

Preparing Kids for Capitalism: The Effect of German Reunification on the Intergenerational Transmission of Preferences*

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Abstract

Among the many dimensions along which children are similar to their parents are economic preferences such as patience and risk aversion. But what drives the correlation in preferences of parents and children? We build a theoretical model featuring different channels of cultural transmission and use the natural experiment of German reunification to shed light on this question. The model highlights that different potential transmission channels have distinct implications for how transmission should differ between the East and the West, and how reunification should affect parent-child correlations. Specifically, genetic channels should act independently of the political regime; passive transmission channels should interact with the greater use of government-provided childcare in East Germany versus parent-provided care in West Germany; and parents' active socialization efforts should be responsive to the new challenges that moving from a socialist to a capitalist system presents. Empirical evidence from the correlation of preferences between parents and children born on both sides of the border before, during, and after the political transition suggests that government intervention had little impact on preference transmission. In contrast, both genetic and active transmission channels find strong support.

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1 Introduction

In the past two decades, the economics literature has seen a growing interest in understanding the formation of preferences and attitudes. This literature has documented that there are persistent differences in preferences and attitudes across countries as well as within countries which vary systematically with differences in geo-climatic conditions (Galor & Ozak, 2016; Galor & Savitskiy, 2018; Alesina, Giuliano & Nunn, 2013; Buggle & Durante, 2017). It has also been shown that preferences and attitudes are affected by the socio-economic conditions that individuals experienced while growing up (Alesina & Fuch-Schuendeln, 2007; Giuliano and Spilimbergo, 2014; Campa & Serafinelli, 2018). Furthermore, the literature has established that preferences and attitudes are formed through social interaction and that both socialization through parents and exposure to other role models play a role in this process. This has been documented both in the context of theoretical models of cultural transmission (Bisin & Verdier, 2001; Doepke & Zilibotti 2008; Doepke & Zilibotti, 2013; Klasing, 2014; Klasing & Milionis, 2014; Doepke & Zilibotti, 2019) as well as empirically. For example, it has been shown that the preferences and attitudes of migrants correlate positively with the preferences and attitudes observed in their ancestry countries (Fernandez & Fogli, 2009; Alesina & Giuliano, 2010; Algan & Cahuc, 2010) and that there is a strong positive correlation between the preferences and attitudes of parents and their children (Dohmen, et al. 2012). Finally, twin studies have shown that some interpersonal variation in preferences can also be attributed to variation in genes (Nicolaou, et al, 2008; Lindquist, Sol & van Praag, 2015).

Our interest in this paper is to assess the importance of different channels of preference transmission that have been explored in the literature. Theoretical models of cultural transmission have stressed different mechanisms through which social interactions influence the formation of preferences. First, there could be passive transmission of preferences from parents to children that arises simply from genetic similarity or living together. Second, there could be active socialization with parents consciously trying to endow their children with preferences that appeal to them, either because they think that these are likely to make their children successful later in life or because parents have these preferences themselves and

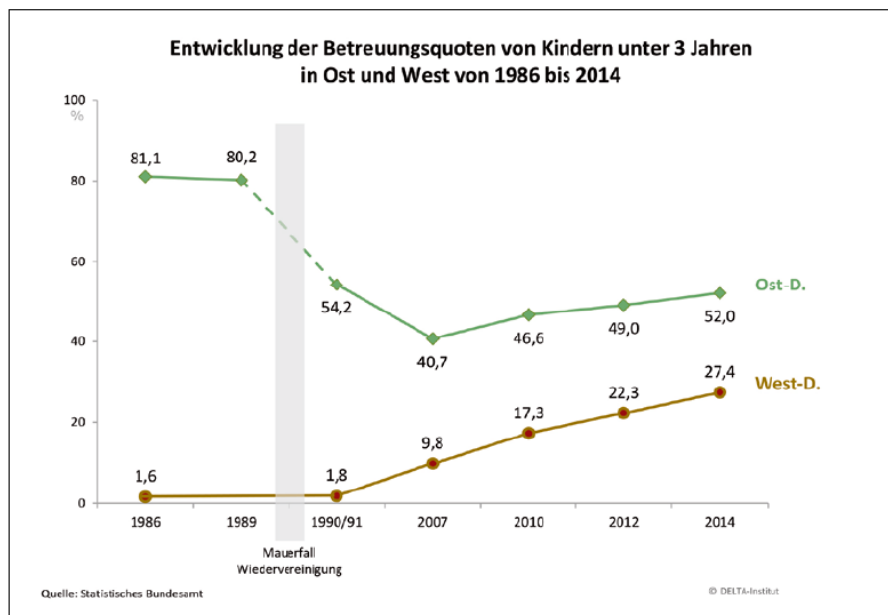
like to have children who are similar to them. Third, individual preferences are influenced by socialization outside of the family, such as interaction with peers and teachers or exposure to role models presented in the media. While all these channels of influence have been discussed in the literature, there is an ongoing debate about the relative importance of these channels.

To shed light on this issue, we first develop a theoretical model of preference formation highlighting the role of different channels of transmission. We then examine how the reunification of Germany in 1990 affected the transmission of preferences from parents to children and how the empirical patterns compare with the model predictions. The end of communism is an interesting laboratory setting to learn more about the importance of these various channels. First, the transition from communism to a free market economy opened up new economic opportunities which may have altered the monetary and non-monetary rewards associated with certain preferences and thus may have changed the preferences and attitudes parents desire their children to have. Second, the reunification of Germany came also with large changes in institutions and the influence of the state in East Germany. For example, the reunification ended state indoctrination through active propaganda in East Germany. Also, while it was common for women to work full time in East Germany and for children to be placed in state-run childcare centers from a very young age, the West German model favored more traditional gender roles with mothers staying home full-time and taking care of their children themselves with no or limited external influences at least until the start of kindergarten.

With the reunification of Germany, the West German model of child care became more common in East Germany. This is visible from Figure 1 displaying the share of children under the age of 3 enrolled in public childcare. Before reunification, in East Germany more than 80 percent of infants and toddlers were in public childcare centers while this share was less than 2 percent in West Germany. After reunification, the gap quickly declined as childcare centers in East Germany were shut down. While less stark, there was also a substantial gap in the availability of kindergarten. About 95 percent of children age 3-6 were enrolled in full-time kindergarten in East Germany shortly before reunification, in West Germany only

67 percent of children attended kindergarten (BFSFJ, 2015) and most of them only part-time (Schenk, 2003). Furthermore, among children age 6-10 more than 80 percent were enrolled in after-school programs in East Germany, in West Germany, on the other hand, this share was less than 5 percent (BFSFJ, 2015). The changes in childcare arrangements in East Germany after reunification came hand in hand with changes in women’s labor force participation (see Table 1). Before reunification, the female labor force participation rate in East Germany was close to 80 percent, with most of it in full-time employment, in West Germany the rate was only 60 percent, with most women working only part-time (Schenk, 2003). After reunification, the labor force participation rate of East German women fell rapidly, reducing the gap to just about 5 percentage points within ten years (DIW, 2014).

Figure 1: Percentage of children under 3 years enrolled in public childcare



Source: BFSFJ (2015), p.57

If time spent together is crucial for the transmission of preferences from parents to children, we would generally expect to see a weaker correlation in preferences between parents and children for children who were raised in East Germany than in

Table 1: Female labor force rate 1950-2010 (in %)

	West Germany	East Germany
1950	45	45
1960	49	62
1970	50	66
1980	53	73
1990	60	78
1995	60	74
2000	63	69
2005	66	73
2010	69	76

Notes: Figures for 1950-1990 refer to women aged 16-60. Figures for 1995-2010 refer to women aged 15-65. Sources: 1950-1990: Schenk (2003), p.54; 1995-2010: DIW (2014), p.34.

West Germany. With the transition to the West German model after reunification, we would then expect to see an increase in the parent-child correlation among families from East Germany. If, on the other hand, the conscious socialization channel is important, we would expect parents to look at the world their children are expected to face when older and make their socialization decisions accordingly. From this perspective, the change in the economic and political system in 1989/1990 should have had a large impact: Parents are now preparing their children for very different lives. If certain preferences are perceived as being more desirable in the new environment, we would expect parents from East Germany to instill these preferences in their children, which would tend to drive down the parent-child correlation in preferences relative to West German families for whom the socio-economic conditions remained stable.

We test these predictions using data from the German Socio Economic Panel (SOEP). The SOEP is a household survey which has been conducted annually since 1984. One of the nice features of the survey is the fact that once a household enters the survey, every member of the household is being followed, even after they move out from the original household and form new households. This

implies that individuals who were children at the time when the household was first surveyed, will be followed even after they have become adults. From that time onward these children, along with their parents, will both fill out the standard personal survey on a regular basis which contains questions about their attitudes and preferences on a range of topics. This feature of the survey allows us to match parents with their adult children and compare their attitudes.

For the purpose of this analysis, we focus primarily on attitudes toward risk tolerance. We do so for three reasons. First, risk attitudes play a key role in economic models, such as models of investment or occupational choice and in particular the choice between risky entrepreneurial activity and (comparably) safe dependent employment. Second, the transition from state communism to capitalism in East Germany brought forward previously non-existing opportunities for entrepreneurial activity.

