yes	Yes	No	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FEs	Yes	Yes	Yes	Yes	Yes	Yes
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes
(Country dummies)*cohort	Yes	Yes	Yes	Yes	Yes	Yes
Observations	104,328	104,328	104,328	103,808	103,808	103,808

Notes: All models estimated with OLS. shock$^{18-25}$*D$^{>19}$ = 1 if more than 19 years have passed from the last shock year at ages 18–25. shock$^{18-25}$*D$_{10-19}$=1 if more than 9 years but less than 20 years have passed from the last shock year at ages 18–25. Country-clustered standard errors in parentheses. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Critical values determined based on $T(38 − 1)$ distribution.

Source: Author's calculations using WVS and GDP data from Barro and Ursúa (2008), World Bank WDI, and IMF WEO.
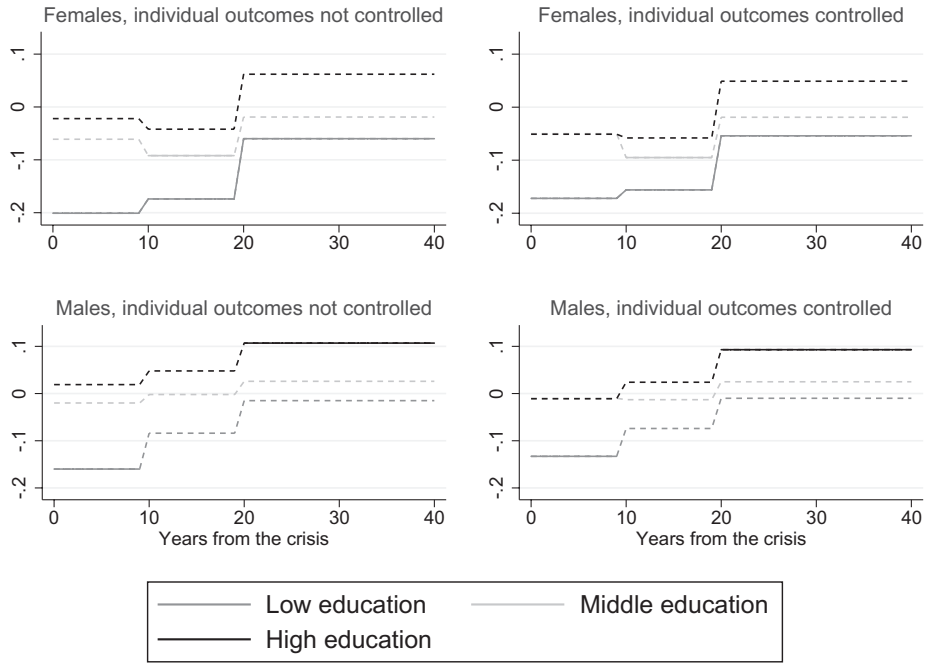
Figure 1. The Dynamic Happiness Effect of an Early Adulthood Macroeconomic Crisis by Education Level and Gender

Notes: Reported happiness effect in the left-hand side (right-hand side) graphs is based on results reported in Column 2 (3) of Table 3. Line is dashed when the effect is not statistically significant at the 5 percent level.*Source:* Author's calculations using WVS and GDP data from Barro and Ursúa (2008), World Bank WDI, and IMF WEO.

status. To ease the interpretation of the results, Figure 1 illustrates the dynamic happiness effect for different gender-education groups using results presented in Columns 2 and 3. In Figure 1, horizontal axis displays the years that have elapsed from the crisis experience and vertical axis measures the size of the estimated happiness effect.

The top left graph of Figure 1 shows that the negative happiness effect is largest for those low-educated females who have experienced the crisis most recently. However, the happiness effect is negative and statistically significant at the 5 percent level also for those low-educated females who have experienced the crisis over 19 years ago. The dark gray line in the bottom left graph of Figure 1 shows that the negative happiness effect for low-educated males is statistically significant only for those who have experienced the crisis recently. Comparing the light gray lines in top left and bottom left graphs of Figure 1 reveals the differences between middle-educated females and males. For the latter, experiencing a crisis in early adulthood has virtually no effect on happiness in later life. In contrast, for middle-educated females the effect is negative and statistically significant if 10–19 years have elapsed from the crisis.

