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Sex-Selective Abortion and the Collapse of the Soviet Union

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Abstract

Elevated Sex Ratios at Birth (SRBs)—an indicator of sex-selective abortion—have been documented in many countries worldwide. This paper examines the causal effect of the Soviet Union’s collapse on SRBs in Post-Soviet countries, using a difference-in-differences research design. Our findings indicate that the collapse resulted in a rise in SRBs by approximately 1.5 percent, peaking in the late 1990s before subsiding in the 2000s. This result suggests that the collapse of the Soviet Union explains 64 percent of the approximately 192,000 missing girls in the Post-Soviet states in the 1990s. Furthermore, the impact of the collapse on SRBs was observed in both high and low son-preference countries, with the effect being roughly twice as large in high son-preference countries, where it persisted into the late 2000s. The conventional theory of pre-natal sex selection typically involves the introduction of modern sex-determination technology into a cultural environment which values sons over daughters. Our findings suggest that economic and political shocks can also be key drivers behind increases in sex-selective abortion and SRBs.

JEL Codes: I12, N30, P36

Keywords: Soviet Union, Reproductive Health, Abortion, Sex-Ratio at Birth, Sex-Selective Abortion

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1 Introduction

The phenomenon of “missing women”, or relatively high ratios of men to women, has been documented in many countries around the world, with the most well-known cases in China and India (Sen, 1990). Global estimates of “missing women” range from Amartya Sen’s initial estimate of 100 million to more recent estimates of 150 million by 2035 (Bongaarts & Guilmoto, 2015). A key driver of the phenomenon is prenatal sex selection. The conventional theory of pre-natal sex selection typically involves the introduction of modern sex-determination technology into a cultural environment which values sons over daughters (Guilmoto, 2009). In this article, we show that political and economic forces can also drive behaviors of sex-selection.

Prenatal sex selection, or sex-selective abortion, is the practice of terminating a pregnancy based on the presumed sex of the fetus. In countries where there is strong son-preference and access to prenatal sex-screening technology, pregnant people may be more likely to have an abortion if their fetus is female. This practice directly leads to elevated SRBs, the number of males born per 100 females. Under non-selective conditions, the SRB should fluctuate near the biological norm of about 105 males per 100 females. This slightly higher proportion of live male births has been found to be both historically and geographically consistent (Hesketh & Xing, 2006). However, in countries with strong son-preference, the SRB can be much higher. For example, Guilmoto (2009) estimates an SRB in mainland China in 2004 of over 120, and an SRB in India of between 112 and 119.

Another region of the world that has documented high SRBs is the Caucasus and Central Asia (Duthé et al., 2012; Guilmoto, 2009). For some countries in this region, the SRB has been documented to be similar to the elevated levels seen in China, especially for Azerbaijan, Armenia, and Georgia (Michael et al., 2013; Schief et al., 2021). As part of the former Soviet Union, these countries share a common history of abortion and birth control policies. Soon after the Bolshevik Revolution, the Soviet Union became the first country in the world to legalize abortion in 1920, but Stalin re-criminalized the procedure in 1936. After a period

of intense pronatalism after World War II, abortion laws were again liberalized in the 1950s under Kruhshev and the Soviet Union's first female Minister of Health, Mariia D. Kovrigina (Nakachi, 2021).

Throughout most of the Soviet Union, abortion was the primary form of limiting fertility, as contraceptives were difficult to obtain or unreliable, discouraged by medical professionals, and women often lacked information about their usage (Michael et al., 2013). Abortion rates in the USSR were the highest in the world, with the Eastern European countries of the Soviet Bloc having the highest rates within the USSR (Denisov et al., 2012). However, sex-selective abortion was not possible until the importation of ultrasound technology, starting in the 1980s and expanding in the 1990s (Michael et al., 2013).

The collapse of the Soviet Union in 1991 led to a period of economic and social breakdown, as well as dramatic demographic collapse, as mortality rates increased and fertility rates plummeted (Billingsley, 2010; Stuckler et al., 2009). It is also in this period that abnormally high SRBs are observed in the newly independent states of the former Soviet Union (Chao et al., 2019; Guilmoto, 2009; Michael et al., 2013).¹ Specifically, Chao et al. (2019) finds a large spike in the SRBs of Armenia, Azerbaijan, and Georgia in the mid-1990s and early 2000s, before decreasing in the 2010s.

While some research has been done on high SRBs in the Post-Soviet states, these have mostly been limited to descriptive studies, and have not examined the determinants and causal effects of the collapse of the Soviet Union on Post-Soviet SRBs. Some work such as Dudwick (2015) has suggested that the collapse of the Soviet Union led to a re-emergence of traditional, patriarchal gender norms and economic dependence on men, which may have contributed to the rise in sex-selective abortion, especially in the context of decreasing fertility rates.² However, no study has empirically tested this hypothesis.

¹The former Soviet states comprise the countries of Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

²Son-preference is especially salient in the context of decreasing fertility. If families expect to have many children, then the practice of sex-selective abortion may be less common, since the probability of having a son is higher. However, as fertility decreases, and families choose to have fewer children, the pressure for any

This paper aims to fill this gap by examining the causal effect of the collapse of the USSR on Post-Soviet SRBs using a difference-in-differences research design. We hypothesize that the collapse of the Soviet Union led to an increase in sex-selective abortion. We find that while the increase in SRBs in the Post-Soviet states is largely driven by countries with high son-preference, the collapse of the Soviet Union also led to an increase in SRBs in countries with relatively lower son-preference. These results suggest that economic and political shocks can also lead to increases in SRBs, even in countries with relatively low son-preference and traditional values.

2 Empirical Strategy

In order to estimate the causal effect of the collapse of the Soviet Union on SRBs in the Post-Soviet states, we use a difference-in-differences research design, comparing the change in SRBs in the Post-Soviet states to a control group of countries that did not experience the collapse of the Soviet Union. We also refine our control group using a matching method to select a control group most similar to the Post-Soviet states prior to the collapse. This step is a useful robustness check, as the Post-Soviet states are a unique group of countries with a shared history of Soviet rule, and especially in the lead-up to the collapse of the Soviet Union, may exhibit different trends in SRBs than other countries given the atmosphere of political and economic uncertainty.

Our main specification is as follows:

$$Y_{it} = \sum_{k=K}^{-2} \beta_k D_{it}^k + \sum_{k=0}^L \beta_k D_{it}^k + X_{it}\Omega + \alpha_i + \tau_t + \epsilon_{it} \quad (1)$$

where Y_{it} is the SRB at time t in country i , D_{it}^k is a dummy variable for the treatment status of country i at time t , X_{it} is a vector of control variables, α_i is a country fixed effect, τ_t is a time fixed effect, and ϵ_{it} is the error term. The β_k are the treatment effects, where k

 individual child to be a son increases, as does the likelihood of sex-selective abortion (Jayachandran, 2017).

is the time period relative to the collapse of the Soviet Union in 1991, and is equal to 0 in 1991 and negative in the years before the collapse. Following conventions in the literature, the pre-treatment coefficients β_k tests the parallel trends assumption and should be near zero, and the post-treatment coefficients estimate the treatment effect. We use a 10 year pre-treatment period and a 15 year post-treatment period. Given the use of survey data which can fluctuate from year to year due to sampling error, we estimate the event study by pooling the data in two year intervals.