Our analysis rests on comparing the risk attitudes of adult “children” with those of their parents and testing whether the parent-child correlation in risk attitudes differs between families from East and West Germany. To test if and to what extent the reunification of Germany affected the transmission of risk attitudes from parents to children, we compare the parent-child correlations between children born at different points in time. If the economic, institutional and political changes that followed with the reunification altered the choices of parents about how to socialize their children, affected the amount of time parents spend with their children due to changes in parental labor force participation and the availability of childcare or altered the role models and ideologies presented in schools and the media, we would expect to see a change in the time trend in the parent-child correlation among families from East Germany relative to West German families. This change would be expected to be visible starting from children born a few years prior to 1989, i.e. children who were young enough to experience the associated changes in the socio-economic environment at an age when their preferences were still malleable.

Two key findings emerge from our empirical analysis. First, parent-child correlations in risk attitudes are similar for East and West-German families whose children were born many years before or after reunification. These are the children

who spent all their key formative years either before or after reunification and for whom the socio-economic environment remained largely stable during their formative years. This suggests that the role of the government-indoctrination channel, i.e. the notion that parent-child correlations should be lower in pre-reunification East Germany because much of the socialization took place in state institutions rather than in the family, finds limited support.

The second finding is that parent-child correlations in risk attitudes are markedly lower among East German families whose children were in their key formative years around the time of reunification, namely children born between roughly 1985 and 1990. For these cohorts, we furthermore observe that children's risk tolerance is elevated relative to East German children born earlier and relative to West German children born at the same time. This observation can be rationalized by East German parents wanting to instill specific attitudes in their children which are deemed beneficial in the new economic environment but are different from the parent's own attitudes. Since parents have very limited influence on their children after a certain age, it makes sense that the socio-economic changes associated with the German reunification only affected young children whose attitudes were still malleable. Specifically, given that East Germans born between 1985 and 1990 are more risk tolerant on average than West Germans born at the same time, the empirical results suggest that parents were endowing their children with higher risk tolerance. This makes sense considering that the transition from state communism to free market economy brought forward previously non-existing opportunities for entrepreneurial activity and considering that risk tolerant individuals are significantly more likely to be entrepreneurs than otherwise identical more risk-averse individuals (Van Praag and Cramer, 2001; Cramer et al., 2002; Caliendo, Fossen and Kritikos, 2006).

Overall, our results on changes in preference transmission around the time of reunification lend support to the conscious socialization channel that responds to changes in the economic environment. In addition, the high overall correlation between parents and children is consistent with a significant role for genetic transmission and cultural transmission driven by parents having a preference for children to develop attitudes similar to their own. In contrast, the results suggest

that the role of passive socialization and the role of government indoctrination is limited, at least as far as risk preferences are concerned. Looking at other economically important preferences and attitudes beyond risk attitudes, we observe parent-child correlation patterns that also lend some support to the relevance of passive socialization and the government indoctrination channel.

2 A Model of Preference Formation

We now describe a model of preference formation that captures the alternative channels for the influence of parents, the state, and the economic environment.

2.1 Setup and Channels of Transmission

We consider a population of families consisting of one parent and one child. Each parent is characterized by a genetic type $G \in \{1, 2\}$ and a phenotype $P \in \{1, 2\}$. In the application to risk-taking behavior that we focus on below, the phenotype would correspond to actual risk aversion, and the genotype captures a genetic predisposition to more risk-loving or more risk-averse behavior.

Our focus is on the determination of the child's phenotype P_C , and on the resulting correlation between parent and child. The child's phenotype emerges from an interaction of its genotype, a socialization effort of the government, and a socialization effort of the parent. For ease of exposition we model these three influences as successive stages, although our main results do not depend on this assumption.

The first stage of transmission is genetic transmission. There is an exogenous probability $p_T > 0.5$ that the child inherits the genotype of its parent. The child then assumes an initial phenotype $P_{C,1}$ where the probability that this phenotype matches the child's own genotype is given by the exogenous probability $p_E > 0.5$.

In the next stage, the state comes into play. In a communist dictatorship, the state may have an interest to instill certain preferences in its subjects, for example to minimize the likelihood of protests and rebellion against its rule. We assume (without loss of generality) that the state prefers the child to have phenotype $P_C = 1$. The ability of the state to implement this preference depends on two

factors. The first is how much access the state actually has to the child to attempt indoctrination; this will depend on childcare arrangements, and in particular on how much time (if any) children spend in state childcare institutions rather than with their families. Let t_s denote the fraction of available time that children spend under state control, where $0 < t_s < 1$. The state can also decide on whether to attempt to shape children's preferences. Let p_s be the probability per unit of time that indoctrination is successful, i.e., that a child with initial phenotype $P_{C,1} = 2$ switches to phenotype $P_{C,2} = 1$ in this second stage.

Accordingly, if the child's initial phenotype is 1, $P_{C,1} = 1$, the state will not attempt to change the phenotype and hence we have $P_{C,2} = P_{C,1} = 1$ for sure. If the child's initial phenotype is 2, $P_{C,1} = 2$, the second stage phenotype will be $P_{C,2} = 1$ with probability $t_s p_s$ and $P_{C,2} = P_{C,1} = 2$ with probability $1 - t_s p_s$.

In the third stage, the parent can make her own socialization effort. Parents have two separate motives for preference transmission. First, as in Bisin and Verdier (2001) and more generally in the literature on cultural transmission, parents place value on their children inheriting their own values, that is, to end up with the same phenotype as the parent has. However, as in Klasing (2014) and Doepke and Zilibotti (2017), parents also feel altruism for the child and would like the child do well in the world. Hence, if parents perceive that a phenotype other than their own may give the child an advantage, this may override their inclination towards transmitting their own phenotype. Formally, the parent maximizes

$$V_P(X, \gamma) = \max_{P_{P,T} \in \{1,2\}} E \{-\gamma |P_P - P_C| + zV_C(P_C, X)\}$$

Here $P_{P,T}$ denotes the parent's choice of which value to attempt to transmit to the child. In the utility, the first term captures the perceived disutility of a mismatch between the parent's and child's phenotype. There is heterogeneity across parents in terms of how much they desire to transmit their own values, captured by a distribution function $F(\gamma)$ with $F(0) = 0$ and $F(1) = 1$. The distribution of γ is independent of the parent's type; we can envision this type being drawn from the same distribution at the beginning of each parent's life. z captures the weight on altruism, and $V_C(P_C, X)$ captures the perceived future utility of the child as a function of its phenotype P_C and aggregate conditions X .

In our application, the conditions X capture the notion that when the economic and political systems switch, other values and attitudes in children may carry rewards or the economic return to given attitudes may increase. For example, risk taking (say, as an entrepreneur) may have high potential rewards in a market economy, but may have little upside in a totalitarian, conformist society where stepping out of bounds may lead to severe punishment.

If the child already has the phenotype preferred by the parent at stage 2, the socialization effort does not change the outcome. If the child has the opposite phenotype, it will switch to the parent's preferred type with probability $t_{\text{pr}}p_{\text{pr}}$, where t_{pr} is the parent's effort (measured in time) and p_{pr} is a parameter summarizing the effectiveness of parents in shaping their children's preferences. We have $0 < t_{\text{pr}} < 1$ and $0 < p_{\text{pr}} < 1$. We impose that:

$$t_{\text{pr}} = f(t_{\text{s}})$$

with $f'(t_{\text{s}}) < 0$, that is, a greater state indoctrination effort lowers the time that parents spend on preference transmission, which reflects time constraints: when the children spent most of their time supervised by the state there is less scope for the parents to intervene.

2.2 Distribution over Child's Phenotype

We can now characterize the distribution over phenotypes for the child.

First, consider a parent with $G = P = 1$, but who would like to socialize his child to phenotype 2, so that there is a conflict between socialization by the government and by the parent.

The probability distribution over initial phenotypes $P_{C,1}$ is:

$$\begin{aligned} p(P_{C,1} = 1) &= p_{\text{E}}p_{\text{T}} + (1 - p_{\text{E}})(1 - p_{\text{T}}) \\ p(P_{C,1} = 2) &= (1 - p_{\text{E}})p_{\text{T}} + p_{\text{E}}(1 - p_{\text{T}}). \end{aligned}$$

The probability distribution over intermediate phenotypes $P_{C,2}$ is:

$$p(P_{C,2} = 1) = p(P_{C,1} = 1) + t_{\text{s}}p_{\text{s}}p(P_{C,1} = 2)$$

$$p(P_{C,2} = 2) = (1 - t_s p_s) p(P_{C,1} = 2).$$

The probability distribution over final phenotypes P_C :

$$\begin{aligned} p(P_C = 1) &= (1 - t_{pr} p_{pr}) p(P_{C,2} = 1) \\ p(P_C = 2) &= t_{pr} p_{pr} p(P_{C,2} = 1) + p(P_{C,2} = 2). \end{aligned}$$

The distribution of $P_{C,1}$ only depends on the genotypes of the parents. The transition matrix from $(G = 1, G = 2)$ to $(P_{C,1} = 1, P_{C,1} = 2)$ is given by

$$\Pi_0 = \begin{bmatrix} p_E p_T + (1 - p_E)(1 - p_T) & (1 - p_E) p_T + p_E(1 - p_T) \\ (1 - p_E) p_T + p_E(1 - p_T) & p_E p_T + (1 - p_E)(1 - p_T) \end{bmatrix}$$

The matrix is symmetric. To keep the notation simple, we rewrite the matrix as:

$$\Pi_0 = \begin{bmatrix} p_0 & 1 - p_0 \\ 1 - p_0 & p_0 \end{bmatrix}$$

where $p_0 = p_E p_T + (1 - p_E)(1 - p_T)$.