Based on these results, one can assess whether it is likely that macroeconomic crises experienced in early adulthood have a direct impact on well-being later in life. In the case of direct effects on SWB, we would not expect to see both genders suffering similar negative effects in the immediate aftermath of the early adulthood crisis and only males recovering. These results rather suggest that females face different circumstances than males when more years have passed from the early adulthood crisis experience. A comparison of the happiness effects reported in the light gray lines in the top left and bottom left graphs of Figure 1 supports this conclusion. The path to recovery is different for males and females.

Let us next examine the role of the observed individual-level outcomes in explaining the dynamic happiness effect for different gender-education groups. The top right and bottom right graphs of Figure 1 report the estimated happiness effects from Column 3 of Table 3. For low-educated males and females, part of the negative happiness effect is mediated through outcomes related to family life, religion, income rank, and employment status. However, the statistical significance of the estimated happiness effect remains unchanged. The observed difference in the dynamic happiness effect between males and females is not explained by differences in the observed circumstances.

Figure 2 reports the estimated dynamic life satisfaction effect of the early adulthood crisis experience for different gender-education groups. Left-hand side graphs plot the results from Column 5 of Table 3 and right-hand side graphs report the results from Column 6 of Table 3. For the most part, these results are similar to the results reported in Figure 1. First, we can observe from Figure 2 that the negative life satisfaction effect is larger for females and for low-educated individuals. Second, the inclusion of control variables in the right-hand side graphs decreases the negative life satisfaction effect. Third, among high-educated males the life satisfaction effect is positive when more than 19 years have elapsed from the crisis experience.

However, results on life satisfaction are not identical to results on happiness in every respect. Figure 2 shows that early adulthood crisis experience is not statistically significantly associated with lower life satisfaction for any gender-education group if the crisis experience has taken place over 19 years ago. According to these results, the negative effect on life satisfaction is severe but not permanent.

The observed difference in the SWB effect between males and females is likely due to differences in unobserved outcomes in later adulthood. One possible explanation is that the cumulative disadvantages in opportunities and experiences generated by the early adulthood crisis are more severe for females.

4. Robustness Checks

In this section, I test the robustness of the baseline results reported in Columns 1 and 4 of Table 1. I focus on the baseline results because I can be certain that they are not contaminated by other outcome variables. First, I test the lasting effect of early adulthood macroeconomic crisis using different thresholds for the macroeconomic crisis. Second, I study the effect of experiencing a crisis at different ages. Third, I investigate the role of experiences of war in explaining the estimated SWB
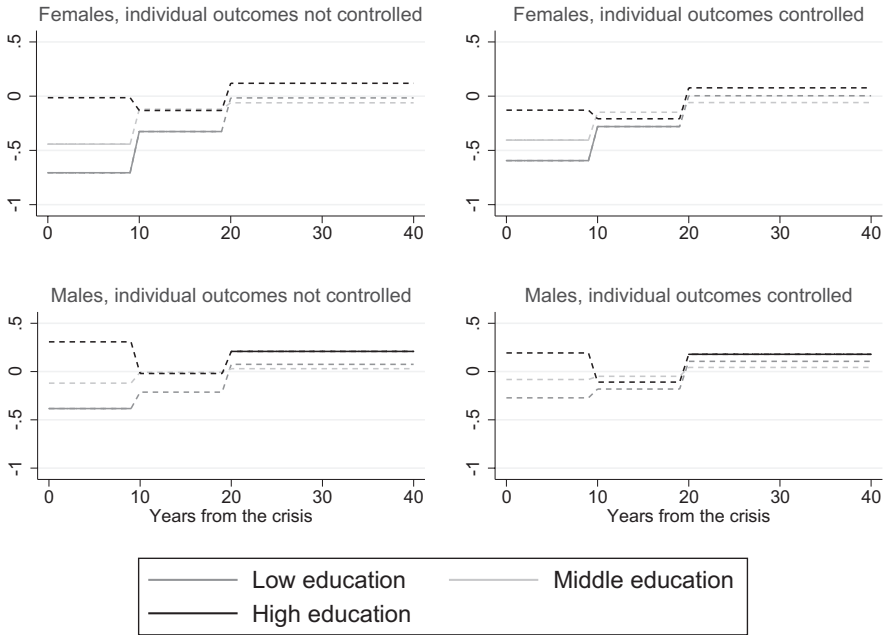
Figure 2. The Dynamic Life Satisfaction Effect of Early Adulthood Macroeconomic Crisis by Education Level and Gender

Notes: Reported life satisfaction effect in the left-hand side (right-hand side) graphs is based on results reported in Column 5 (6) of Table 3. Line is dashed when the effect is not statistically significant at the 5 percent level.*Source:* Author's calculations using WVS and GDP data from Barro and Ursúa (2008), World Bank WDI, and IMF WEO.

effect. Fourth, I discuss the possibility of repeated crises being behind the result. Fifth, I examine how the results differ between OECD countries and non-OECD countries. Finally, I examine the robustness of the results by creating placebo treatments of the early adulthood macroeconomic crises.

