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Environmental Incentives and Parental Investments

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Abstract

This paper analyses how a family's economic environment influences parental investments in children's development. Worsening economic conditions can incentivize parental investments by raising the importance of human capital accumulation in ensuring later-life success. Using a large representative German survey, in a regional- and time-fixed effects setting, I estimate the causal impact of the local unemployment rate on parental investment measures. I find that a rise in the unemployment rate increases measures of maternal support, academic interest and homework assistance. Furthermore, heterogeneity analysis suggests that the responsiveness of parenting behavior on economic incentives differs by parental and child background characteristics such as parental locus of control and secondary school track.

Keywords: parenting, human capital, regional labor market
JEL-Codes: J13, J24, R23

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1 Introduction

Parents spend a lot of time, money and effort to raise successful children. There exists extensive evidence that parental inputs are indeed important for children's human capital development (see e.g. Cunha and Heckman, 2008; Del Boca, Flinn, and Wiswall, 2014; Fiorini and Keane, 2014; Todd and Wolpin, 2007). Yet, the intensity with which parents invest in their children varies substantially between families and over time (Kalil, 2015). Understanding the origins of parental investment discrepancies is imperative in the light of the rising importance of human capital for ensuring favorable later-life outcomes (Acemoglu and Autor, 2011).

The literature investigating determinants of parental investments, traditionally viewed children's skill formation as something that happens within the internal family environment. The first intergenerational human capital investment models explain differences in parental investments by variation in the personal constraints parents face, such as financial bounds (Becker and Tomes, 1979, 1986). Accordingly, the empirical literature underlies the importance of limitations within the family environment in generating variation in parenting behavior. There is ample evidence that disadvantaged family backgrounds – related to parental education, household income, or parental unemployment status – are associated with less favorable parenting practices (see e.g. Cobb-Clark, Salamanca, and Zhu, 2018; Cunha et al., 2006; Heckman and Mosso, 2014; Kalil, 2015; Lareau, 2011). More recently, studies emerged that explore whether differences in parental investments can also be explained by parents facing various external incentives. The seminal paper by Doepke and Zilibotti (2017) formalizes the idea that parenting styles may react to environmental conditions. The authors present a model similar to the original human capital investment models, but allow the returns to investments to depend on a family's socioeconomic environment. The broad intuition being that a different socioeconomic environment requires a different type of cognitive and non-cognitive skill set to do well in life.

In this paper, I ask, how changing economic conditions - in the form of unemployment rates - influence parents' investment choices? From previous research we know that economic circumstances can change people's expectations and beliefs about the future (see e.g. Giuliano and Spilimbergo, 2013; Goda, Shoven, and Slavov, 2011). In environments with high unemployment rates, parents may change their belief on the relative importance of human capital for finding a job and being successful. This reasoning is supported by evidence of the Great Recession where the least educated people were most severely hit by the economic downturn (OECD, 2019). A change in beliefs, may also change parental behavior. It is well-documented that beliefs about returns to investments are highly predictive for actual investments and that there are substantial heterogeneities in beliefs between parents from different socioeconomic backgrounds (see e.g. Boneva and Rauh, 2018; Cunha, Elo, and Culhane, 2013). Therefore, the hypothesis is that an increase of the unemployment rates causes a rise in parental investments. Studies that analyze individuals' own human capital investment choices, find that increased unemployment rates can indeed

motivate individuals to invest more in their education (see e.g. Barr and Turner, 2015; Clark, 2011; Rice, 1999; Sievertsen, 2016). I expect that declining economic circumstances can also foster incentives for parental investments, as they raise the perceived significance of their child's human capital for ensuring favorable later-life outcomes.

This paper adds to the few empirical studies that investigate whether the external environment incentivizes parents' behavior. Doepke and Zilibotti (2017) provide suggestive evidence by means of significant correlations between parenting styles and measures of returns to education, inequality and redistribution policies at the country-level that support their theoretical model. A paper by Dohmen et al. (2019), confirms that parenting styles adapt to the external environment, as the authors observe a decrease in the use of permissive parenting if the expected returns to education are higher. Another stream of literature explores how parental behavior is influenced by a household's local neighborhood environment. The results here are mixed, as some studies show that, in richer neighborhoods, parents become more involved in school and read more often to their child, other studies find a decrease of supportive parenting when families are randomly relocated to better neighborhoods (Kohen et al., 2008; Leventhal and Brooks-Gunn, 2000, 2001; Patacchini and Zenou, 2011; Schonberg and Shaw, 2007).

To investigate the relationship between economic conditions and parental investments, I make use of survey data from the German Socio-Economic Panel. The data combine measures of parental investments with detailed information on child, parent and household characteristics. I link the survey data to regional unemployment data, which serves as a proxy for the broader economic environment parents encounter. The main challenge in estimating the causal effect of the unemployment rate on parental investments is the endogeneity bias that arises if e.g. parents with different investment capabilities sort into particular types of economic environments. Therefore, I estimate a state- and year-fixed effect model to control for regional- and time-invariant heterogeneity. In addition, I control for a broad array of background characteristics that may vary over time such as parent's own unemployment status, to ensure that the effects cannot be explained by changes in families' personal circumstances.

The findings provide evidence that parents respond to environmental incentives, despite the relative crudeness of the economic environment proxy. I find that an increase in the regional unemployment rate significantly increases supportive parenting practices, raises the chance that parents are interested in their child's academic performance, and increases the chance of offering homework help.