The transition matrix from $(P_{C,1} = 1, P_{C,1} = 2)$ to $(P_{C,2} = 1, P_{C,2} = 2)$ is independent of the parent's type.

$$\Pi_{state} = \begin{bmatrix} 1 & 0 \\ t_s p_s & (1 - t_s p_s) \end{bmatrix}$$

The final transition from $P_{C,2}$ to P_C depends on the type of the child $P_{C,2}$ and the choice of the parents P_P .

For example, if the parents choose $P_P = 1$

$$\Pi_{social} = \begin{bmatrix} 1 & 0 \\ t_{pr}p_{pr} & (1 - t_{pr}p_{pr}) \end{bmatrix}$$

while if the parents choose $P_P = 2$

$$\Pi_{social} = \begin{bmatrix} (1 - t_{pr}p_{pr}) & t_{pr}p_{pr} \\ 0 & 1 \end{bmatrix}$$

If we assume that the genotype and the phenotype of the parent are the same, $G = P$, the overall transition matrix from $(P = 1, P = 2)$ to $(P_C = 1, P_C = 2)$ is given by

$$\Pi = \Pi_0 \times \Pi_{state} \times \Pi_{social}.$$

2.3 The Relationship between the Child's and the Parent's Phenotype

The model as described so far fully characterizes the transmission of preferences, given the parameters characterizing genetic transmission and given the choices of government and parents. Below, we would like to empirically evaluate this model using evidence on the relationship between the phenotypes of parents and children. To do this, it is useful to consider more formally what the model implies for this relationship.

We can characterize the covariance between the phenotypes of parent and child using a formula for binary random variables. For family i at time t , let $X_{P,it}$ be a binary random variable of parent's type

$$X_{P,it} = \begin{cases} 1 & \text{if } P_{it} = 2 \\ 0 & \text{if } P_{it} = 1 \end{cases}$$

and $X_{C,it}$ be a binary variable of children type

$$X_{C,it} = \begin{cases} 1 & \text{if } P_{C,it} = 2 \\ 0 & \text{if } P_{C,it} = 1 \end{cases}$$

The covariance formula can be written as (subscripts omitted):

$$\begin{aligned} Cov(X_C, X_P) &= E[X_C X_P] - E[X_C]E[X_P] \\ &= P(X_C = 1, X_P = 1) - P(X_C = 1)P(X_P = 1) \\ &= P(X_C = 1, X_P = 1) - \left(P(X_C = 1|X_P = 1)P(X_P = 1) \right. \\ &\quad \left. + P(X_C = 1|X_P = 0)P(X_P = 0) \right) P(X_P = 1) \\ &= P(X_C = 1|X_P = 1)P(X_P = 1) - P(X_C = 1|X_P = 1)[P(X_P = 1)]^2 \\ &\quad + P(X_C = 1|X_P = 0)P(X_P = 0)P(X_P = 1) \\ &= \left[P(X_C = 1|X_P = 1) - P(X_C = 1|X_P = 0) \right] P(X_P = 1)P(X_P = 0) \end{aligned}$$

This expression is useful because $P(X_P = 1)P(X_P = 0)$ only depends on the parent's type, which is predetermined before any actions. The policy of the state and the parenting decision affects the covariance only through the difference between $P(X_C = 1|X_P = 1)$ and $P(X_C = 1|X_P = 0)$.

Later, we will also consider regressions of the children's type on the parent's type:

$$X_{C,it} = \alpha_t + \beta_t \times X_{P,it} + \epsilon_{it}$$

β is the additional probability of children being type 2 if their parents are of type 2 instead of type 1. When $\beta = 0$, this means that the parents' type has no predictive power to whether the children become type 2. Suppose the intergenerational transmission of types occurs only through the genetic channel (i.e. $\Pi = \Pi_0$). $\beta = 0$ then implies that $p_0 = 1/2$. This corresponds to the case that both children types are equally likely for each type of parents. Having type 2 parents does not make the children more likely to be type 2 compared to type 1 parents.

The variations of the coefficient β over time are informative as to whether the type transmission occurs exclusively through the genetic channel. β_t across time could be obtained by performing the cross-sectional regression at different points in time. If we believe that types were transmitted only through genetic transmission, we would expect β_t to be constant over time.

To relate the regression coefficient to our model, the formula derived for the covariance helps characterizing the limit of the estimator. Let the estimate of β be $\hat{\beta}$

$$\hat{\beta}_t \rightarrow_p \frac{Cov(X_{C,it}, X_{P,it})}{Var(X_{P,it})} = P(X_{C,it} = 1|X_{P,it} = 1) - P(X_{C,it} = 1|X_{P,it} = 0) \quad (1)$$

By examining the change in the transition matrix, we can predict how β_t changes.

2.4 Summary of Model Predictions

In Appendix A, we formally explore the comparative statics of the model and how various transmission channels affect the correlation of preferences between parents and children. Here, we provide a summary of these results and the preceding discussion.

1. If transmission is entirely due to genetic transmission, there should be a positive correlation between the phenotypes of parent and child, and a regression of child on parent preferences should be independent of time and political regime.
2. If the state transmission channel is important, parent-child correlations in preferences should be higher with less state intervention. Both the genetic channel and the parental transmission channel imply a positive correlation in the preferences of parent and child; parents may choose to endow their children with preferences different from their own if economic conditions make this useful, but at best this would lower the correlation between parent and child. State intervention unambiguously lowers the impact of

these channels that lead to a positive correlation. For our application, this means that children born in East Germany in the late 1980s, who spend their formative years with less state intervention than those born earlier, should be more strongly correlated with their parents.

3. If the active socialization channel is important, parent-child correlations should drop when changes in aggregate conditions X raise the importance of endowing children with specific preferences. The change in aggregate conditions introduces a force that is orthogonal to the existing preferences of the parent and thus lowers parent-child correlations. Notice that this channel has the opposite prediction of the previous one for what should happen around German re-unification: Parents raising children just after 1989 would realize that the “new world” that their children are born into may require attitudes and values quite distinct from those that promised success under the previous regime; the process of endowing children with these preferences would lower the correlation with the parents’ own preferences.

In summary, evidence on how the correlation of parent-child preferences changes around the time of unification is informative about the importance of the different transmission channels. If the preferences of parents and children are positively correlated and the size of the correlation is unchanged over time, this would favor genetic transmission as the main mechanism. In contrast, a change in correlations around the time of reunification would signal, depending on the direction of the change, the importance of the state indoctrination or the parental socialization channel.

2.5 Application to Investment in Risk Tolerance

We illustrate the model findings with an application to the determination of risk preferences. The two geno- and phenotypes correspond to low and high risk tolerance. Specifically, we have $P_C \in \{1, 2\}$, where $P_C = 2$ corresponds to higher risk tolerance (in fact, risk neutrality).

The utility that children experience in adulthood depends on an entrepreneurial choice between risky entrepreneurship and being a worker. Workers always

receive a fixed wage of W ; entrepreneurs can be successful with probability χ , where $0 < \chi < 1$, earning a high return of X , or they can fail with probability $1 - \chi$, yielding a return of zero. Individuals with $P_C = 2$ are risk neutral, and their utility is given by expected consumption. Hence, they choose to be entrepreneurs whenever $\chi X > W$. If risk-averse individuals with $P_C = 1$ choose to be workers, their utility is given by the safe wage W . Risk averse-individuals never choose to be entrepreneurs (this can be guaranteed by attaching sufficiently low utility to the possibility of zero consumption).

Given the setting, the child's utility can be written as:

$$V_C(P_C, X) = P_C \chi X + (1 - P_C)W.$$

The decision problem of the parent is:

$$V_P(X, \gamma) = \max_{P_P, T \in \{1, 2\}} E \{-\gamma |P_P - P_C| + z [P_C \chi X + (1 - P_C)W]\}$$

We focus on the case where the government aims to instill risk aversion in its citizens, for example because high risk aversion makes it less likely that individuals will push for regime change, which is individually risky for them given the state security apparatus.

The parental choice of $P_{P,T}$ occurs in the final stage, given the intermediate phenotype $P_{C,2}$ after the action of the government. A parent with the risk-tolerant phenotype $P_P = 2$ aims to instill risk tolerance if the inequality

$$z(\chi X - W) > -\gamma$$

is satisfied, and conversely risk-averse parents of type $P_P = 1$ will instill risk tolerance if we have:

$$z(\chi X - W) > \gamma.$$

Not surprisingly, risk-averse parents are more likely to instill risk aversion and vice versa.

We focus on the case in which entrepreneurship has a positive return, $\chi X > W$.

In this case, parents who themselves are risk tolerant always aim to instill risk tolerance, as the parameter γ is non-negative. Conversely, the fraction of risk-averse parents who aim to instill risk tolerance is given by $F(z(\chi X - W))$.

We can now characterize how the transmission of risk tolerance is affected by changes in the environment. We are particularly interested in the effects of a decline in state indoctrination t_s combined with a rise in the return to risk tolerance X due to the transition to a market economy. In isolation, a decline in state indoctrination lowers parent-child correlations, because state indoctrination is a force that is orthogonal to the interaction of parents and children and also lowers parental influence. Conversely, an increase in X on its own unambiguously lowers the correlation in preferences between parents and children, because risk-averse parents become more likely to transmit risk tolerance to their children to benefit from the new opportunities.

We now illustrate these effects with a computed example. In this economy, The parameter values are $z = 0.5$, $p_s = p_{pr} = 0.5$, $W = 2$, $\chi = 0.5$, and $X = 2.2$. The probabilities of genetic transmission and expression are such that the initial correlation in phenotypes between parents and children is 0.9, and there are equal numbers of each type. Lastly, the function $f(t_s)$ is such that $t_{pr} = f(t_s) = 1 - t_s$, and γ has a uniform distribution on $[0, 1]$.