In the models presented in the previous section, I have followed Barro and Ursúa (2008) and Giuliano and Spilimbergo (2014) and assumed that macroeconomic crisis is defined by a 10 percent peak to trough decrease in real GDP per capita. This assumption results in a situation where most of the 10 percent drops in GDP in developed countries have taken place before the year 1950. One way to test the robustness of the baseline results is to change the crisis threshold to allow smaller economic contractions to be coded as crises. I have used thresholds of 9 percent, 8 percent, 7 percent, 6 percent, and 5 percent peak to trough decreases in real GDP per capita in defining the crisis period in the following robustness checks. Table 4 reports the results for the same models as the ones estimated in Columns 1 and 4 of Table 1 using the alternative crisis thresholds.

Results in Columns 1 and 2 of Table 4 show that early adulthood crises defined using the 9 percent and 8 percent threshold are also statistically significantly associated with lower levels of happiness. Using a lower crisis threshold than 8 percent, however, results in a smaller and, in most cases, insignificant effect on

happiness. The estimated effect on life satisfaction is also closer to zero when using smaller thresholds, but is still statistically significantly different from zero at the 5 percent significance level. These results suggest that smaller crises experienced in early adulthood are also associated with lower SWB later in life. However, a more severe crisis in early adulthood has larger lasting impacts on SWB.

Thus far, I have focused on the effects of crisis experiences in the early adulthood. It is also possible that experiencing a macroeconomic crisis at some other age has a lasting effect on individual SWB. For example, macroeconomic crises experienced in childhood can affect the development of an individual through a variety of channels. Following Giuliano and Spilimbergo (2014), I have constructed six different 8-year range intervals for age (2–9, 10–17, 26–33, 34–41, 42–49, and 50–57). In each column of Table 5, I test the lasting effect of experiencing a crisis during one of these ages. Only individuals who are older than the upper bound of the interval are included in the analysis. Thus, the focus is, again, on the lasting effects of past crises. The crisis is defined using the 10 percent peak to trough decrease in real GDP per capita as a threshold.

Columns 1–6 and 7–12 of Table 5 report the effect of experiencing a crisis at different ages on happiness and life satisfaction, respectively. Results in Columns 1 and 7 indicate that macroeconomic crisis experienced in childhood is not associated with lower SWB later in life. On the contrary, Columns 5 and 10 of Table 5 show that, for individuals older than 41, the crisis experience at 34–41 is associated with statistically significantly lower happiness but no association is found with life satisfaction. Experiencing a crisis at ages 42–49 has no statistically significant effect on happiness, but a significant negative effect on life satisfaction at the 5 percent level. When assessing the effect magnitudes, it should be noted that for individuals older than 41 or older than 49 the lasting SWB effect is identified from a much shorter time span. According to the results presented in Table 5, macroeconomic crisis has a statistically significant impact on both aspects of well-being only when it is experienced at the ages of 18–25.

Many of the early adulthood crises that are used to identify the well-being effects in this paper occur not only in times of economic crises, but also in times of war. Thus, it is worth studying how the well-being effects of economic crises (as defined by decreases in GDP) change when the long-term impacts of war experiences are controlled for. In Columns 1 and 3 of Table A1 in the Online Appendix, I have augmented the baseline models with a variable that gets value one if the country has experienced a war during the time when the individual was 18–25 years old.[10] The results show that early war experiences have statistically significant negative effects on life satisfaction but not on happiness. It is possible that when

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[10]To define whether the country is at war, I have utilized the Correlates of War (COW) data, in which the definition of war is as follows: "war must involve sustained combat, involving organized armed forces, resulting in a minimum of 1000 battle-related combatant fatalities within a twelve-month period" (Sarkees and Dixon, 2020). Furthermore, I have used the data on interstate wars (version 5.0) and intra-state wars (version 5.1). From the former, I have only included conflicts in which the participating country itself has experienced 1000 fatalities. From the intra-state wars data, I have only included conflicts that are determined as "Civil war for central control" and only for those countries in which the war is waged. Thus, I have excluded those instances where the country participates in a conflict outside its borders.