3 Data

We compute annual country-level SRBs using the database compiled by Chao et al. (2019), which documents SRBs for most countries in the world based on a large number of surveys and censuses. Chao et al. (2019) constructs SRBs from vital records by computing the total number of boys born in a year relative to the total number of girls. When using survey data, Chao et al. (2019) creates cohorts and computes SRBs within a given range of years around a reference year.

For many countries in our sample there are multiple sources for SRBs available in a given county-year combination. To select a unique country-year SRB in these cases, we use the following hierarchy of sources, with the first being the most preferred: (1) Vital Records; (2) Direct Censuses; (3) Demographic Household Survey (DHS) data; and (4) other surveys.³ We select this ordering of sources based on the assumption that vital records are the most complete sources of data, and that direct censuses are more reliable than surveys.

For control variables used in the matching procedure, we use data on log output and population from the Maddison Project Database, as well as indicators for social conflict from Gleditsch et al. (2002) and Davies et al. (2023) (Bolt & Van Zanden, 2024).

Additionally, we use data from the World Values Survey to construct a indices of son-

³We prioritize DHS surveys over other surveys, given their large sample sizes and international comparability, with over 400 surveys in 90 countries.

preference and traditional values for each country (Inglehart et al., 2014). The World Values Survey collects data on individual attitudes towards a variety of social issues, including those around having sons versus daughters, as well as attitudes towards traditional gender roles. The World Values Survey is uniquely suited for our purposes since the same questions are asked across countries, including in the Post-Soviet states, and the survey has been conducted multiple times over the last several decades.

In this analysis, we use Wave 3 of the World Value Survey collected from 1995-1998. While data for this wave was collected a few years after the collapse of the Soviet Union, it includes a larger number of Post-Soviet states than other waves, but is still contemporaneous with the period of interest.

We construct an index of son-preference by using the following question from the World Values Survey: “If you were to have only one child, would you rather have it be a boy or a girl?” Respondents could answer that they would prefer either a boy, a girl, or no preference. The son-preference index is calculated as the percentage of respondents in a country who answer that they would prefer a boy. We define former USSR countries with high son-preference as those with a son-preference index above the 75th percentile of the world distribution, and lower son-preference countries as those with a son-preference index below the 75th percentile.

Since we use a wave of the World Values Survey that was collected after the collapse of the Soviet Union, responses to a single question on son-preference may either be affected by the collapse itself, or be too limited in scope to capture the full range of son-preference expression in a country. Therefore, we also construct a multi-dimensional index of traditional gender norms using questions from the World Values Survey on attitudes towards traditional attitudes and cultural norms towards women, girls, and sons.⁴ We use Principal Component

⁴The questions we use are the following: (1) “If you were to have only one child, would you rather have it be a boy or a girl?;” (2) “If someone says a child needs a home with both a father and a mother to grow up happily, would you tend to agree or disagree?;”, (3) “Do you think that a woman has to have children in order to be fulfilled or is this not necessary?;” (4) “Do you agree or disagree with the following statement?: ”Marriage is an out-dated institution;”, (5) “If someone said that individuals should have the chance to enjoy complete sexual freedom without being restricted, would you tend to agree or disagree?;” (6) “If a woman

Analysis (PCA) to construct this index. We define former USSR countries with high traditional values as those with a traditional values index as those below the 20th percentile of the world distribution, and a low traditional values index as those with a traditional values index above the 20th percentile.⁵

4 Results

Table 1 shows the mean excess SRBs by region and decade. Excess SRBs are calculated by subtracting the biological norm of 1.05 from the observed mean SRB within a region. The Post-Soviet states have some of the highest excess SRBs in the world, along with East Asia and South Asia. Additionally, the SRB for the Post-Soviet states increased overtime, from an SRB of 1.07 in the 1980s, increasing to an SRB of 1.08 in the 2000s, and decreasing slightly into the 2010s.

Figure 1 shows the son-preference index by country. The median son-preference, as shown by the dashed yellow line, is about 0.30, meaning that about 30% of respondents in the World Value Survey would prefer a son over a daughter if they could have only one child. The Post-Soviet states have some of the highest son-preference indices in the world, with most Post-Soviet states having a son-preference index above the 75th percentile of the world distribution, and Armenia and Georgia having higher son-preference indices than India and China. Countries on the far left of the figure have very low son-preference, with the lowest son-preferring countries being in Scandinavia and Oceania.⁶

wants to have a child as a single parent but she doesn't want to have a stable relationship with a man, do you approve or disapprove?;" (7) "A working mother can establish just as warm and secure a relationship with her children as a mother who does not work;" (8) "Being a housewife is just as fulfilling as working for pay;" (9) "Both the husband and wife should contribute to household income;" (10) "On the whole, men make better political leaders than women do;" (11) "If a women earns more money than her husband, it's almost certain to cause problems;" and (12) "A university education is more important for a boy than for a girl."

⁵We use the 20th percentile instead of the 25th percentile for distribution in the PCA index in order to have a more balanced distribution of countries in the high and low traditional values groups.

⁶Appendix figure A1 shows the traditional values index by country. The PCA-constructed traditional values index largely overlaps with the single dimension son-preference index, with Post-Soviet states having some of the most traditional values in the world (low values on the index), again with Armenia and Georgia

The baseline difference-in-differences estimate of the collapse of the Soviet Union on SRBs are shown in figure 2.⁷ There are no substantial pre-trends, and there is a statistically significant increase in the SRB relative to 1990 in the late 1990s, before tapering off in the 2000s. While broadly similar to the descriptive results, the difference-in-differences estimates suggest that the Post-Soviet effect on SRBs dissipates by the late 2000s. The peak treatment effect in the late 1990s is about 0.015, an SRB about 1.5% higher than the biological norm of 1.05. Relative to the mean SRB in the Post-Soviet states in the 1990s, this treatment effect suggests that the collapse of the Soviet Union explains about 60% of the total excess SRB in the Post-Soviet states in this period. Figure 3 shows the difference-in-differences estimates of the collapse of the Soviet Union on SRBs using a matched comparison group. Each treated country is matched to to three comparison countries with similar pre-treatment levels of armed conflict, population, and GDP. We use Mahalanobis distance to calculate the distance between the Post-Soviet states and the comparison group. The results are relatively similar to the baseline estimates, with the treatment effect peaking around the same time period and tapering off in the 2000s.

Using the biological norm of 1.05 as a reference point, the total number of girls missing in the Post-Soviet states between 1991 and 1999 is about 192,000. Given that the average treatment effect of the collapse of the Soviet Union from 1991 to 1999 is about 0.012, this suggests that about 122,000 of these are missing due to the collapse of the Soviet Union, or about 64% of the total number of missing girls in the Post-Soviet states in the 1990s.

Figure 4 shows the event study of the collapse of the Soviet Union on SRBs separately estimated for countries with high son-preference and low son-preference (top and bottom panels, respectively). In these estimates, countries with high son-preference have a son-preference index above the 75th percentile of the world distribution, and countries with

having some of the most traditional values in the world. Overall, the traditional values index categorization of countries is highly correlated (0.58) with the son-preference index categorization of countries, and the two indices largely overlap.