Figure 1 shows how in this economy the correlation in phenotype (i.e., measured risk aversion) between parents and children varies with state indoctrination. We see that as t_s rises, the parent-child correlation declines substantially. The state pushes all children towards risk aversion, regardless of the preferences of the parents, which lowers parent-child correlations.

Figure 2 shows what happens if we we fix state indoctrination at t_s at 0.5 and vary the return to entrepreneurship X . As X rises, the parent-child correlation declines once again. Here the effect comes through reorienting parental intervention from reinforcing their own preferences towards equipping their children with the attitudes that have a high return in the new environment. As X rises, more parents who are risk averse themselves push their children toward risk tolerance, which lowers the overall correlation between the preferences of parents and children.

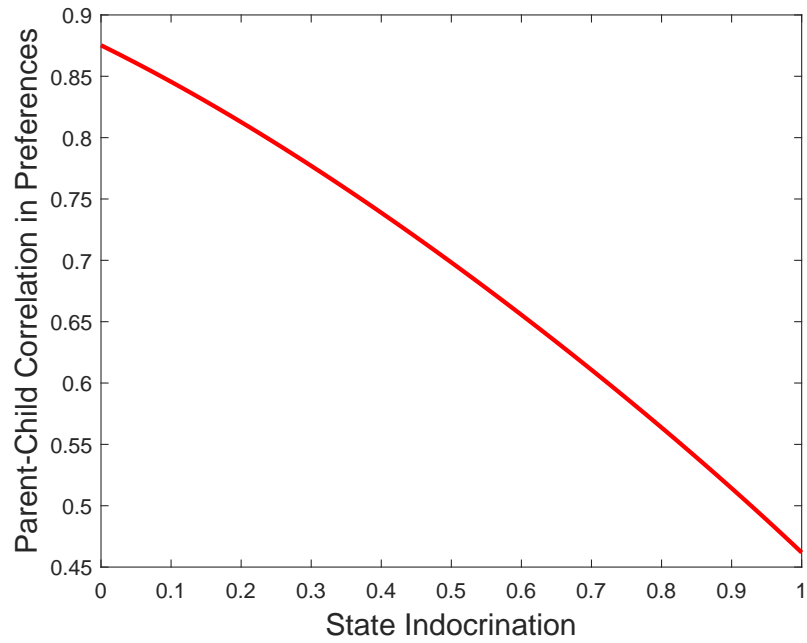


Figure 1: State Indoctrination and the Transmission of Preferences

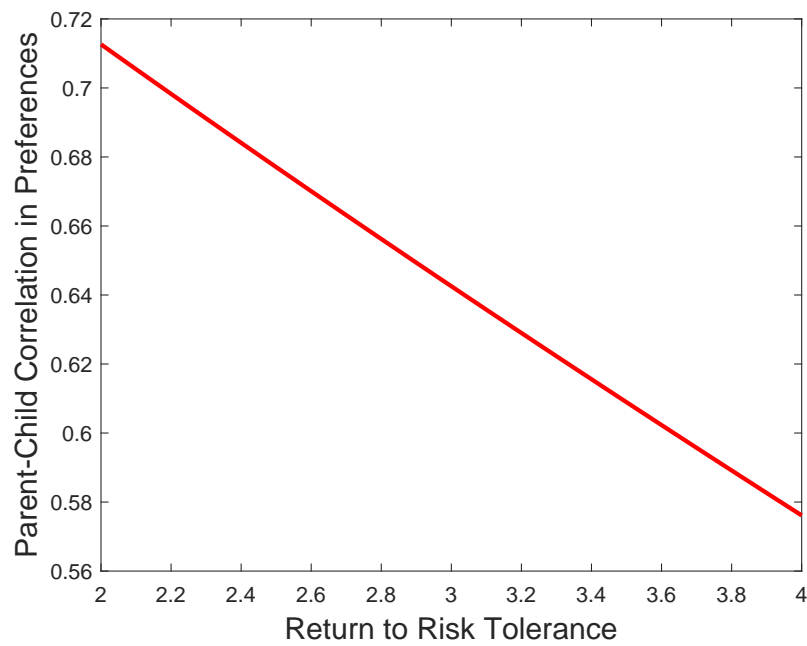


Figure 2: Return to Entrepreneurship and the Transmission of Preferences

In our view, the reunification of Germany is best understood as a massive decline in state indoctrination with an increased incentive to equip children with values that are likely to lead to success in the new environment. The analysis shows that the decline in state indoctrination alone should have increased parent-child correlations. If in the data we observe instead a decline in correlations, this can only be accounted for (from the perspective of the theory) by the active socialization channel playing an important role. We now turn to empirical evidence to show that the data indeed support this conclusion.

3 Evidence on the Formation and Transmission of Preferences: East and West Germany Before and After Reunification

To test the model predictions, we analyze the parent-child correlations in preferences in a sample of East German and West German families and how this correlation was affected by the German re-unification in 1989. As discussed in Section 1, the degree of state influence in child rearing was substantially higher in East than in West Germany prior to reunification. The reunification of Germany brought forward not only a convergence of the East-German child-rearing model to the West German one, but also a transition to free market economy and the arrival of new economic opportunities. Thus, the German reunification provides the ideal testing ground for examining the model predictions regarding the role of the different channels of transmission of preferences from parents to children.

This empirical analysis requires a data set that allows us to observe the preferences and attitudes of children and their parents as well as the geographic origin (East v. West) of the family. The German Socioeconomic Panel (SOEP) meets these data requirements. The SOEP is a representative household survey that has been conducted annually since 1984. A major advantage of the SOEP is that once a household enters the survey, all its members are followed even after they have left the originally sampled household. This feature allows us to observe both young adults, whom we refer to as 'children', and their parents who no longer live in the same household. Every year, each adult member of a SOEP household has to complete the personal survey, which, among others, asks detailed questions about the individual's preferences, values and attitudes concerning a range of different

subjects. Importantly, interviews are conducted separately with each person to ensure that household members answer the questions independently. The SOEP survey furthermore includes information about the part of Germany, East or West, where respondents lived in 1989, allowing us to identify the geographic origin of the family.

In the following, we first describe our estimation strategy. Afterwards, we provide more information on the data and how we measure preferences.

3.1 Estimation Strategy

Our empirical strategy rests on exploiting variation in the location of residence of a child's family during the period when the two parts of Germany were separated and migration from East Germany to West Germany was prohibited. To quantify the effect of reunification, we compare children born at different points in time. With this in mind, our main regression equation is

$$\begin{aligned}
 Y_{ist} = & \alpha + \gamma_1 Pre_i + \gamma_2 East_i \cdot Pre_i + \gamma_3 East_i \cdot Post_i \\
 & + \beta_1 Y_{ist}^P \cdot Pre_i + \beta_2 Y_{ist}^P \cdot Post_i + \beta_3 Y_{ist}^P \cdot East_i \cdot Pre_i + \beta_4 Y_{ist}^P \cdot East_i \cdot Post_i \\
 & + X'_{ist} \phi + X'_{ist} \phi^P + \tau_{st} + \varepsilon_{ist}.
 \end{aligned}$$

Y_{ist} is the attitude of child i living in state (Bundesland) s in survey year t , Y_{ist}^P indicates the corresponding attitudes of their parents. $East_i$ is a dummy variable indicating whether the family is from East Germany. Pre_i is a dummy variable indicating whether the child was born before 1985. $Post_i$ is a dummy variable indicating whether the child was born in or after 1985. The choice of 1985 as the cut-off year is motivated by the fact that key attitudes are formed primarily during early childhood and then remain largely stable over the remaining life-time. Since the German reunification occurred in 1989/90, children born before 1985 spent most of their formative years before reunification, while those born after 1985 also spent a substantial part of their formative years in re-unified Germany. τ_{st} denotes state-year fixed effects. The inclusion of state-year fixed effects implies that we compare children from East and West Germany, born before or after 1985, who at

the time the survey was taken were living in the same German state. X_{ist} and X_{ist}^P denote individual and parental controls. We control for children's gender, age, education, household income, marital status, and employment status, as well as age, education and household income of the child's parents.

The coefficient γ_1 captures the difference in attitudes between children born before and after 1985 in West Germany. The coefficients γ_2 and γ_3 capture the differences in attitudes between children from East and West Germany born before and after 1985 respectively. The coefficients β_1 and β_2 capture the strength of correlation between the attitudes of a child and their parents for children from West Germany born before and after 1985 respectively. The coefficients β_3 and β_4 capture the differences in the parent-child correlations between children from the East and from the West born before and after 1985 respectively. As we are interested in whether and to what extent the strength of intergenerational transmission of attitudes differs between families from the East and the West and whether this changed as a result of reunification, the primary coefficients of interest are β_1 , β_2 , β_3 and β_4 .

Positive values for β_1 and β_2 and no significant difference between the two would indicate that genetic transmission is the key channel. A value of $\beta_3 < 0$ would indicate that the parent-child correlation for children born prior to 1985 was weaker among East German families than among West German ones. Such a finding would lend support to the importance of the state-indoctrination channel since it was common for East German parents to work full time and have their children being taken care of in state-run childcare institutions, while in West Germany the vast majority children were cared for within the family, by their mothers, at least until the start of kindergarten. A value of $\beta_4 > \beta_3$ would lend further support to the importance of this channel of preference transmission as the disappearance of public childcare and the fall in female labor force participation in East Germany after reunification would be expected to increase the parent-child correlation for East German children born shortly before or after reunification relative to that of earlier-born East German children. A value of $\beta_4 < 0$ with $\beta_4 < \beta_3$, on the other hand, would indicate that active socialization is a relevant channel. Since the transition from state communism to capitalism brought forward new economic

opportunities in East Germany, we would expect that East German parents would start instilling specific preferences in their children that are beneficial in this new economic environment but different from their parents' own preferences. Instilling specific preferences in their children would drive down the parent-child correlation in preferences.