TABLE 4
SWB and Macroeconomic Shocks, Alternative Crisis Definition

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Happiness	Happiness	Happiness	Happiness	Happiness	Satisfaction	Satisfaction	Satisfaction	Satisfaction	Satisfaction
Crisis threshold	9%	8%	7%	6%	5%	9%	8%	7%	6%	5%
Shock[18-25]	-0.036***	-0.028***	-0.015	-0.016	-0.017*	-0.080**	-0.077**	-0.064**	-0.069**	-0.063**
	(0.013)	(0.010)	(0.009)	(0.010)	(0.009)	(0.034)	(0.035)	(0.028)	(0.029)	(0.027)
Current shock	-0.241***	-0.288***	-0.268***	-0.268***	-0.268***	-0.731***	-0.774***	-0.702***	-0.704***	-0.704***
	(0.076)	(0.080)	(0.072)	(0.072)	(0.072)	(0.178)	(0.185)	(0.171)	(0.171)	(0.171)
Male	-0.032**	-0.032**	-0.032**	-0.032**	-0.032**	-0.071*	-0.071*	-0.071*	-0.071*	-0.071*
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.039)	(0.040)	(0.040)	(0.040)	(0.040)
Education dummies	No	No	No	No	No	No	No	No	No	No
Controls for number of children	No	No	No	No	No	No	No	No	No	No
Employment status dummies	No	No	No	No	No	No	No	No	No	No
Income dummies	No	No	No	No	No	No	No	No	No	No
Relationship dummies	No	No	No	No	No	No	No	No	No	No
Religion dummies	No	No	No	No	No	No	No	No	No	No
Age FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Country dummies)*cohort dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	104,328	104,328	104,328	104,328	104,328	103,808	103,808	103,808	103,808	103,808

Notes: All models estimated with OLS. Threshold used for defining a macroeconomic shock reported in the second row. Country-clustered standard errors in parentheses. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Critical values determined based on $T(38-1)$ distribution.
Source: Author's calculations using WVS and GDP data from Barro and Ursúa (2008), World Bank WDI, and IMF WEO.

individuals evaluate their lives, the memory of war is more salient than when they think of how happy they feel. Controlling for the war does not have a large impact on estimated happiness effect of macroeconomic crises but the effect on life satisfaction becomes statistically insignificant. However, because many of the economic crises, as defined by the 10 percent decline in real GDP per capita, coincide with war events in the data, I have also analyzed the results using the macroeconomic crisis threshold of 5 percent. These results are reported in Columns 2 and 4 in Table A1. The effect of macroeconomic crisis on happiness in Column 2 of Table A1 is similar in magnitude than previously (Column 5 of Table 4), but statistically insignificant. The effect of a macroeconomic crises on life satisfaction in Column 4 of Table A1 is now statistically significant at the 10 percent level, and, when compared to Column 10 in Table 4, we observe that controlling for the war experience has an impact on the coefficient estimate. Taken together, these results support the main conclusion of the paper that early adulthood macroeconomic crises have negative effects on SWB later in life.

It is also possible that the well-being effect associated with early adulthood macroeconomic crises is due to crises repeating within a country. I tested this hypothesis with the baseline model by controlling for further crisis in two different ways. First, I controlled for a dummy that indicates that an individual has experienced a crisis in one or more of the age range intervals after turning 25. Second, I controlled for the number of such crises experienced after the early adulthood. The control variables were not found statistically significant, and the early-adulthood crisis was more statistically significant than them in all models. Nonetheless, adding the number-of-later-crisis variable in the life satisfaction model led to statistical insignificance of the early-adulthood crisis variable. However, using the 5 percent threshold for crisis led to statistical significance when controlling for the number of later crises. In sum, the later crises are not found to have impacts and statistically significant well-being effects of early-adulthood crises can be found when controlling for later crises. These results are not reported here but are available upon request.

The effects of macroeconomic crises on SWB might not be the same in developing and developed countries. To investigate this, I introduce an interaction term $OECD * shock$[18−25] into the baseline model to capture the effect difference between countries that were OECD members before the start of the survey sample and countries that were not. The results from this exercise are reported in Columns 1 and 3 of Table A2 in the Online Appendix. The findings are mixed. For happiness, I find no difference in the effect for members and non-members of the OECD. For life satisfaction, the interaction term is positive and statistically significant, implying that no effect can be found for the OECD countries. However, it should be noted that most of the 10 percent declines in GDP in OECD countries have taken place before the year 1950, so the impacts for most developed countries are identified from crises that happened decades before the survey year. To address this problem, I re-estimated the models using the more inclusive 5 percent threshold for the crisis. Results show that the effect is not statistically significantly different between OECD members and non-members for happiness or life satisfaction. The results also suggest that the negative happiness effect observed in Column 5 of Table 4 is mainly driven by the negative effect found for OECD countries.