In addition, the results show that parental and child background characteristics can influence how responsive parents are to incentives from the external environment. First, the estimates point towards stronger responses for parents with lower internal locus of control levels, suggesting that parents who attach a larger value to the role of the environment in determining life outcomes also react more to changes in that environment. Second, I find stronger responses when children received a lower secondary school track

recommendation. This is in line with lower educated individuals being hit harder by the negative consequences of recessions, causing these children to be at a higher risk to be affected by worsened economic situations. Third, families in the lowest quartile of the income distribution show larger increases in parental investments measures. It is likely that parents from disadvantaged backgrounds are more attentive to worsened economic conditions, or are more concerned by them, and therefore respond stronger. Finally, I observe a weaker response to environmental incentives when parents are lower educated, potentially due to increased stress related to their own labor market prospects during times of high unemployment.

The results indicate that the local economic environment can create incentives for parents to invest in their children's human capital, and that parents' reaction may depend on family background characteristics. Hence, differences in investment levels between families may be legitimate when taking the economic environment into consideration. However, the negative heterogeneous effect for low-educated parents also touches upon a potential downside of incentives, namely that too much pressure can cause psychological distress. From the literature we know that just purely thinking about finances can impede cognitive functioning of poor people, while non-poor individuals' cognitive function remains unaffected (Mani et al., 2013). Accordingly, studies that investigate children's development during the Great Recession find that the additional stress caused by the economic downturn negatively affected children's outcomes, irrespective of whether their parents lost their job or not (see Gassman-Pines, Gibson-Davis, and Ananat, 2015; Kalil, 2013, for reviews of the literature). Although it can not be said with certainty, for parents without a secondary school qualification the additional stress and worry for their own employment that comes with worsened economic conditions may overshadow potential higher awareness, and therefore result in lower investments.

The rest of the paper is structured as follows. In the next section I describe the survey and measures in more detail. Section 3 explains the empirical strategy and the underlying identifying assumptions. Section 4 presents the results, including robustness tests. Finally, section 5 provides concluding remarks.

2 Data

The analysis draws primarily on data from the German Socio-Economic Panel (SOEP), a representative household survey that is conducted annually since 1984 (Berlin, 2019). The survey follows roughly 11,000 households over time, consisting of more than 30,000 individuals (Wagner, Frick, and Schupp, 2007). The themes inquired by SOEP cover a wide range of individual characteristics such as education level, unemployment status, migration background and personality traits. Also with respect to household characteristics the SOEP gathers detailed information, for example on the number of children within a household and the disposable income. In addition, the SOEP administers since the be-

ginning of the century a specific youth questionnaire to children in the year they turn 17, which I use to obtain knowledge on parental investments.

The youth survey contains several questions where children are asked about parental behavior. I classify behavior as parental investment when 1) it requires parents to spend time, money or attention, and 2) it fosters children's development. Several survey items fulfill these requirements. First, maternal (paternal) support measures the degree to which the mother (father) expresses a supportive and predominantly authoritative parenting style. Both support variables are standardized and constructed by factor analysis.[1] Moreover, the youth survey inquires about whether or not parents display interest for children's academic performance, if they provide actual support with homework and whether they have hired a tutor to help their children with school work. Lastly, the questionnaire asks about ways parents have contact with the child's school. From this an ordinal measure is constructed counting the number of ways parents contact school.[2]

The economic environment is measured by the local prevalent unemployment rate. As this is a relatively crude measure for economic incentives, it should rather be seen as a proxy for the broader economic environment that parents face in their region. I make use of the unemployment data stemming from the German Federal Institute for Research on Building, Urban Affairs and Spatial Development. The unemployment rate reflects the percentage of individuals aged 15 to 65 that are unemployed according to the German Unemployment Agency, and is measured in the main specifications at the federal state level (BBSR, 2017a). As the SOEP surveys are predominately conducted within the first four months of the year, the unemployment rate is measured in the year before the survey took place. Figure A1 in the appendix presents the yearly development of the unemployment rate for all 16 German federal states over the sample period, which shows quite some variation both across states as well as over time.

For the empirical analysis to be relevant I only include children who follow education at the time of the survey, and who live in the same household as their mother. Moreover, I exclude children for whom not all family and parental background variables are available. The final sample consists of 5009 children, surveyed in the years 2001 to 2018.

3 Empirical Strategy

As the prime goal of this paper is to analyze the impact of the economic environment on parents' investment choices, I estimate the following equation:

$$y_{i,r,t} = \beta_0 + \beta_1 U_{r,t-1} + \delta X_{i,t} + \rho_t + \omega_r + \epsilon_{i,r,t} \tag{1}$$

[1] The included items overlap with the items of the parenting style and dimension questionnaire (PSDQ) that define an authoritative parenting style (Robinson et al., 2001).

[2] For the exact items of the maternal and paternal support, as well of school contact, please see table A1 in the appendix.

where $y_{i,r,t}$ is a vector of the parental investment measures of child i, who lives in state r, in year t. $U_{r,t-1}$ denotes the lagged unemployment rate at the federal state level. The terms ρ_t and ω_r are sets of state and year dummies that respectively capture regional and time fixed effects. Depending on whether the parental investment variable is continuous or binary the equation is estimated by means of ordinary least squares (OLS) or logit regression. Moreover, as the main variation of the unemployment rate emerges at the state level, the error term $\epsilon_{i,t}$ is clustered by state.

$X_{i,t}$ is a set of control variables. Following the extensive literature on individual determinants of parenting behavior, I include controls for parental education, household income, number of children and a measure of maternal locus of control.[3] In addition, I control for parental unemployment and single-parenthood, of which there is evidence that their likelihood of occurring is affected by the state of the economy (see e.g. Amato and Beattie, 2011). Arguably, these indicators could be seen as a mechanism of how regional economic circumstances impact parenting practices. However, as the aim of this paper is to detect the effect of economic incentives, rather than indirect effects through changed personal circumstances, I include both measures as controls. Finally, I control for a child's gender, migration background, and mother's age.