3.2 Data

We build our sample based on data from the German Socioeconomic Panel (SOEP). Each observation in our dataset consists of a child-mother-father triplet, which we refer to as a 'family', observed at a particular point in time. We focus on children born after 1970 as we have very few observations for children born before that. Table 2 reports some key characteristics of this sample.

Table 2: Sample characteristics

	East	West
All respondents (children)	7,244	18,688
% female	48.7	48.2
% with tertiary education	12.5	11.0
% employed	61.1	58.4
% married	9.3	6.7
% living without parents	40.8	27.9
% born 1977-84	44.1	33.0
% born 1985-91	43.5	40.1
% born 1992-99	12.4	26.8
% unique observations	21.7	26.0

We identify the geographic origin of each family based on the question "Where did you live in 1989: East or West?" For children born before 1989, we code the family as originating from the East if the child lived there in 1989. For children born in or after 1989, we code a family as originating from the East if both of the child's parents lived in East Germany in 1989. Children with one East German

and one West German parent are excluded from the analysis. We also exclude the very small number of children who lived in West Germany in 1989 but whose both parents lived in East Germany at that time. Naturally, we also exclude from our analysis families of non-German origin.

We require that information on a person's attitudes is observed in the same survey year as those of their mother and father. Our measure of parental attitudes corresponds to the average value of the attitudes of the mother and father of a given child in our sample. Since some children and their parents answered a given question in multiple waves, the same family may appear multiple times in our data set. As preferences and attitudes of adults tend to be stable over time, this will produce a strong correlation in the error terms across observations pertaining to the same child. We deal with this by clustering the standard errors at the child level.

The SOEP survey contains a variety of questions dealing with people's preferences, attitudes and values. As discussed earlier, we focus our discussion on risk attitudes. To provide a broader picture, we also document some results for other preferences that play an important role for individual socio-economic decision making, namely time preference, trust and reciprocity (Falk et al., 2018). In the following, we describe how we measure these.

3.2.1 Risk attitudes

The SOEP includes a question asking people to state how willing they are to take risks in general. The possible responses range from 0 denoting no willingness to take risks at all to 10 denoting very high willingness to take risks. This question was asked in 2004 and 2006 and then annually since 2008.

In addition, the SOEP asks about the willingness to take risks in six specific domains, namely driving, financial matters, sports and leisure, career, health and trusting other people. The response values to these questions all range from 0, which denotes no willingness to take risks at all, to 10, which denotes very high willingness to take risks. These questions were asked in 2004, 2009 and 2014. Furthermore, the survey contains a question asking how much of an endowment of EUR 100,000 the respondent would be willing to invest in a hypothetical lottery

that would double or half their investment with a probability of 0.5. This question was asked in 2004 and 2009. It has seven response values reflecting seven different investment amounts (EUR 0; EUR 20,000; EUR 40,000; EUR 60,000; EUR 80,000; EUR 100,000).

To make the responses to these in total eight questions on risk attitudes comparable, we re-scale the response values so that they range between 0 and 1 for each question, with higher values indicating greater risk tolerance. A factor analysis of the individual responses to these eight questions revealed that they are highly correlated with one another and form one single latent factor. Since the first, most general, question on risk attitudes is covered most frequently in the SOEP surveys, we use the responses to this question as our main measure of risk attitudes. As an alternative measure, we use the simple average of an individual's answers to all eight questions. In this case, we only utilize observations from 2004, 2009 and 2014.

3.2.2 Time preferences

Time preference captures the extent to which individuals are willing to trade off present rewards for future rewards. We measure this by a question asking respondents to indicate whether they would generally describe themselves as a patient or as an impatient person. We consider this a valid proxy for time preference as people's self-assessed level of patience has been shown to be highly correlated with their choices between immediate and delayed financial rewards (Falk et al., 2018). The original responses for these question range from 0 (very impatient) to 10 (very patient). We re-scale them so that they range from 0 to 1 instead.

3.2.3 Trust

How much respondents trust others they don't know is captured by five questions. In three cases, respondents are asked to indicate on a scale from 1 to 4 to what extent they agree with a given statement. The three statements are: (1) "People can generally be trusted"; (2) "Nowadays you can't rely on anyone"; (3) "If you are dealing with strangers, it is better to be careful before trusting them". The fourth

question asks respondents whether they think that most people are fair or most people are exploitative. The fifth question asks whether respondents think that most people are helpful or mostly act in their own interest. All five questions were asked in 2003, 2008 and 2013. We re-scale the response values for each of these five questions so that they fall between 0 and 1. A factor analysis revealed that these five items reflect one latent factor. We hence use as our measure of trust the simple average of the individual responses to these five questions with higher scores indicating higher levels of trust.

3.2.4 Negative reciprocity

Negative reciprocity captures to what extent people would punish others for unfair behavior directed at themselves or take revenge. The SOEP contains four questions capturing such issues. In all cases, the respondent is asked to indicate on a scale from 1 to 7 to what extent a given statement applies to them personally. The four statements are (1) "If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost"; (2) "If somebody puts me in a difficult position, I will do the same to them"; (3) "If somebody insults me, I will insult them as well"; (4) "When other people wrong me, I try to just forgive and forget". Questions (1), (2) and (3) were asked in 2005, 2010, 2015, 2016 and 2017. Question (4) was asked in 2010, 2015 and 2016. We code the responses to these questions such that higher values indicate that the statement applies more strongly to the respondent, i.e. higher values reflect a stronger tendency for negative reciprocal behavior, and we re-scale the response values so that they fall between 0 and 1. A factor analysis of the responses to these four questions revealed that they reflect one latent factor. We thus measure negative reciprocity as the simple average across the re-scaled answers to these four questions.

3.2.5 Positive reciprocity

Positive reciprocity reflects to what extent people would respond in a positive reciprocal way to good deeds of others directed toward them. The SOEP contains three questions capturing such issues. Just like in the case of negative reciprocity, respondents are asked to indicate on a scale from 1 to 7 to what extent a given

statement applies to them personally. The three statements capturing positive reciprocity are: (1) "If someone does me a favor, I am prepared to return it"; (2) "I go out of my way to help somebody who has been kind to me before"; (3) "I am ready to undergo personal costs to help somebody who helped me before". These questions were asked in 2005, 2010, 2015, 2016 and 2017. We re-scale the response values of each question to fall between 0 and 1. A factor analysis of the responses to these three questions revealed that they reflect one latent factor. We hence measure positive reciprocity as the simple average of the re-scaled individual answers to these questions with higher scores reflecting a stronger tendency for positive reciprocal behavior.

3.3 Results

3.3.1 Main results

We start off by plotting the evolution of risk attitudes (measured via the "general" risk attitudes question) of the children in our sample as well as the parent-child correlation in risk attitudes by birth year of the children, distinguishing between children from East and West Germany. These plots are displayed in Figure 2(a) and 2(b) respectively. To facilitate comparisons, we have in both cases filtered out common time trends between the West German and East German series.

Figure 2(a): Children's level of risk tolerance

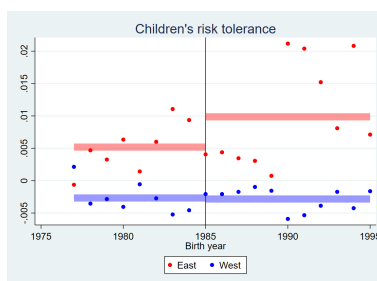
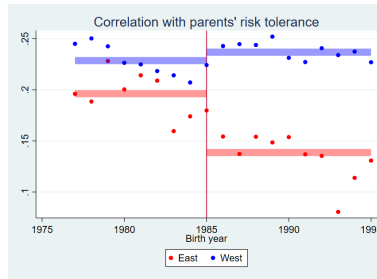


Figure 2(b): Parent-child correlation in risk tolerance



From Figure 2(b), we see that until about 1985 the level of correlation was slightly lower in the East. This is suggestive of the passive socialization and state indoctrination channel: With women in full-time employment and children being heavily influenced by the state, we would expect a lower parent-child correlation in East Germany. Around 1985 we see a break in the series. The parent-child correlation in East Germany falls relative to West Germany. This is contrary to what we would expect from the passive socialization channel because the institutional changes that came with the reunification implied that East German children born after 1985 would be expected to have more interaction with their parents and thus be more similar to their parents. This movement in the opposite direction hence suggests that conscious socialization played a role. With new economic opportunities becoming available, parents would change course and instill specific attitudes in their children they themselves may not possess, causing a decline in the parent-child correlation. This will not only affect children born after reunification, but also children born slightly before that are still young enough to experience the changes during their formative years. Figure 2 (a) suggests that the break in the parent-child correlation in East Germany came with an increase in risk tolerance, suggesting that the institutional and economic changes induced parents to instill more risk tolerance in their children.