TABLE 5
SWB and Macroeconomic Shocks, Alternative Age Ranges

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Happiness	Happiness	Happiness	Happiness	Happiness	Happiness	Satisfaction	Satisfaction	Satisfaction	Satisfaction	Satisfaction	Satisfaction
Shock$^{2-9}$	0.012 (0.008)						0.035 (0.021)					
Shock$^{10-17}$		-0.017 (0.011)						-0.039 (0.029)				
Shock$^{26-33}$			-0.010 (0.012)						-0.008 (0.046)			
Shock$^{34-41}$				-0.039** (0.015)						-0.026 (0.050)		
Shock$^{42-49}$					-0.046 (0.035)						-0.193** (0.094)	
Shock$^{50-57}$						-0.034 (0.023)						0.013 (0.079)
Current shock	-0.269*** (0.066)	-0.270*** (0.066)	-0.263*** (0.072)	-0.258*** (0.073)	-0.247*** (0.072)	-0.238*** (0.073)	-0.553*** (0.211)	-0.550*** (0.209)	-0.677*** (0.272)	-0.618** (0.291)	-0.510* (0.268)	-0.485** (0.206)
Male	-0.038*** (0.013)	-0.038*** (0.013)	-0.019 (0.013)	-0.008 (0.014)	0.003 (0.015)	0.028 (0.018)	-0.067 (0.040)	-0.068* (0.040)	-0.053 (0.037)	-0.010 (0.031)	0.014 (0.036)	0.043 (0.043)
Education dummies	No	No	No	No	No	No	No	No	No	No	No	No
Controls for number of children	No	No	No	No	No	No	No	No	No	No	No	No
Employment status dummies	No	No	No	No	No	No	No	No	No	No	No	No
Income dummies	No	No	No	No	No	No	No	No	No	No	No	No
Relationship dummies	No	No	No	No	No	No	No	No	No	No	No	No
Religion dummies	No	No	No	No	No	No	No	No	No	No	No	No
Age FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Country dummies)*cohort	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	127,475	126,486	80,995	58,665	39,417	24,365	126,827	125,842	80,646	58,467	39,347	24,394

Notes: All models estimated with OLS. Superscript in the shock variable denotes the age at which shock is experienced. Shock is defined using 10 percent peak to trough decrease in real GDP per capita in every column. Country-clustered standard errors in parentheses. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Critical values determined based on $T(38-1)$ distribution.
Source: Author's calculations using WVS and GDP data from Barro and Ursúa (2008), World Bank WDI, and IMF WEO.

Finally, to further test the robustness of the baseline results presented in Table 1, I follow Giuliano and Spilimbergo (2014) and create placebo treatments by assigning each individual with the macroeconomic history of another, randomly selected country. If this country experienced a macroeconomic crisis when the individual was 18–25 years old, then the placebo shock dummy equals 1. In Table A4 in the Online Appendix, I have replicated the results presented in Table 1 using the placebo shock dummy as the explanatory variable. The results show that there is no statistically significant association between the placebo shock dummy and the SWB variables. This supports the idea that the baseline model is identifying the average effect of an early adulthood macroeconomic crisis on SWB.

5. Conclusion

In this paper, I have shown that experiencing a severe macroeconomic crisis at the ages of 18–25 is associated with lower SWB later in life. The negative impact on happiness is more persistent than the negative impact on life satisfaction. According to the analysis presented in the paper, the negative SWB effect is not fully transmitted through measured outcomes related to family life, religion, earnings, or employment status. However, based on the results on heterogenous responses, it seems plausible that experiencing a macroeconomic crisis in early adulthood does not have a direct effect on SWB either. Thus, I propose that experiencing a macroeconomic crisis in early adulthood affects SWB later in life via other outcomes. One explanation is that experiencing a severe economic shock in early adulthood leads to cumulative disadvantages in opportunities and experiences that result in lower SWB years later.

The results presented in this paper underscore the importance of macroeconomic circumstances that individuals face when entering adulthood. Based on the results, stabilization policies may have positive long-run consequences for individuals' SWB later in life. Future research should focus on further determining the specific indirect channels through which early adulthood crisis experiences are related to SWB by examining outcomes (other than SWB) for different groups of individuals.

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