The main challenge in estimating the causal effect of environmental incentives on parental investments is endogeneity, as there are several potential variables that could simultaneously influence a family's economic environment as well as their parenting behavior. For instance, in Germany states are to a certain extent free to design their own education system. Differences in the educational set-up might not only influence parenting practices, but could simultaneously impact a state's unemployment rate. A similar reasoning applies to other institutional or cultural differences between states. The state fixed effects ensure that these invariant state characteristics are controlled for. Moreover, the year fixed effects take care of spurious correlations originating from broader time trends of parenting behavior and the economy. Assuming that the state and year fixed effects capture all unobserved heterogeneity that is correlated with both parental investments and the economic environment, the β_1-coefficient estimates the causal effect of changes in the unemployment rate within states and time, on parental investments.

Furthermore, this paper aims to analyze whether the response of parental investments to environmental incentives depend on certain parental background characteristics. To capture potential heterogeneous responses, I estimate a second equation where I interact the independent variable of interest with specific background variables:

$$y_{i,r,t} = \beta_0 + \beta_1 U_{r,t-1} + \beta_2 U_{r,t} * q_{i,t} + \delta X_{i,t} + \rho_t + \omega_r + \epsilon_{i,r,t} \tag{2}$$

here $q_{i,t}$ is a subset of the control variables in $X_{i,t}$, for which heterogeneous effects may be expected. In particular, $q_{i,t}$ includes a measure for maternal locus of control, a child's

[3] I base individual parent controls only on maternal characteristics, as for all children the mother was surveyed, while this holds not for fathers.

Table 1: The effect of regional unemployment on parental investments

	(1) Maternal support	(2) Paternal support	(3) Academic interest	(4) Homework help	(5) Paid tutor	(6) Contact with school
Unem. rate	0.018**	0.012	0.011**	0.015***	-0.004	-0.005
	(0.008)	(0.015)	(0.005)	(0.005)	(0.005)	(0.006)
N	5009	5009	5009	5009	5009	5009
State & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table 1 shows the effect of the state unemployment rate on measures of parental investment. Maternal and paternal support are standardized as a Z-score. Academic interest, homework help and paid tutor are binary variables. Contact with school is measured on a five-point scale. The set of controls include: children's gender, secondary school track, household income vigintile, number of children within the household, single-parenthood, parents' unemployment status, parents' education, immigrant background, mother's age and locus of control. Columns 1, 2 and 6 are estimated by means of OLS, while columns 3 and 4 are estimated by logit regressions. The logit coefficients are displayed as average marginal effects. Standard errors are clustered at the federal state level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

secondary school track recommendation, household's disposable income and maternal education level. All these measures may influence the perceived risk by parents that their child is affected by an unfavorable economic environment.

4 Results

4.1 Main Results

Table 1 shows the impact of the state unemployment rate on the different parenting investment measures. Column 1 presents a positive statistically significant effect of the unemployment rate, with maternal support as the dependent variable. A one percentage point increase in regional unemployment increases maternal support such as talking about a child's worries, by 0.018 standard deviations. I also find a positive effect for paternal support in column 2, although this is not statistically significant. In addition, column 3 shows a positive effect for parental interest in a child's academic performance. The estimated marginal effect implies that a one percent point increase in the unemployment rate increases the probability of parents being interested in their child's academic performance by 1.1 percent. The increased academic interest seems to translate in also providing active assistance with children's homework, as is portrayed in column 4. It shows that parents who are faced with a one percentage point increase in the state unemployment rate are 1.5 percent more likely to help their child with homework. For the investment measures in the last two columns, that is hiring a tutor and contact intensity with a child's school, I observe no significant effects of the regional unemployment rate, with the standard errors ruling out any effect larger than 0.5 percentage point.[4]

[4]For ease of interpretation column 6 is estimated by means of OLS regression, however estimating an ordered logit model instead lead to qualitative similar results.

The results indicate that when the unemployment rate in a household's surroundings go up, parents react by increasing certain investments into their children, which is in accordance with the reasoning laid out in the introduction. The magnitude of the effect of the unemployment rate on the different investment measures is meaningful, considering that it is merely a rough proxy for people's broader economic living surroundings and changes in their personal situation are controlled for. Especially in times of a recession when unemployment rates can plummet several percentage points per year, its effect on parental investment measures can be substantial.[5]

4.2 Heterogeneous Responses

In addition to the general effect of the economic environment, this paper analyses whether parents with certain background characteristics are more incentivized by the environment than others. As stated in section 3, I look at maternal locus of control, a child's secondary school track recommendation, household's disposable income and maternal education level, since these measures may influence parents' perceived risk for their child to be harmed by increasing unemployment rates.

First, maternal internal locus of control reflects the importance mothers attach to the environment for determining life outcomes. On the one hand, parents with a lower internal locus of control are more likely to belief that worsening economic conditions negatively impact their child, triggering a larger response. However, at the same time we know that parents with a low locus of control underestimate the impact their investments have on their child's development (Cunha, Elo, and Culhane, 2013; Lekfuangfu et al., 2017). Whereas parents with a higher internal locus of control do belief they can actively change their children's outcomes. Still, as these parents in general already invest more, there is less scope to raise investments even further.[6] The results for the continuous maternal support investment variable are presented in table 2, while the outcomes for the binary variables of academic interest and homework support are presented by marginal plots in figures 2 and 3.[7] Column 1 in table 2 shows that mothers with a low locus of control increase support more in response to a raise in the unemployment rate than mothers with a higher locus of control. Suggesting that parents who attach a greater value to the external environment in determining outcomes, respond stronger to changes in this environment. Nonetheless, panel A of figures 2 and 3 show no significant difference in the marginal effect between low and high locus of control parents on the probability of academic interest and homework assistance.