⁷We limit SRBs to between 0.95 and 1.15 to limit the effect of outliers that may be due to sampling error in the survey data.

low son-preference have a son-preference index below the 75th percentile, with the index being calculated as the number of respondents in a country who would prefer a son over a daughter or no preference if they could have only one child. Post-Soviet countries with low son-preference are Estonia, Latvia, Lithuania, and Ukraine, and the remaining Post-Soviet countries are classified as high son-preference.

First examining the effect of the collapse of the Soviet union on SRBs in high son-preference countries in the baseline model in the top panel of figure 4, there is some evidence of a reduction in SRBs just before the collapse, though these estimates are not statistically significant. After the collapse of the Soviet Union, the high son-preferring countries experienced a large increase in SRBs, with the treatment effect peaking again in the late 1990s. However, compared to the pooled estimates, the treatment effect only tapers off slightly in the 2000s, and in fact remains elevated through the 2000s. For the high son-preference countries, the peak treatment effect of 0.02 represents a 1.9% increase in the SRB relative to the biological norm of 1.05. Turning to the baseline estimates for those Post-Soviet countries with low son-preference in the top right panel, there is little evidence of a trend in SRBs before the collapse of the Soviet Union. After 1991, however, there is an increase in SRBs that is statistically significant, peaking in the late 1990s at about 0.01, or a 0.9% increase in the SRB relative to the biological norm of 1.05—about half the size of that in high son-preferring countries. This effect dissipates in the 2000s, and by the end of the decade the SRB is back to its pre-treatment level. Appendix figure A2 shows the event study of the collapse of the Soviet Union on SRBs using the matched comparison group for high and low son-preference countries. The results are broadly similar to the baseline estimates, with the treatment effect peaking in the late 1990s and tapering off quickly for low son-preference countries, and remaining elevated through the 2000s for high son-preference countries.

In addition to assigning son-preference based on the son question in the World Values Survey, we also construct an index of son-preference by using an array of questions from the World Value Survey that relate to traditional norms around women and children, as

described above. We use the first principal component of these questions as the traditional values index, and split the Post-Soviet states into high and low traditional values countries based on being in the bottom 20th percentile of the world distribution. The distribution of the traditional values index by country is shown in appendix figure A1. Figure 5 shows the baseline event study estimate of the collapse of the Soviet Union on SRBs, split by Post-Soviet countries with high traditional values and low traditional values in the top and bottom panels, respectively. Similar to the results in figure 4, for countries with high traditional values, there is little evidence of a trend in SRBs before the collapse of the Soviet Union, but a large increase in SRBs after the collapse, with the treatment effect peaking in the late 1990s at 0.018. The treatment effect then tapers off slightly in the 2000s, before increasing again at the end of the decade. For countries with low traditional values, there is little evidence of a trend in SRBs before the collapse of the Soviet Union, but a significant increase in SRBs after the collapse, with the treatment effect peaking in the late 1990s at 0.01. The treatment effect then decreases through the 2000s, and by the end of the decade the effect of the collapse of the Soviet Union on SRBs is slightly negative.

Appendix figure A3 show the event study of the collapse of the Soviet Union on SRBs using the matched comparison group for high and low traditional values countries. The results are broadly similar to the baseline estimates, with the treatment effect peaking in the late 1990s and tapering off quickly for low traditional values countries, and peaking in the late 1990s, diminishing in the 2000s, and then increasing again in the late 2000s for high traditional values countries.⁸

⁸We also check if the results are robust to import intensity. We use data on import to GDP ratios from Gräbner et al. (2021) to construct a measure of trade openness. We use average import to GDP growth rates from 1991–2000 to construct this measure. We define former USSR countries with high trade openness as those with mean growth rates above the 75th percentile of the world distribution, and low trade openness as those with mean growth rates below the 75th percentile. Appendix figure A4 shows the baseline treatment effect is larger, though noisier, in high import growth countries, but the effect is still substantial in low import growth countries. Appendix figure A5 shows the matched difference-in-differences estimates of the collapse of the Soviet Union on SRBs, split by high and low trade openness. The matched estimates suggest the same pattern as the baseline estimates.

5 Discussion

Overall, the difference-in-differences results suggest that the collapse of the Soviet Union had a causal effect on SRBs in the Post-Soviet states. This effect peaked in the late 1990s and early 2000s, and tapered off before 2010. The peak effect of the collapse of the Soviet Union on SRBs is about 0.015 in the decade after the collapse. This represents a substantial increase in SRBs; given the biological norm of 1.05, the results suggest that the collapse of the Soviet Union led to a 1.5% increase in the SRB in the Post-Soviet states. This effect is substantial, explaining about 64% of the total number of missing girls in the Post-Soviet states from 1991 to 1999. For further illustration, this 1.5% increase in SRB is about 95% of the size of the increase in SRBs in East Asia and Southern Asia from the 1980s to the 1990s, as seen in table 1.

When split by son-preference, we find that while the treatment effect is larger in high son-preference countries, the collapse of the Soviet Union also led to an increase in SRBs in low son-preference countries, with a peak treatment effect in high-son-preference countries of increase of about 2% relative to the biological norm, and an increase of about 1% in low son-preference countries. When split by traditional values, again higher traditional values countries have a larger treatment effect.

One of the primary drivers of sex-selective abortion discussed in the literature is a deep rooted cultural norm around son-preference. Our findings corroborate this literature, but further suggest that economic and political shocks can also lead to increases in SRBs, even in countries with relatively lower son-preference and traditional values. Some proposed mechanisms for sex-selective abortion may become especially salient in the context of economic and political distress. For example, if families are facing economic hardship, they may change the way they value female or male children based on specific institutional features around marriage markets, property rights, or labor market conditions (Choi & Hwang, 2020; Yoo et al., 2017). Social turmoil, such as the transition from socialism to a market-based economy, may have led to a re-emergence of patriarchal property rights and norms, and therefore

increases in families selecting for sons.

Guilmoto (2009) proposes three conditions which precipitate the increase in sex-selective abortion and SRBs: (1) the ability for parents to obtain an abortion through the availability of technology and the legal framework; (2) a moral readiness to engage in sex-selective abortion due to a socially grounded preference for sons; and (3) a fertility “squeeze,” where families are having fewer children and therefore the pressure for any individual child to be a son is higher. The collapse of the Soviet Union and the political and economic distress which followed may have contributed to increases in all three of these conditions. Further research is needed to disentangle the mechanisms through which the collapse of the Soviet Union led to increases in SRBs, and to understand the long-term effects of these increases on the Post-Soviet states.