In Table 3, we examine these patterns more systematically. The dependent variable is the risk attitudes of children in our sample (measured via the "general" risk attitudes question). We are interested in the correlation between the risk attitudes of a child and those of their parents. The latter is measured as the simple average of the risk attitudes of their mother and father respectively. As mentioned in Section 3.1, throughout all our regressions we control for state-year fixed effects

as well as extensive set of individual and parental control variables.¹

In col. 1, we look at the overall correlation between children's and parents' risk attitudes without distinguishing between the geographic origin of families or different cohorts of children. We see that parents' risk attitudes are strongly positively correlated with the risk attitudes of their children.

In col. 2 we test whether the parent-child correlation differs between families from East and West Germany. We see that while on average children from East Germany are more risk tolerant than West German children, the parent-child correlation is weaker for families from East Germany.

In col. 3 we test whether the difference in the parent-child correlation between East and West German families varies across cohorts of children. We find that the parent-child correlation is similar for East and West German children born before 1985, but among children born after 1985 it is significantly weaker for East German families than for West German families.

In col. 4 we distinguish further between children born after 1985 but before 1990, i.e. before reunification, and those born in or after 1990. We find that the parent-child correlation for East German children born in the interim period 1985-1989 is similar to that of East German children born in or after 1990, while both are lower than the corresponding parent-child correlations for West German children or East German children born before 1985. This indicates that the key factor driving the results in col. (3) is whether East German children spent their formative years in the new economic regime, but it makes little difference whether children spent just some or all their formative years in that regime.

¹Education is measured on a scale from 1 to 6 corresponding to the six levels in the International Standard Classification of Education (ISCED) system. If a child's educational level is not observed, we code their education level as zero. To account for such missing data, we include in addition a dummy variable indicating whether the respondent's educational attainment is missing. For marital status, we consider whether a person is married or not. To capture the employment status, we include two dummy variables, one capturing whether a person is working and one capturing whether a person is unemployed. Parental age, education and household income are measured as the averages of these variables across mother and father respectively.

Table 3: Main results

Dependent Variable:	Risk attitudes of children born 1977-99			
Parental attitudes	0.264*** (0.01)	0.286*** (0.02)		
Parental attitudes x East		-0.094*** (0.03)		
Parental attitudes, pre 1985			0.254*** (0.03)	0.255*** (0.03)
Parental attitudes, post 1985			0.301*** (0.02)	0.316*** (0.03)
Parental attitudes, post 1990				-0.027 (0.04)
Parental attitudes x East, pre 1985			-0.014 (0.05)	-0.016 (0.05)
Parental attitudes x East, post 1985			-0.139*** (0.04)	-0.171*** (0.05)
Parental attitudes x East, post 1990				0.058 (0.07)
East		0.055*** (0.02)		
pre 1985 x East			0.024 (0.03)	0.025 (0.03)
post 1985 x East			0.072*** (0.02)	0.084*** (0.03)
post 1989 x East				-0.015 (0.04)
Observations	23,469	23,469	23,469	23,469
R-squared	0.12	0.11	0.11	0.11

Notes: All regressions control for state-year fixed effects and demographic controls of the children and parents as well as period dummies (post-1985, post-1990). Standard errors clustered at the level of the fixed effects are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

3.3.2 Additional checks

In the following we conduct a number of additional checks related to testing for possible drivers of the above findings and the estimation of alternative specifications to assess the robustness of the main results.

In Table 4 we conduct various tests to see what is driving the results. First, we test whether it is the current location of residence that is driving the differential patterns for East and West German children or the geographic origin of the family. To do so, we distinguish between children originating from East Germany who at the time the survey was taken lived in West Germany and children from East Germany who are still living in former East Germany. With this in mind, in col. 1, we exclude East German children who were living in West Germany at the time the survey was taken. In col. 2 we do the opposite and exclude East German children still living in East Germany. We see that the patterns in the parent-child correlations are very similar in the two cases and statistically not different from one another. We observe in both cases a lower parent-child correlation in risk attitudes for East German children born after 1985 compared to West German children. This indicates that the differential patterns for East and West German children are unrelated to the environment in which people currently live, but are driven by where they spent their formative years.

Second, we test whether the differential patterns in the parent-child correlations depend on the level of risk tolerance of the parents. To do so, we split the sample between children whose parents have below-median levels of risk tolerance and those whose parents have above-median risk tolerance. We see that the East-West difference in the parent-child correlation in risk attitudes is only observed among parents with below-median levels of risk tolerance. This suggests that the experience of the transition from socialism to capitalism induced the relatively more risk-averse parents to instill in their children attitudes different from their own, in other words, more risk tolerance than they themselves possess. The relatively more risk tolerant parents, on the other hand, continued to transmit their own risk attitudes to their children to the same degree as before reunification. This makes sense as the transition to capitalism should have increased the returns to risk tolerance which, when observed by rather risk-averse East German parents,

Table 4: Exploring possible drivers

Dependent Variable:	Risk attitudes of children born 1977-1999			
	East living in East	East living in West	Parents' attitudes below median	Parents' attitudes above median
Parental attitudes, pre 1985	0.255*** (0.03)	0.256*** (0.03)	0.316*** (0.05)	0.235*** (0.06)
Parental attitudes, post 1985	0.299*** (0.02)	0.301*** (0.02)	0.462*** (0.04)	0.296*** (0.03)
Parental attitudes x East, pre 1985	-0.032 (0.06)	0.050 (0.06)	-0.151 (0.11)	0.088 (0.10)
Parental attitudes x East, post 1985	-0.125*** (0.04)	-0.141 (0.09)	-0.315*** (0.08)	-0.076 (0.06)
pre 1985	0.033* (0.02)	0.034* (0.02)	0.069** (0.03)	0.040 (0.04)
pre 1985 x East	0.016 (0.04)	-0.011 (0.03)	0.052 (0.04)	-0.022 (0.06)
post 1985 x East	0.048* (0.03)	0.072 (0.05)	0.113*** (0.03)	0.048 (0.04)
Observations	21,953	18,040	11,749	11,720
R-squared	0.12	0.12	0.11	0.08

Notes: All regressions control for state-year fixed effects and demographic controls of the children and parents as well as dummy variable for the post-1985 period. Standard errors clustered at the level of the fixed effects are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

would have induced them to put more effort into instilling risk tolerance in their children, causing their children to end up with risk preferences that are quite different from those of their parents.

In Tables 5 and 6 we assess the robustness of the main results by controlling for additional variables and making small modifications to the regression specification.

Table 5: Robustness checks I

Dependent Variable:	Risk attitudes of children born 1977-99		
Add. controls	Religion	Height	Living alone
Parental attitudes, pre 1985	0.256*** (0.03)	0.261*** (0.03)	0.253*** (0.03)
Parental attitudes, post 1985	0.304*** (0.02)	0.312*** (0.02)	0.300*** (0.02)
Parental attitudes x East, pre 1985	-0.016 (0.05)	-0.026 (0.05)	-0.013 (0.05)
Parental attitudes x East, post 1985	-0.143*** (0.04)	-0.165*** (0.04)	-0.139*** (0.04)
pre 1985 x East	0.024 (0.03)	0.030 (0.03)	0.023 (0.03)
post 1985 x East	0.074*** (0.02)	0.083*** (0.02)	0.071*** (0.02)
Observations	23,469	18,927	23,469
R-squared	0.11	0.12	0.11

Notes: All regressions control for state-year fixed effects and demographic controls of the children and parents as well as dummy variable for the post-1985 period. Standard errors clustered at the level of the fixed effects are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

We start with including additional controls in Table 5. In col. 1, we control for the religious denomination of the children in our sample via dummy variables.²

²The categories for religious denomination are: Protestant, other Christian, other non-Christian, no religious affiliation, missing religion. The reference category is Catholic.

In col. 2, we control for children's and parental height as height has been shown to be correlated with risk attitudes (Dohmen et al, 2007). In col. 3, we control for whether the children in our sample were living with their parents at the time the survey was taken. We do so because adult children living together with their parents may be systematically different from adult children living on their own. As we can see from Table 5, the inclusion of these additional control variables leaves the main results intact.

In Table 6, we estimate some alternative specifications. In col. 1 we include cohort fixed effects to control for common cohort-specific trends in the risk attitudes of East and West Germans.

In col. 2, we include family fixed effects. This allows us to hold constant family-specific factors that could result in a lower correlation between parents' and children's risk attitudes, such as differences in the way children are raised. Thus, in this specification, we are focusing entirely on variation in birth years between children born to the same parents. We still observe that the parent-child correlation in risk attitudes is weaker for East German children born after 1985 than for West German children born around the same time or for East German children born before 1985. Thus, we can conclude that the main results are not driven by unobserved family characteristics.

In col. 3 we exclude respondents living in Berlin. Berlin is a special case as it was geographically located in East Germany, but part of it belonged to West Germany. We see that excluding residents of Berlin leaves the original results intact.

In col. 4 we use our alternative measure of risk tolerance which captures risk tolerance along multiple dimensions. We find the same patterns for this broader measure of risk tolerance, demonstrating that the results are not specific to the way we measure risk tolerance.