Second, as the least educated individuals are hurt the most in economic downturns, parents with children in lower secondary school tracks might be more concerned by high unemployment rates affecting their children's future. Therefore, I look at whether the effect on parental investments differs by the track recommendation children received at

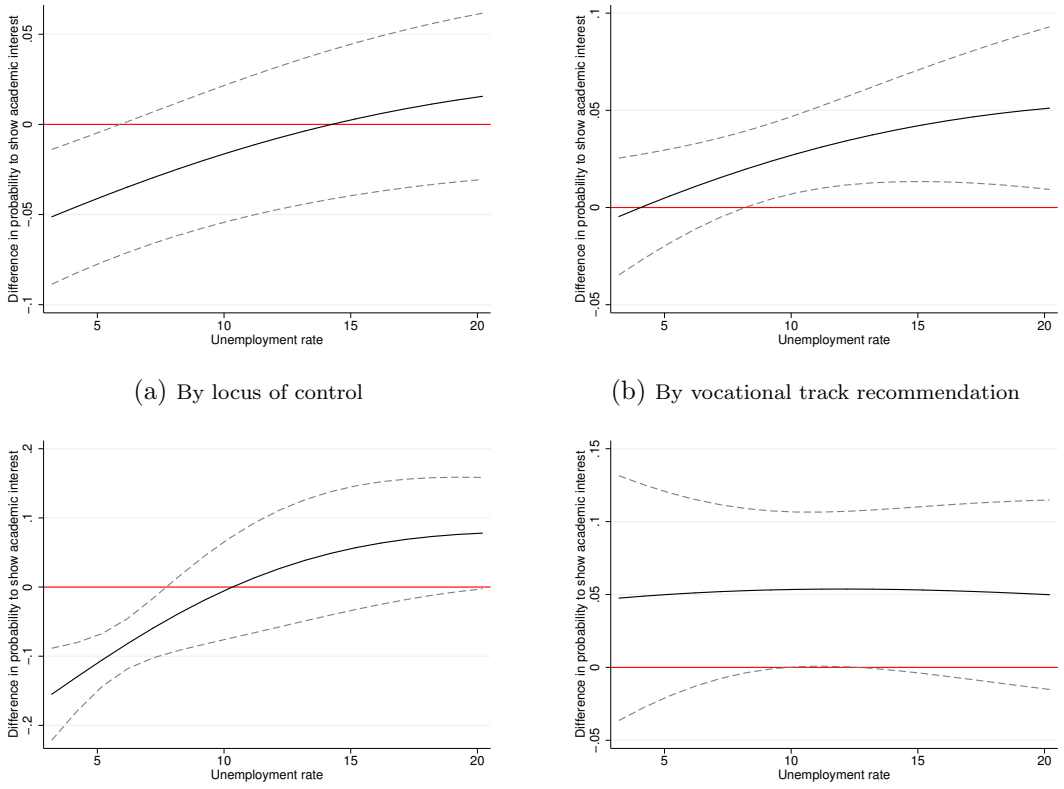
[5] See table A2 in the appendix for an overview of the effect sizes of the background variables.
[6] See footnote 5.
[7] For the results of the other three investment measures see table A3 and figure A2 in the appendix.

Table 2: Heterogeneous effects of regional unemployment on maternal support

	Maternal support			
	(1)	(2)	(3)	(4)
Unem. rate	0.019**	0.024**	0.021**	0.020**
	(0.007)	(0.010)	(0.007)	(0.007)
Unem.*Low loc	0.009**			
	(0.003)			
Unem.*Vocational track		-0.004		
		(0.009)		
Unem.*Low educated			-0.032*	
			(0.017)	
Unem.*Low income				0.008
				(0.014)
N	5009	5009	5009	5009
State & Year FE	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes

Notes: Table 2 shows the interaction effects of the state unemployment rate and several background characteristics on the maternal support measure. Maternal support is standardized as a Z-score. The set of controls include: children's gender, secondary school track, household income vigintile, number of children within the household, single-parenthood, parents' unemployment status, parents' education, immigrant background, mother's age and locus of control. In addition, I include indicators of low maternal locus of control, vocational track recommendation, low parental education, and low household income. The regressions are estimated by means of OLS. Standard errors are clustered at the federal state level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 2: Heterogeneous effects of regional unemployment on parental academic interest