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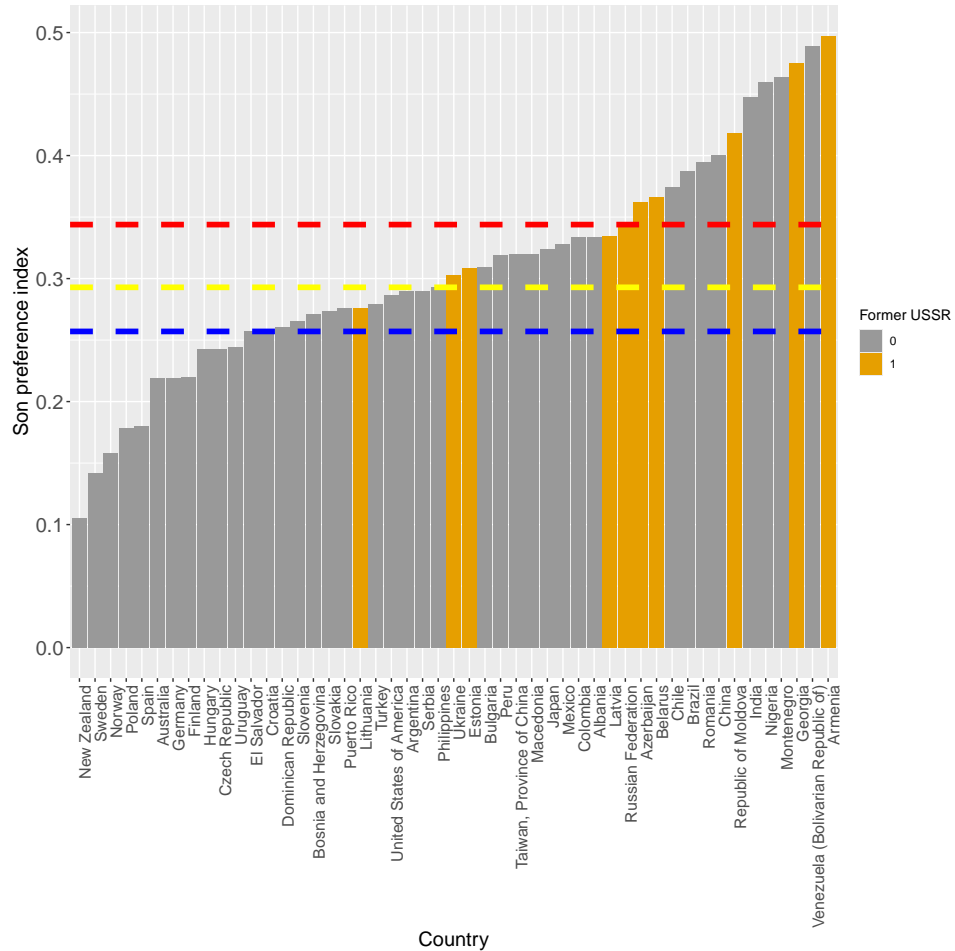
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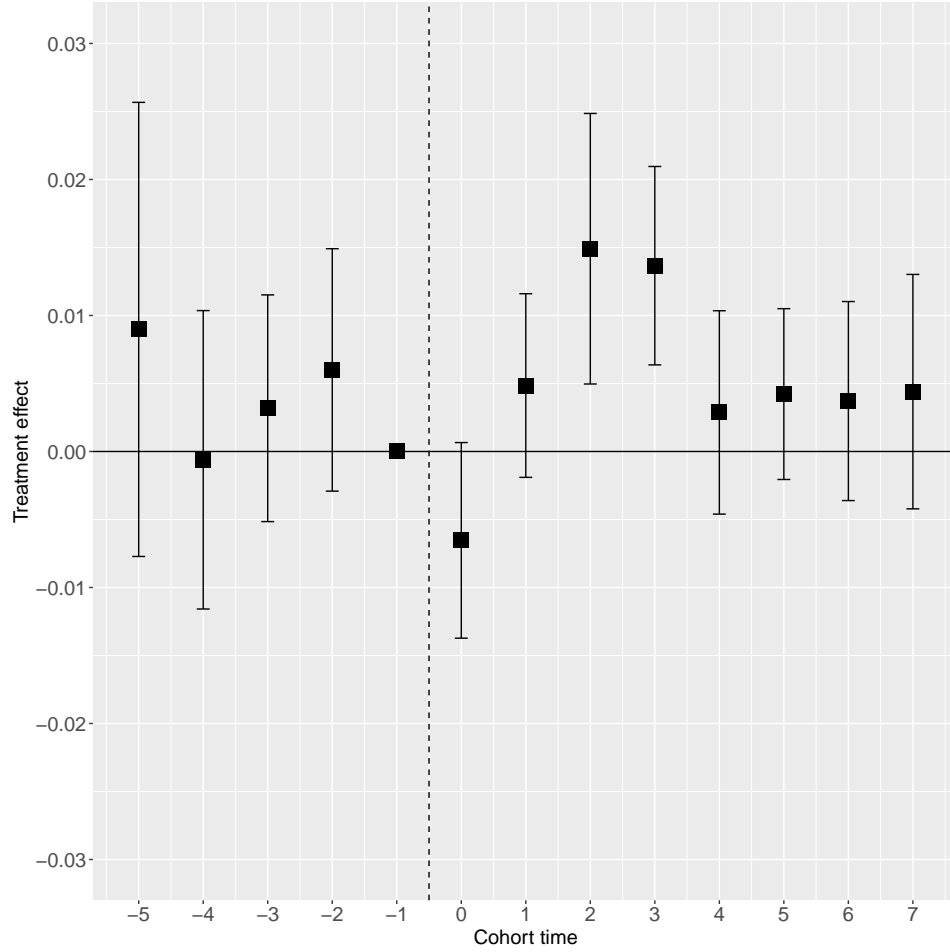
Figures

Figure 1: Son-Preference Index by Country



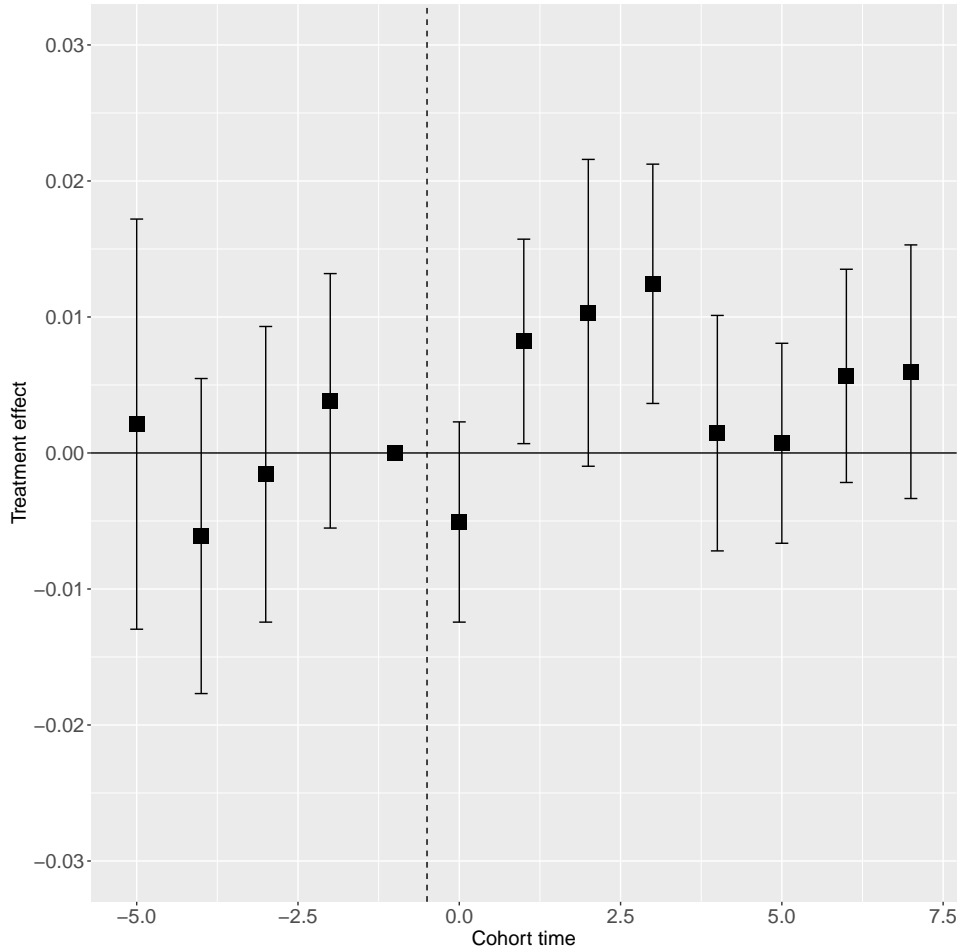
Notes: This figure shows the son-preference index by country. The son-preference index is calculated as the percentage of respondents in a country who answer on the World Value Survey that they would prefer a son over a daughter or no preference if they could have only one child. The dashed blue line, dashed yellow line, and dashed red line show the 25th percentile, median, and 75th percentile of the son-preference index, respectively. Bars shaded in dark yellow represent Post-Soviet states. Source: Author's construction from Chao et al. (2019) and Inglehart et al. (2014) data.