As mentioned before, our main sample includes multiple observations for each family since a given family may have answered the question on risk attitudes in multiple survey rounds. This may create biases in the estimation. To deal with this, in col. 5 we remove the duplicated observations for each family and use just the first observation for each family instead. While the magnitudes of

Table 6: Robustness checks II

Dependent Variable:	Risk attitudes of children born 1977-1999				
Specification	Cohort fixed effects	Family fixed effects	Exclude Berlin	Alternative DV	First obs. only
Parental attitudes, pre 1985	0.257*** (0.03)	0.148*** (0.03)	0.250*** (0.03)	0.388*** (0.03)	0.333*** (0.04)
Parental attitudes, post 1985	0.300*** (0.02)	0.201*** (0.02)	0.301*** (0.02)	0.457*** (0.03)	0.298*** (0.02)
Parental attitudes x East, pre 1985	-0.019 (0.04)	-0.023 (0.05)	-0.008 (0.05)	-0.078 (0.06)	-0.071 (0.07)
Parental attitudes x East, post 1985	-0.138*** (0.04)	-0.105*** (0.04)	-0.128*** (0.04)	-0.129** (0.05)	-0.084* (0.05)
pre 1985 x East	0.026 (0.03)	-0.033 (0.25)	0.014 (0.03)	0.028 (0.02)	0.055 (0.04)
post 1985 x East	0.074*** (0.02)	0.038 (0.25)	0.059*** (0.02)	0.041** (0.02)	0.045 (0.03)
Observations	23,469	16,445	22,642	6,207	6,154
R-squared	0.12	0.45	0.11	0.19	0.09

Notes: All regressions control for state-year fixed effects and demographic controls of the children and parents as well as dummy variable for the post-1985 period. Standard errors clustered at the level of the fixed effects are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

the coefficients change, we still observe qualitatively the same pattern, namely a lower parent-child correlation in risk attitudes among East German children born after 1985 compared to West German children born around the same time or East German children born before that. This indicates that the results are not driven by families appearing in the data set multiple times.

3.3.3 Results for other preferences

In Table 7 we turn to the other economically important preferences, namely patience (col. 1), trust (col. 2), and negative reciprocity (col. 3) and positive reciprocity (col. 4). We do so in order to assess whether the patterns discovered in the main analysis are unique to risk attitudes, or hold more broadly. In the appendix, we furthermore present results for a number of other attitudes we can observe in the SOEP but that are arguably less important for economic decision making.

Comparing the results for these other preferences to those for risk attitudes, we see clear differences in the patterns. While we observe in all cases a strong parent-child correlation, the patterns of East-West differences differ. For trust and patience we observe a significantly lower parent-child correlation among East German children born before 1985. For positive reciprocity, we observe a significantly stronger parent-child correlation among East German children born after 1985.

This pattern of a relatively weaker parent-child correlation for children who spent their formative years under socialism is what we would expect to see if the parent-child transmission of attitudes is mostly passive and thus strongly influenced by the extent of state involvement. In an environment where children spend most of their time in state-run childcare facilities where they are indoctrinated in a particular direction, we would expect the correlation in attitudes between parents and their children to be lower than in an environment where children spend most of their time with their parents. As discussed in Section 1, in East Germany, before reunification, the large majority of children, starting from the age of 1, were cared for full-time in state-run nurseries, kindergarten and after-school programs. In West Germany, on the other hand, children under the age of 3 would typically be cared for full-time by their mothers and once they start kindergarten and school

Table 7: Results for other preferences

Dependent Variable:	Trust	Patience	Neg. reciprocity	Pos. reciprocity
Parents, pre 85	0.351*** (0.03)	0.228*** (0.06)	0.300*** (0.05)	0.223*** (0.05)
Parents, post 85	0.352*** (0.02)	0.166*** (0.04)	0.382*** (0.03)	0.275*** (0.03)
Parents x East, pre 85	-0.117** (0.05)	-0.248*** (0.09)	0.067 (0.09)	-0.050 (0.10)
Parents x East, post 85	0.011 (0.05)	-0.019 (0.07)	-0.082 (0.06)	0.121** (0.06)
pre 85 x East	0.018 (0.02)	0.159*** (0.06)	-0.021 (0.04)	0.044 (0.08)
post 85 x East	-0.005 (0.03)	0.010 (0.05)	0.023 (0.03)	-0.096** (0.05)
Observations	6,133	3,695	3,769	3,769
R-squared	0.15	0.08	0.14	0.14

Notes: All regressions control for state-year fixed effects and demographic controls of the children and parents as well as a dummy variable for the post-1985 period. Standard errors clustered at the level of the fixed effects are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

would only spend the mornings in kindergarten or school respectively and the rest of the day with their mothers. After reunification, the availability of child care fell abruptly in East Germany and East German children started spending more time in early childhood in the care of their parents. Given this, it is natural to expect that the parent-child correlation in attitudes should increase over time, which is exactly what we observe for these preferences. This suggests that for trust, patience and reciprocity passive socialization by parents and state indoctrination play an important role, while the economic returns to these attitudes seem to not have changed much as a result of the regime change. This stands in stark contrast to risk attitudes where we observe the parent-child correlation in East and West Germany to be similar for children born before 1985 but lower for East German children born after 1985, suggesting that for risk attitudes active socialization is an important channel.

In sum, the results presented in Tables 3 to 7 demonstrate that there is substantial heterogeneity in the strength of transmission of attitudes from parents to children across different types of families. Transmission of risk attitudes was generally stronger for East German children who experienced their formative years before reunification and the resulting changes in economic conditions occurred than for children who spent at least part of their formative years under the altered socio-economic conditions. For the latter group of children, the strength of the parent-child transmission is also significantly weaker for East German children than for West German ones. For West German children, on the other hand, reunification did not affect the strength of the parent-child transmission. These patterns suggest that the transition from communism to capitalism and the resulting changes in the socio-economic conditions affected the intergenerational transmission of risk attitudes by inducing parents to actively transmit certain preferences that they deem beneficial in the new economic environment. For other important economic preferences we do not see such a pattern. Here, we typically observe that the parent-child correlation is stronger for East German children born close to or after reunification than for East German children born long before reunification. This is consistent with a model of cultural transmission where parents mostly transmit their attitudes passively to their children and state indoctrination of children plays an important role. With the collapse of East German childcare facilities after

reunification and children consequently spending more time with the parents, the parent-child correlations in attitudes increased and reached levels similar to those observed among West German families.

4 Conclusions

Theories of preference formation have described various channels through which parental preferences and attitudes are transmitted intergenerationally, from parents to children. Parental preferences may be passed on through the sharing of genes, may passively rub off on the children, or parents may consciously try to instill particular preferences in their children. The transmission of preferences from parents to children is also influenced by other factors, namely the children's interaction with other members of society and their exposure to role models at school or in the media. All theories of parent-child transmission imply a strong correlation in preferences between parents and their children, a pattern which has been empirically confirmed for a variety of preferences (Dohmen et al., 2012). However, we do not have a good understanding of the relative importance of these different channels of preference transmission.

To address this point, in this paper we present a model of preferences formation that captures the interplay of the three main forces of transmission, namely genetic transmission, influence through the state/passive transmission from parents, and active socialization by parents. The model predicts that if genetic transmission is the main mode of transmission, the level of parent-child correlation should be constant and independent of the economic and institutional environment parents and children are facing. If the main mechanism behind preference formation is state influence, the model predicts that the level of parent-child correlation should be higher in an environment where children spend less time in the care of the state and more time in the care of their parents. Finally, if active socialization by parents is the main channel and parents care about the economic wellbeing of their children, a change in the economic environment should induce a change in the parents' socialization choices and consequently lower the parent-child correlation.

To empirically assess the relative importance of these three forces of cultural transmission we study the natural experiment of Germany's reunification in 1989/90.

Before reunification, East and West Germany had vastly different childcare arrangements, with East German children spending most of their time in state-run childcare institutions from a very young age and West German children spending most of their time in the care of their mothers. After reunification, state-run childcare facilities in East Germany closed down and East Germany quickly converged to the traditional West German model of in-home care. At the same time, the transitions from socialism to capitalism in East Germany brought forward a whole range of new economic opportunities requiring a new mindset, such as higher willingness to take risks to embrace entrepreneurial opportunities.

Looking at attitudes toward risk and comparing the level of the parent-child correlation in risk attitudes between East and West German families and children born at different points in time, we confirm earlier literature showing a high level of parent-child correlation. Importantly, though, we find that the level of this correlation evolved differently over time in East and West Germany. While the correlation remained roughly constant in West Germany, we observe that the correlation was markedly lower for East German children born between 1985 and 1990 compared to East German children born earlier and then remained at this lower level also post-reunification. This suggests that for risk attitudes, active socialization by parents is a key driving force behind the positive parent-child correlation. As the economic environment changed, East German parents started instilling more risk tolerance in their children, driving down the correlation in children's risk tolerance with their parents' (low) level of risk tolerance. At the same time, the level of the parent-child correlation for children born before 1985 is similar for East and West German families. This suggests that state-level influence and, correspondingly, passive transmission from parents to children plays only a minor role in the formation of risk attitudes. Interestingly, these patterns are only observed for attitudes toward risk. For other economically important preferences, such as patience, trust and reciprocity, we do find evidence for the role of the state/passive parental transmission.

The findings of this paper suggest that the formation of preferences is a complex process that involves a multitude of different forces. But not all preferences are alike. For some, such as risk preferences, economic forces appear to play a much

more important role than for others. This in turn implies that the extent to which preferences adjust to a changing economic environment and the speed at which they adjust may not be the same for all types of preferences. Some preferences may show more volatility and dynamics while others may be more stable and sluggish in their response to a changing environment. To the extent that preferences and attitudes influence individual economic decision-making and, consequently, affect economic development, some drivers of economic development, such as entrepreneurship, may act more forcefully and push forward economic development more effectively than other drivers that are, for example, linked to people's trust or patience.