(a) By locus of control

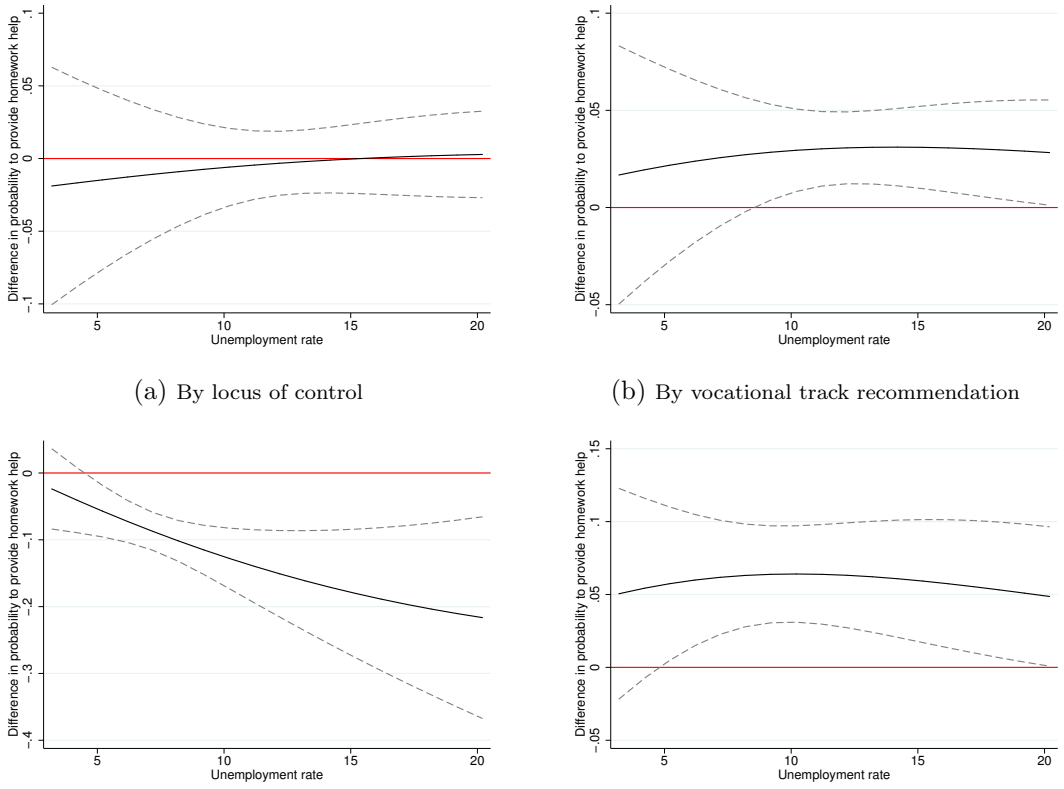
(b) By vocational track recommendation

(c) By parental education

(d) By parental income

Notes: Figure 2 shows the difference in the marginal effect of a one percentage point increase in state unemployment on the probability of parents showing academic interest by certain background characteristics. Panel A presents the difference between parents with a locus of control measure in the lowest quartile versus parents with a measure belonging to one of the three highest quartiles. Panel B shows the difference between children who received a vocational track recommendation and children receiving an academic track recommendation. Panel C displays the difference based on whether parents have less than a secondary school qualification. Finally, panel D presents the difference between households with a disposable income in the lowest quartile versus households with an income belonging to one of the three highest quartiles. The dotted gray lines represent the 90 percent confidence intervals.

Figure 3: Heterogeneous effects of regional unemployment on parental homework help



(a) By locus of control

(b) By vocational track recommendation

(c) By parental education

(d) By parental income

Notes: Figure 3 shows the difference in the marginal effect of a one percentage point increase in state unemployment on the probability of parents helping with homework by certain background characteristics. Panel A presents the difference between parents with a locus of control measure in the lowest quartile versus parents with a measure belonging to one of the three highest quartiles. Panel B shows the difference between children who received a vocational track recommendation and children receiving an academic track recommendation. Panel C displays the difference based on whether parents have less than a secondary school qualification. Finally, panel D presents the difference between households with a disposable income in the lowest quartile versus households with an income belonging to one of the three highest quartiles. The dotted gray lines represent the 90 percent confidence intervals.

the age of ten. I compare children who received a vocational track recommendation, to those who received an academic track recommendation, where I expect to see stronger parental responses for children who were advised a vocational track.[8] Column 2 of table 2 displays no difference in the provision of maternal support for children with a vocational track recommendation. However, panel B of figures 2 and 3 indeed portrays marginally significant positive effects on the indicators of academic interest and homework assistance.[9]

Third, parents' own educational background might play a role in how parents perceive the economic environment. On the one hand, lower educated parents, i.e. without a secondary school qualification, may be more aware or worried by worsening economic circumstances, and therefore be more incentivized by them. On the other hand, low-educated parents themselves are at higher risk to be hurt by rising unemployment rates. This might cause them to experience higher stress levels, leading to decreasing attention for parental investments (Kalil, 2013).[10] In accordance with the latter reasoning, column 3 of table 2, as well as panel C of figure 3, show a negative interaction effect for maternal support and homework help, respectively. For homework support the negative marginal effect even increases for higher unemployment rates, which is in line with individuals experiencing high levels of stress especially during recessions. Panel C of figure 2 displays no significant difference in the probability to show academic interest.[11]

Finally, a similar trade-off could hold for household income; parents with lower income could be more concerned or attentive with respect to the unemployment rate, while at the same time they might be more pressured by it. As can be observed from panel D of figures 2 and 3, I find positive interaction effects between being in the lowest quartile of the income distribution and indicators of academic interest and homework help. These outcomes suggests that it is rather educational background than income, that matters when it comes to experiencing stress due to higher unemployment rates. Instead, lower income families respond to increased unemployment rates by raising parental investments.

4.3 Additional Results

To test the sensitivity of the main results with respect to the included sample and the economic indicator, I perform several robustness analyses. First, until now I assume that the set of controls capture all heterogeneity that is left after including the fixed effects and is correlated with both the unemployment rate and the error term. However, selection bias could still arise when families move to, or away from, a certain region, explicitly taking into consideration the changing environmental context, generating endogenous contextual

[8] Depending on the state the percentage of children going to vocational tracks ranges from 55 to 68 percent (Statista, 2019).

[9] Although there is no general effect of the unemployment rate on the probability of hiring a tutor and intensity of school contact, column 6 of table A3 and panel B of figure A2 in the appendix do present a marginally significant positive interaction effect for children with a vocational track recommendation.

[10] Note that as I control for parental unemployment status, effects are not caused by parents becoming unemployed themselves.

[11] In addition, column 7 of table A3 in the appendix presents a negative interaction effect for intensity of contact with school.