Figure 2: Event Study of the Collapse of the Soviet Union on SRBs



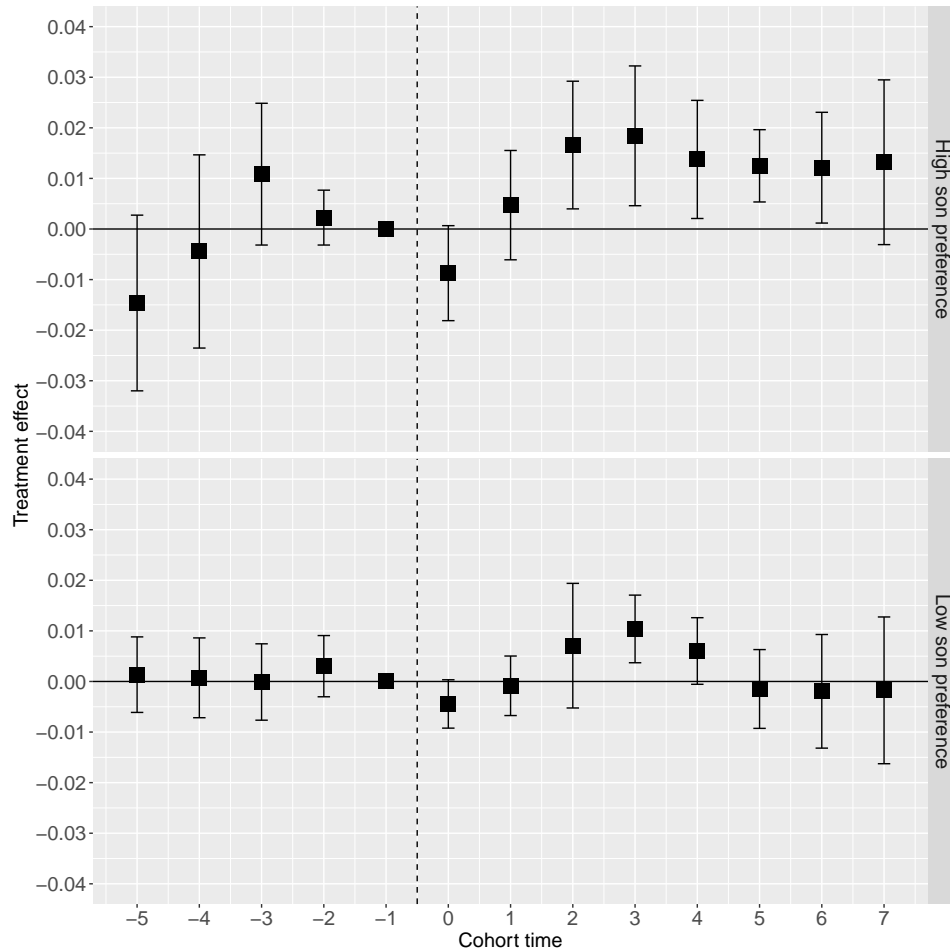
Notes: This figure shows the difference-in-differences estimates of the collapse of the Soviet Union on SRBs. The vertical axis represents the estimated treatment effect, and the horizontal axis represents the time period relative to the collapse of the Soviet Union in 1991. Cohort time represents two-year intervals around the collapse of the Soviet Union. Confidence intervals clustered at the country-level are shown at the 90% level. Source: Author's construction from Chao et al. (2019) data.

Figure 3: Matched Event Study of the Collapse of the Soviet Union on SRBs



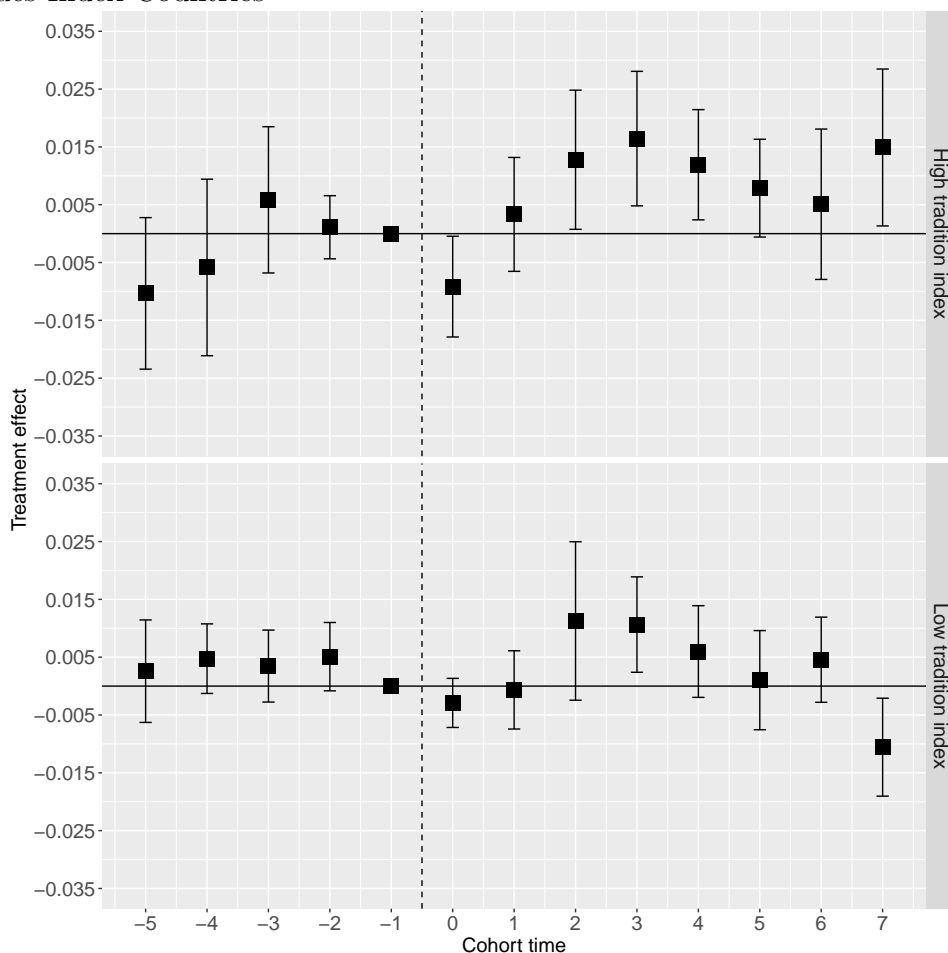
Notes: This figure shows the matched difference-in-differences estimates of the collapse of the Soviet Union on SRBs. The vertical axis represents the estimated treatment effect, and the horizontal axis represents the time period relative to the collapse of the Soviet Union in 1991. Cohort time represents two-year intervals around the collapse of the Soviet Union. Treated countries are matched based on pre-treatment levels of armed conflict, population, and GDP to three comparison countries. Confidence intervals clustered at the country-level are shown at the 90% level. Source: Author's construction from Chao et al. (2019), Bolt and Van Zanden (2024), Gleditsch et al. (2002), and Davies et al. (2023) data.