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A Comparative Statics for Parental Transmission

We now characterize the effect of a parameter change on β

A.0.1 State prefers 1, Parents prefer 1, state raises effort

Using 1, we need to compute the change in probability for the children being type 2 for each type of parents.

$$\begin{aligned}
 \frac{\partial \Pi}{\partial t_s} &= \Pi_0 \times \frac{\partial \Pi_{state}}{\partial t_s} \times \Pi_{social} \\
 &= \Pi_0 \times \begin{bmatrix} 0 & 0 \\ p_s & -p_s \end{bmatrix} \times \Pi_{social} \\
 &= \Pi_0 \times \begin{bmatrix} 0 & 0 \\ p_s(1 - t_{pr}p_{pr}) & -p_s(1 - t_{pr}p_{pr}) \end{bmatrix}
 \end{aligned}$$

Thus,

$$\frac{\partial \beta}{\partial t_s} = -p_s(1 - t_{pr}p_{pr})(2p_0 - 1)$$

Hence, if $p_0 > 1/2$, β decreases. The effect of the increase in effort by the state reduces the probability of children being type 2 for both types of parents. The effect on the transitional probability is $-p_s(1 - t_{pr}p_{pr})p_0$ for type 2 parents while the effect is $-p_s(1 - t_{pr}p_{pr})(1 - p_0)$ for type 1 parents. Suppose $p_0 > 1/2$, the initial type of the child is likely to be the same as the parent's by the genetic transmission. Thus, the children of type 2 parents are more likely to be subject to state influence to turn them into type 1. Hence, the decrease in the probability of children being

type 2 for type 2 parents is bigger than the decrease in the probability of children being type 2 for type 1 parents. The additional probability of children being type 2 brought by the parent being type 2 decreases.

A.0.2 State prefers 1, Parents prefer 2, parents raise effort

$$\begin{aligned}
\frac{\partial \Pi}{\partial t_s} &= \Pi_0 \times \Pi_{state} \times \frac{\partial \Pi_{social}}{\partial t_s} \\
&= \Pi_0 \times \Pi_{state} \times \begin{bmatrix} -p_{pr} & p_{pr} \\ 0 & 0 \end{bmatrix} \\
&= \begin{bmatrix} p_0 + (1 - p_0)(t_s p_s) & (1 - p_0)(1 - t_s p_s) \\ (1 - p_0) + p_0(t_s p_s) & p_0(1 - t_s p_s) \end{bmatrix} \times \begin{bmatrix} -p_{pr} & p_{pr} \\ 0 & 0 \end{bmatrix}
\end{aligned}$$

Therefore,

$$\begin{aligned}
\frac{\partial \beta}{\partial t_s} &= p_{pr}((1 - p_0) + p_0(t_s p_s)) \\
&\quad - p_{pr}(p_0 + (1 - p_0)(t_s p_s)) \\
&= -p_{pr}(1 - t_s p_s)(2p_0 - 1)
\end{aligned}$$

If $p_0 > 1/2$ and $t_s p_s < 1$, then β falls as a result of raising effort to turn type 1 children into type 2. The increase in t_{pr} increases the probability of having type 2 children conditioned on both parents' type.

Imagine that $t_s p_s = 1$, meaning the state perfectly turns all of the children into type 1. In this case, all children, regardless of their parents' type, are equally susceptible to parents' influence to be turned into type 2. Thus, β is unchanged. Now suppose $t_s p_s < 1$ and $p_0 > 1/2$, such that type 2 parents are more likely to have type 2 children than type 1 parents. Since the state does not perfectly convert all the type 2 children into type 1, type 2 parents are still more likely to have type

2 children after state's influence. As a result, children born to type 1 parents are more likely to be affected by the parents' effort to turn them into type 2.

A.0.3 State prefers 1, Mixed Parents' preferences, parents raise effort

What about mixed parents' preferences? Assume that a share ω of the parents prefers type 1 and a share $1 - \omega$ of the parents prefers type 2. The transition matrix in the last stage then becomes

$$\Pi_{social} = \omega \begin{bmatrix} 1 & 0 \\ t_{pr}p_{pr} & (1 - t_{pr}p_{pr}) \end{bmatrix} + (1 - \omega) \begin{bmatrix} (1 - t_{pr}p_{pr}) & t_{pr}p_{pr} \\ 1 & 0 \end{bmatrix}$$

Thus,

$$\begin{aligned} \frac{\partial \Pi_{social}}{\partial t_s} &= \omega \begin{bmatrix} 0 & 0 \\ p_{pr} & -p_{pr} \end{bmatrix} + (1 - \omega) \begin{bmatrix} -p_{pr} & p_{pr} \\ 0 & 0 \end{bmatrix} \\ &= \begin{bmatrix} -(1 - \omega)p_{pr} & (1 - \omega)p_{pr} \\ \omega p_{pr} & -\omega p_{pr} \end{bmatrix} \end{aligned}$$

Now, the effect of state influence on β is given by

$$\begin{aligned} \frac{\partial \beta}{\partial t_s} &= (1 - \omega)(-p_{pr}(1 - t_s p_s)(2p_0 - 1)) \\ &\quad + \omega(-p_{pr}(1 - t_s p_s)(2p_0 - 1)) \\ &= -p_{pr}(1 - t_s p_s)(2p_0 - 1) \end{aligned}$$

It turns out that the composition of preferences does not matter. Recall that β is measuring the strength of the genetic channel. The effect of socializing, regardless of the target type, dampens the strength of the genetic channel. Therefore, the composition does not affect the effect on β .

B Additional Empirical Results

In this section, we estimate the baseline specification of Table 3, col. 3, for a number of other attitudes we can observe in the SOEP. The results are shown below in table A1.

In col. 1 we look at people's views on fairness, which has been shown to be a determinant of preferences for redistribution (Alesina & La Ferrara, 2005; Alesina & Giuliano, 2011). These are commonly captured by people's views on how much control they think they have over their lives and whether life's outcomes are mostly determined by hard work or luck. We capture views on fairness with a similar set of five questions. In these questions, the respondent is asked to indicate on a scale from 1 to 7 to what extent a given statement applies to them personally. The four statements are (1) "What you achieve depends on luck"; (2) "Others make the crucial decisions in my life"; (3) "When problems arise, I doubt my abilities"; (4) "Possibilities are defined by social conditions"; (5) "I have little control over my life". We re-scale the response values of each question to fall between 0 and 1 and then measure views on fairness as the simple average of the re-scaled individual answers to these five questions with higher scores reflecting that individuals feel they have little control over their lives.

In col. 2 we look at political views. We measure this with a standard question asking respondents to describe their political views from (1) completely left to (10) to completely right.

In col. 3, 4 and 5 we consider how much importance individuals attribute to certain political goals, namely greater political influence of ordinary citizens, price stability and freedom of speech. Higher values on these variables imply that these goals are considered more important.

In col. 6 we look at the importance of family. This is captured as the simple average across two questions asking respondents to indicate how important it is for them to have a happy marriage or partnership and having children.

In col. 7 we look at attitudes toward materialism. This is measured as the simple average across two questions asking respondents to indicate how important it is for them to be able to afford something and be successful in their job.

Table A1: Results for other attitudes

Dependent Variable:	Views on fairness	Polit. views	Citizen influence	Price stability	Freedom of speech	Family	Materialism	Success
Par. att., pre 85	0.416*** (0.05)	0.408*** (0.05)	0.352*** (0.04)	0.288*** (0.04)	0.269*** (0.04)	0.332*** (0.04)	0.262*** (0.03)	0.373*** (0.05)
Par. att., post 85	0.363*** (0.03)	0.437*** (0.03)	0.262*** (0.03)	0.260*** (0.03)	0.265*** (0.03)	0.237*** (0.03)	0.265*** (0.02)	0.323*** (0.03)
Par. att. x East, pre 85	-0.262*** (0.09)	-0.109 (0.09)	-0.137* (0.07)	-0.076 (0.07)	-0.010 (0.07)	-0.231*** (0.07)	-0.076 (0.05)	-0.116 (0.09)
Par. att. x East, post 85	-0.069 (0.06)	-0.019 (0.06)	0.009 (0.06)	-0.026 (0.06)	-0.056 (0.07)	-0.053 (0.06)	-0.007 (0.04)	-0.076 (0.06)
pre 85 x East	0.100** (0.04)	0.084** (0.04)	0.031 (0.04)	0.012 (0.05)	0.092* (0.05)	0.015 (0.02)	0.009 (0.02)	0.088 (0.07)
post 85 x East	0.021 (0.03)	0.020 (0.03)	-0.032 (0.04)	-0.010 (0.05)	0.106** (0.05)	0.006 (0.02)	-0.017 (0.02)	0.073* (0.04)
Observations	3,691	3,671	3,693	3,668	3,689	8,049	8,086	3,636
R-squared	0.14	0.14	0.08	0.14	0.14	0.14	0.08	0.14

Notes: All regressions control for state-year fixed effects and demographic controls of the children and parents as well as dummy variable for the post-1985 period. Standard errors clustered at the level of the fixed effects are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Finally, in col. 8 we look at people's views on what determines success in life. This is captured as the simple average across three questions asking respondents about the extent to which they think that their life's course depends on themselves, that one has to work hard to be successful and that inborn abilities are more important than efforts.

While the patterns of the parent-child correlation in attitudes vary somewhat, we broadly see patterns that are similar to what we observed for trust, patience and reciprocity. The parent-child correlation tends to be lower for East German children born before 1985 than for West German children born at the same time and compared to East German children born after 1985. This suggests that also for these other attitudes, the presence and then disappearance of state indoctrination in East Germany appears to be an important mechanism driving the parent-child correlation. Active transmission of particular attitudes by parents, on the other hand, does not seem to play an important role.