Table 3: Robustness of the effect of regional unemployment on parental investments

	Maternal support			Academic interest			Homework help		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unem. rate	0.018**	0.016*	0.015	0.011**	0.010**	0.007	0.015***	0.013**	0.011**
	(0.008)	(0.009)	(0.010)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
N	5009	4648	5009	5009	4648	5009	5009	4648	5009
State & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specification	Baseline	Not moved	RoR	Baseline	Not moved	RoR	Baseline	Not moved	RoR

Notes: Table 3 shows the robustness of the state unemployment rate on parental investments. Maternal support is standardized as a Z-score. Academic interest and homework help are binary variables. Columns 1, 4 and 7 present the baseline specification. Columns 2, 5 and 8 restrict the sample to families who did not move municipalities during the last three years. Columns 3, 6 and 9 measures the unemployment rate at the regional economic center level, and accordingly includes regional economic center fixed effects. The set of controls include: children's gender, secondary school track, household income vigintile, number of children within the household, single-parenthood, parents' unemployment status, parents' education, immigrant background, mother's age and locus of control. Columns 1 to 3 are estimated by means of OLS, while columns 4 to 9 are estimated by logit regressions. The logit coefficients are displayed as average marginal effects. Standard errors are clustered at the federal state level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

conditions. Most likely this would lead to an underestimation of the results, as intuitively parents who care the most about the economic environment move to more advantageous surroundings. To explore this possibility, I restrict the sample to only those families that did not move to another municipality in the last three years.[12] Table 3, columns 2, 5 and 8, show similar, or even slightly lower, point estimates and significance levels of the effect of the unemployment rate on maternal support, academic interest and homework assistance for this restricted sample.[13] Hence, there is no reason to belief that the baseline estimates are underestimated due to parents moving to more prosperous regions.

Second, I test whether the federal state is the relevant regional level to consider. It could be that incentives stemming from a more local economic environment have a higher relevance for parents. Therefore, the coefficients in columns 3, 6 and 9 of table 3 are estimated with the unemployment rate measured at the level of the regional economic center (RoR), and include RoR fixed effects. In total there are 96 regional economic centers in Germany, which are constructed based on local labor markets and commuting areas (BBSR, 2017b). For all three parental investment variables employing the RoR unemployment rate reduces its impact, both in terms of effect size and significance level. This suggests that regarding investment choices, parents are more incentivized by the state level environment than by the local labor market environment. A potential explanation could be that when it comes to a child's future, parents rather consider the state environment to be relevant than the local labor market. Alternatively, this finding could be related to the way how information is distributed, as (economic) news is often reported at the federal state level.

Third, the unemployment rate is merely one potential proxy for the environmental incentives parents face. An alternative indicator that is frequently mentioned in this literature is the prevalent level of income inequality (see e.g. Doepke and Zilibotti, 2017). The underlying intuition is the same; in more unequal surroundings the relative income loss of not succeeding are larger, and hence there lies more weight on human capital to succeed. I therefore investigate how parental investments respond to changes in inequality, where income inequality is defined by the 90/10 ratio, which is a common indicator for inequality (OECD, 2019).[14] Table A5 in the appendix shows that the inequality rate does not significantly influences any of the parental investment measures.

Lastly, the mixed results for the two environmental proxies raise the question whether parents alter their beliefs in response to changes in the economic environment and merely do not always act upon it, or whether it did not change expectations in the first place. I test this presumption for both environmental measures. Table 4 regresses an indicator of

[12] As the analysis includes state fixed effects, it would be sufficient to restrict the sample to those households that did not move outside their state. However, as this information is not available, I take the more conservative approach and restrict the sample to those who did not move to a different municipality.

[13] The results for the other parental investment measures can be found in table A4 in the appendix, but also seem unaffected.

[14] The 90/10 ratio demonstrates the relationship between the income of the 90th percentile compared to the income of the 10th percentile. I construct this ratio based on personal income information of the entire (weighted) SOEP sample, and to ease interpretation standardize it.

Table 4: The effect of regional unemployment and inequality on parental worries.

	Maternal worry: eco. dev.		Paternal worry: eco. dev.	
	(1)	(2)	(3)	(4)
Unem. rate	0.010***		0.023***	
	(0.003)		(0.005)	
Ineq. ratio		0.009		-0.005
		(0.010)		(0.013)
N	5009	5009	4168	4168
State & Year FE	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes

Notes: Table 4 shows the effect of the state unemployment rate and inequality ratio on maternal and paternal worries about economic development. Both maternal and paternal worries are binary variables. Columns 3 and 4 have less observations as less fathers filled in the survey. The set of controls include: children's gender, secondary school track, household income vigintile, number of children within the household, single-parenthood, parents' unemployment status, parents' education, immigrant background, mother's age and locus of control. The regressions are estimated by means of logit regression. All coefficients are displayed as average marginal effects. Standard errors are clustered at the federal state level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

being worried about the economic development on the unemployment and inequality rate. Columns 1 and 3 show that both mothers and fathers are more likely to be concerned when the unemployment rate goes up. A one percentage point increase in the state unemployment rate, increases the probability that mothers and fathers are worried about the economic development by respectively 1.0 and 2.3 percent. By contrast, columns 2 and 4 make clear that changes in the regional inequality ratio do not affect parents' economic concerns. The outcomes of table 4 provide suggestive evidence that the unemployment rate indeed generates changes of parental beliefs about the economic chances of their children.

5 Conclusion

It is well-established that parental investments are important for children's development and later success in life. Nonetheless, the intensity of these investments varies greatly between parents. The current literature predominantly analyses the role of parental and family background characteristics to explain differences in parenting behavior. Instead, this paper investigates the role of the external living environment to explain parental investment choices. I employ German survey data, in a regional- and time-fixed effect setting, to estimate the causal impact of variation of the regional unemployment rate on multiple investment measures.