Figure 4: Event Study of the Collapse of the Soviet Union on SRBs: Low Son-Preference and High Son-Preference Countries



Notes: This figure shows the difference-in-differences estimates of the collapse of the Soviet Union on SRBs. The vertical axis represents the estimated treatment effect, and the horizontal axis represents the time period relative to the collapse of the Soviet Union in 1991. Cohort time represents two-year intervals around the collapse of the Soviet Union. The top panel show the estimates for high son-preference countries, and the bottom panel show the estimates for low son-preference countries. Confidence intervals clustered at the country-level are shown at the 90% level. Source: Author's construction from Chao et al. (2019) and Inglehart et al. (2014) data.

Figure 5: Event Study of the Collapse of the Soviet Union on SRBs: Low and High Traditional Values Index Countries



Notes: This figure shows the difference-in-differences estimates of the collapse of the Soviet Union on SRBs. The vertical axis represents the estimated treatment effect, and the horizontal axis represents the time period relative to the collapse of the Soviet Union in 1991. Cohort time represents two-year intervals around the collapse of the Soviet Union. The left panels show the estimates for high traditional value countries, and the right panels show the estimates for low traditional value countries. The top panels shows the baseline estimates, and the bottom panels shows the estimates with matched comparison countries. Confidence intervals clustered at the country-level are shown at the 90% level. Source: Author's construction from Chao et al. (2019) and Inglehart et al. (2014) data.

Tables

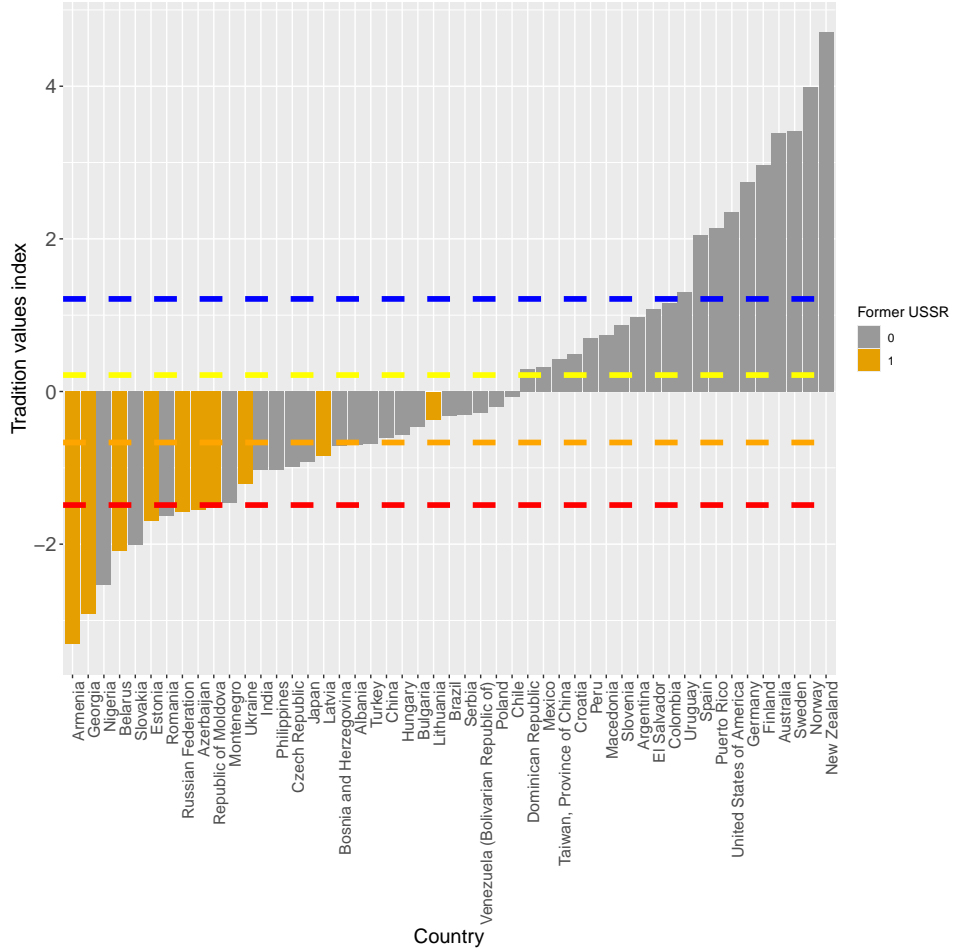
Table 1: Average Sex Ratios at Birth Deviations by Region and Decade

	Region	1980s	1990s	2000s	2010s
1	Eastern Asia	0.0195	0.0357	0.0285	0.0275
2	Former USSR	0.0178	0.026	0.0294	0.0231
3	Latin America and the Caribbean	-0.0125	-0.0039	-0.0026	-0.0011
4	Northern Africa	0.0029	0.0193	0.003	0.0001
5	South-eastern Asia	0.0188	0.0159	0.0124	0.0184
6	Southern Asia	0.0059	0.021	0.022	0.0239
7	Sub-Saharan Africa	-0.0123	-0.0135	-0.0036	-0.021
8	Western Asia	0.0058	0.002	0.012	0.0106

Notes: This table shows the difference in mean sex ratios at birth (SRB) from the biological norm of 1.05 by region and decade. Source: Author's construction from Chao et al. (2019) data.