The results show that the economic environment indeed matters for the investments choices parents make. I observe that a rise of the state unemployment rate causes an increase in measures of maternal support, academic interest and homework help. The positive effects of the unemployment rate are in line with the hypothesis laid out in the

introduction, which states that worsening economic conditions can incentivize parental investments by raising the importance of human capital accumulation in ensuring success. Moreover, the findings fit well with recent theoretical and empirical papers claiming that the prevailing economic surroundings incentivize parental behavior that relates to children's human capital development (Doepke and Zilibotti, 2017; Dohmen et al., 2019). The absence of an effect for having hired a tutor and intensity of school contact, could have several reasons. Potentially, these type of investments require more or different resources from parents than the other investment measures, and are therefore less susceptible or more difficult to change. For example, it can be quite expensive to hire a private tutor. Another explanation can be that parents perceive these types of investments as less relevant for children's human capital development. In addition, the observed heterogeneous effects provide suggestive evidence that especially parents with lower locus of control, income and having a child at a lower educational track are incentivized by the external environment. By contrast, parents who themselves have no educational qualification seem to lower investments, potentially due to increased stress.

The outcomes of this paper provide three main insights. First, the findings help explain observed differences in parenting behavior between families facing different economic circumstances. Accordingly, papers that model parental investment decisions should take the economic environment of families into account, as parents actively respond to environmental incentives. Observed differences in parental investment levels between families might therefore be valid given differences in prevailing living surroundings. Second, the heterogeneous effects based on families' background characteristics show that parents do not all respond similar to incentives set by the environment. Hence, the effect of the external environment should not be looked at in isolation, but rather in combination with the family environment. Previous research shows that during recessions especially the human capital development of disadvantaged children is harmed, for example due to the consequences of parental unemployment and income instability within a family (see Kalil, 2013, for a review of the literature). The stronger investment responses by parents with lower internal locus of control, income and having a child at a lower educational track have the potential to reduce these inequalities. However, it is worrisome that low-educated parents instead diminish investments when the unemployment rate rises, such that – even in the absence of changes in personal circumstances – disadvantages for children from low-educated household may increase during economic downturns due to negative parental investment responses. Third, the analysis demonstrates broader insights in how childhood experiences can be formed by the state of the economy. Several studies find that experiencing recessions as a child influences economic behavior later in life (Giuliano and Spilimbergo, 2013; Malmendier and Nagel, 2011; Malmendier, Tate, and Yan, 2011). The results in this paper could indicate that children who grow up in an economically deprived surrounding might also perceive higher amounts of pressure from their parents to perform well.

The paper opens up several avenues for future research. The results show that parents react to changes in the regional unemployment rate, although not to changes of the inequality ratio. These different effects raise the question what determines parents' perception of the economic environment, and which economic factors could play a role? This question is also interesting with respect to the heterogeneous responses based on parental and child background characteristics, as it indicates that economic factors not always uniformly translate into increased concerns about children's chances in life.

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Appendix

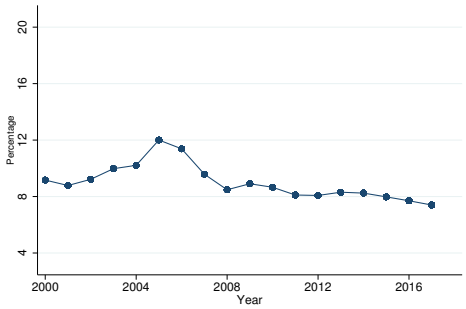
A Additional Figures and Tables

Table A1: Survey items of parental investment variables

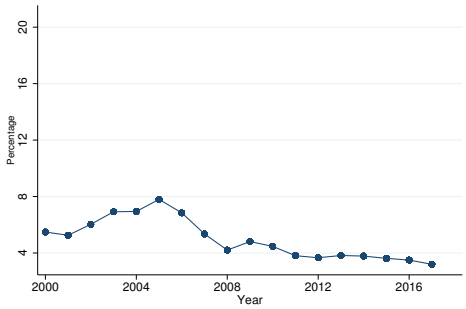
Variable	Item description	Min	Max
Maternal/paternal support	Mother/father talks about things you do	1	5
	Mother/father talks about things that worry you	1	5
	Mother/father asks you prior to making decisions	1	5
	Mother/father expresses opinion on something you do	1	5
	Mother/father able to solve problems with you	1	5
	Mother/father has impression of trusting you	1	5
	Mother/father asks your opinion on family matters	1	5
	Mother/father gives reason for making decision	1	5
	Mother/father shows that she loves you	1	5
School contact	Parents take part in parents evening	0	1
	Parents consult teachers	0	1
	Parents are engaged as parent representatives	0	1
	Parents are involved as parents representative	0	1

Notes: Table A1 presents details on the survey items that are employed for the parental investment measures. The items of maternal and paternal support are used in confirmatory factor analysis to create the final investment measures. For school contact I count the number of activities undertaken by parents.