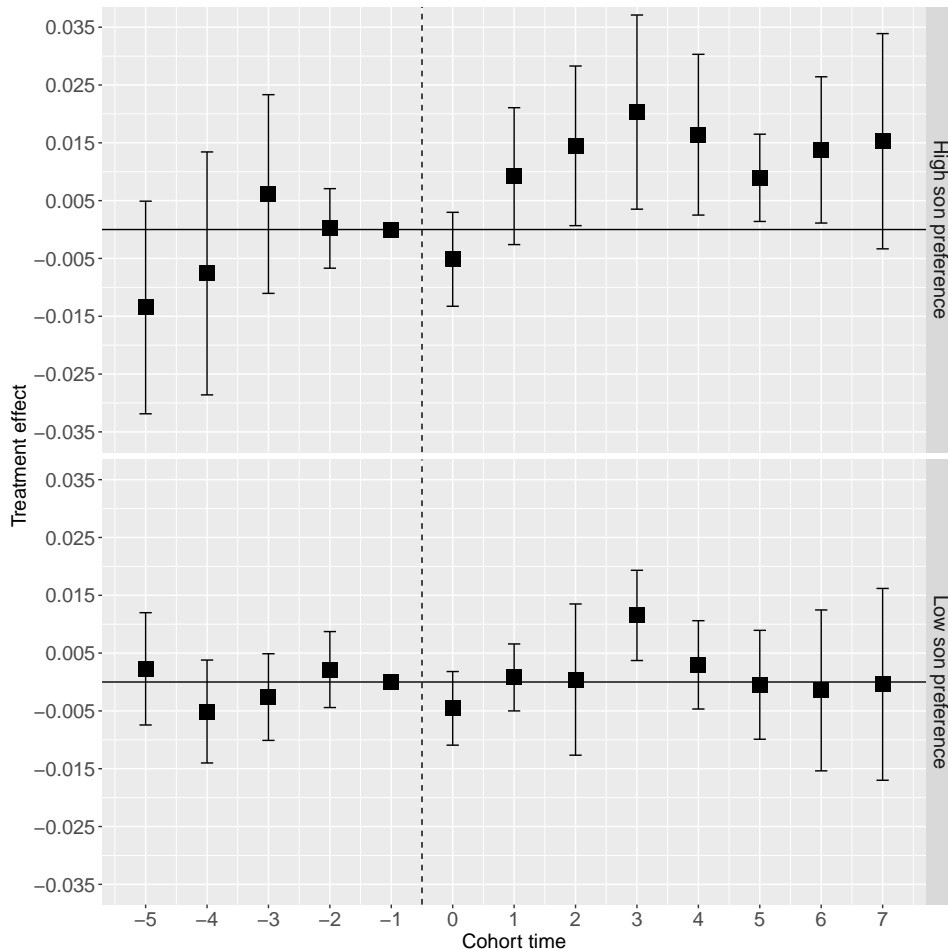
Appendix

Figure A1: Traditional Values Index by Country



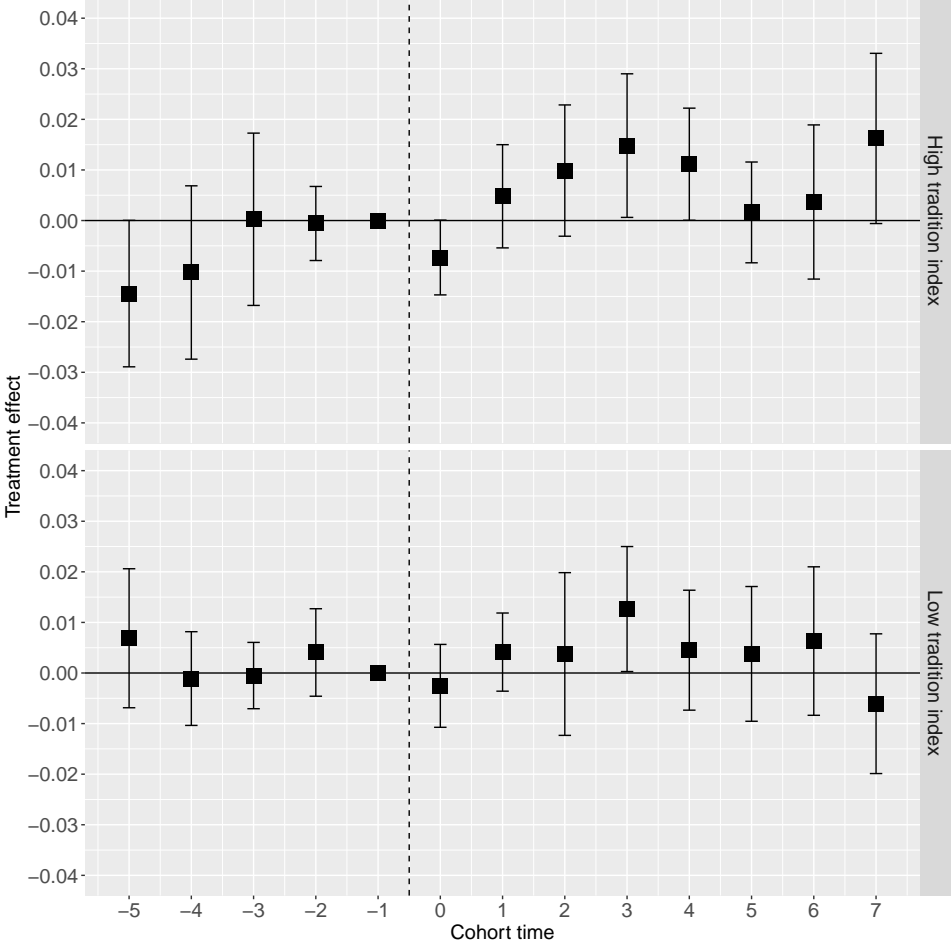
Notes: This figure shows the traditional values index by country. The traditional values index is calculated using PCA from the questions in the World Values survey that relate to traditional gender norms for women and children. The dashed blue line, dashed yellow line, dashed orange line, and dashed red line show the 80th percentile, 60th percentile, 40th percentile, and 20th percentile of the traditional values preference index, respectively. Bars shaded in dark yellow represent Post-Soviet states. Source: Author's construction from Chao et al. (2019) and Inglehart et al. (2014) data.

Figure A2: Matched Event Study of the Collapse of the Soviet Union on SRBs: Low Son-Preference and High Son-Preference Countries



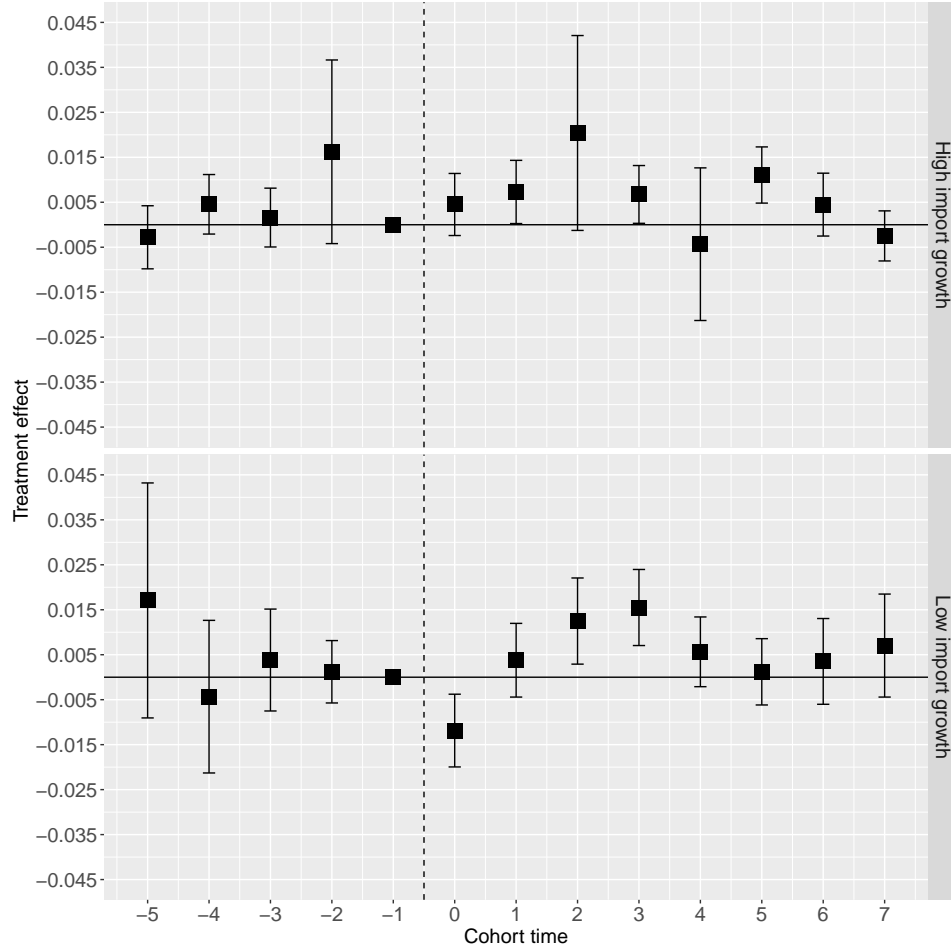
Notes: This figure shows the difference-in-differences estimates of the collapse of the Soviet Union on SRBs. The vertical axis represents the estimated treatment effect, and the horizontal axis represents the time period relative to the collapse of the Soviet Union in 1991. Cohort time represents two-year intervals around the collapse of the Soviet Union. The top panel show the estimates for high son-preference countries, and the bottom panel show the estimates for low son-preference countries. Treated countries are matched based on pre-treatment levels of armed conflict, population, and GDP to three comparison countries. Confidence intervals clustered at the country-level are shown at the 90% level. Source: Author’s construction from Chao et al. (2019), Inglehart et al. (2014), Bolt and Van Zanden (2024), Gleditsch et al. (2002), and Davies et al. (2023) data.

Figure A3: Matched Event Study of the Collapse of the Soviet Union on SRBs: Low and High Traditional Values Index Countries



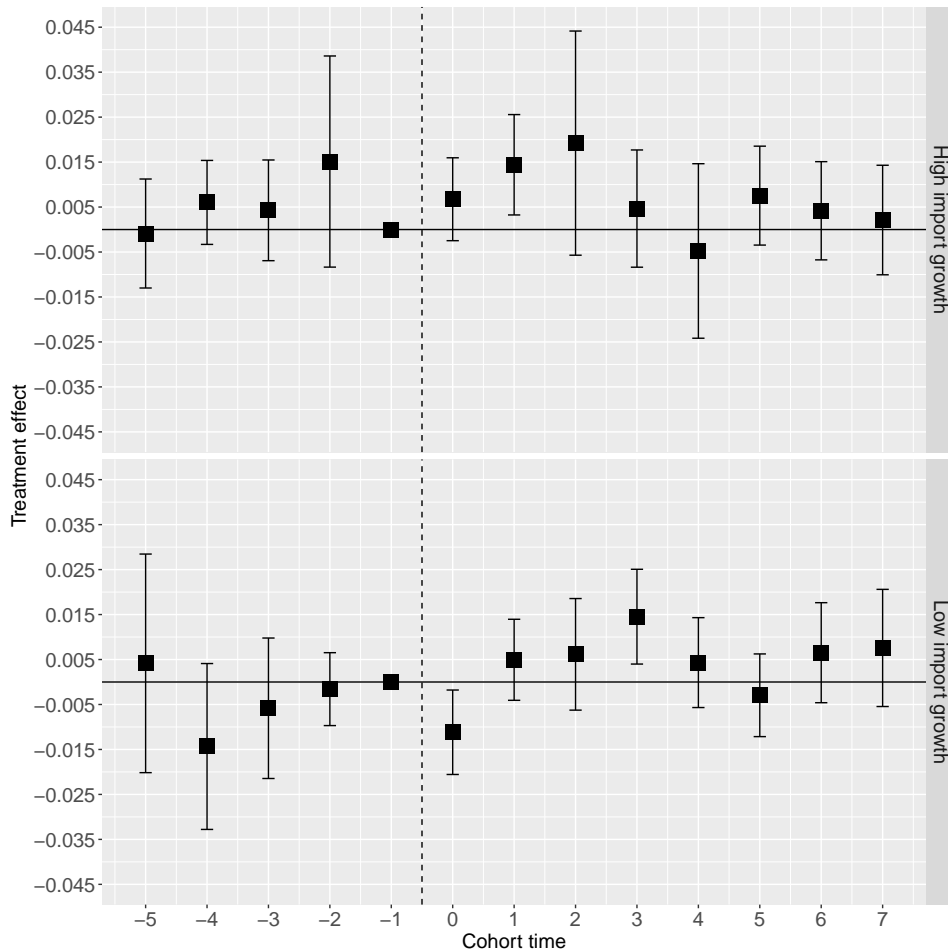
Notes: This figure shows the difference-in-differences estimates of the collapse of the Soviet Union on SRBs. The vertical axis represents the estimated treatment effect, and the horizontal axis represents the time period relative to the collapse of the Soviet Union in 1991. Cohort time represents two-year intervals around the collapse of the Soviet Union. The top panel shows the estimates for high traditional value countries, and the bottom panel shows the estimates for low traditional value countries. Treated countries are matched based on pre-treatment levels of armed conflict, population, and GDP to three comparison countries. Confidence intervals clustered at the country-level are shown at the 90% level. Source: Author’s construction from Chao et al. (2019), Inglehart et al. (2014), Bolt and Van Zanden (2024), Gleditsch et al. (2002), and Davies et al. (2023) data.

Figure A4: Event Study of the Collapse of the Soviet Union on SRBs: Low and High Trade Openness Countries



Notes: This figure shows the difference-in-differences estimates of the collapse of the Soviet Union on SRBs. The vertical axis represents the estimated treatment effect, and the horizontal axis represents the time period relative to the collapse of the Soviet Union in 1991. Cohort time represents two-year intervals around the collapse of the Soviet Union. The top panel shows the estimates for high import growth countries, and the bottom panel show the estimates for low import growth countries. The top panels shows the baseline estimates, and the bottom panels shows the estimates with matched comparison countries. Confidence intervals clustered at the country-level are shown at the 90% level. Source: Author's construction from Chao et al. (2019) and Gräbner et al. (2021) data.

Figure A5: Matched Event Study of the Collapse of the Soviet Union on SRBs: Low and High Trade Openness Countries



Notes: This figure shows the difference-in-differences estimates of the collapse of the Soviet Union on SRBs. The vertical axis represents the estimated treatment effect, and the horizontal axis represents the time period relative to the collapse of the Soviet Union in 1991. Cohort time represents two-year intervals around the collapse of the Soviet Union. The top panel shows the estimates for high traditional value countries, and the bottom panel shows the estimates for low traditional value countries. Treated countries are matched based on pre-treatment levels of armed conflict, population, and GDP to three comparison countries. Confidence intervals clustered at the country-level are shown at the 90% level. Source: Author's construction from Chao et al. (2019), Gräbner et al. (2021), Bolt and Van Zanden (2024), Gleditsch et al. (2002), and Davies et al. (2023) data.