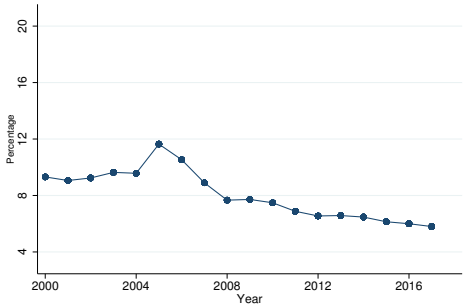
Figure A1: Yearly unemployment rate by federal state



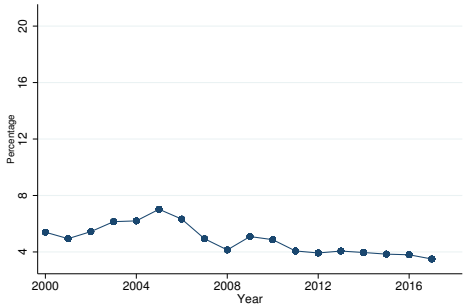
(a) North Rhine-Westphalia



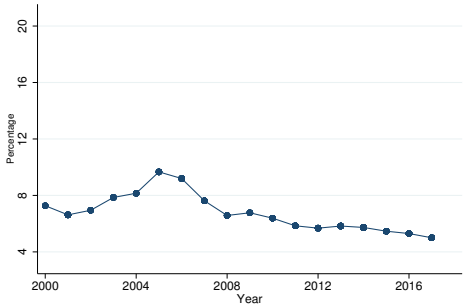
(b) Bavaria



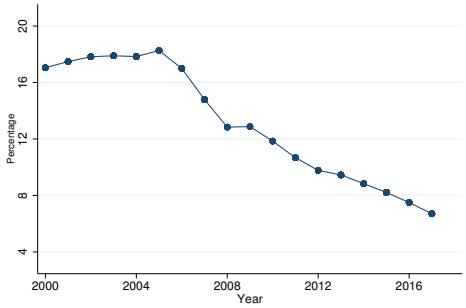
(c) Lower Saxony



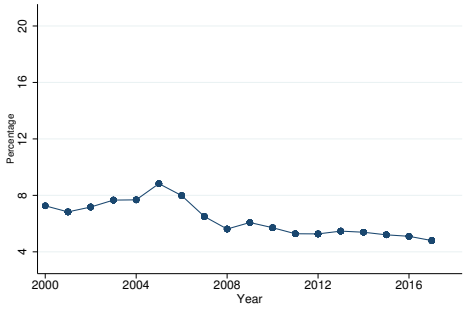
(d) Baden-Wuerttemburg



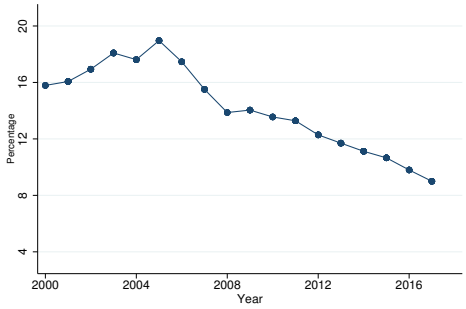
(e) Hessen



(f) Saxony

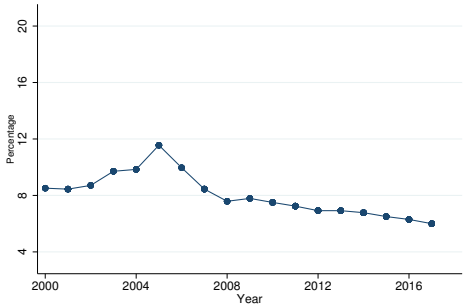


(g) Rhineland-Palatinate

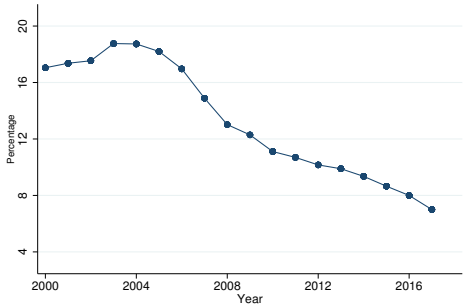


(h) Berlin

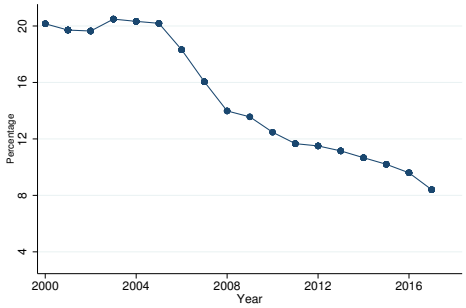
Figure A1 (continued): Yearly unemployment rate by federal state



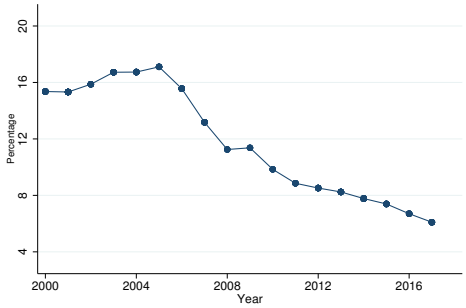
(i) Schleswig-Holstein



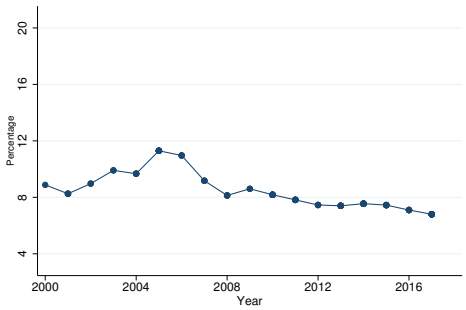
(j) Brandenburg



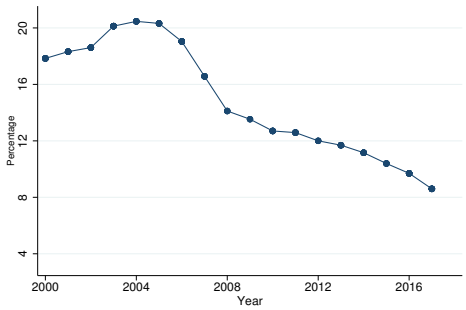
(k) Saxony-Anhalt



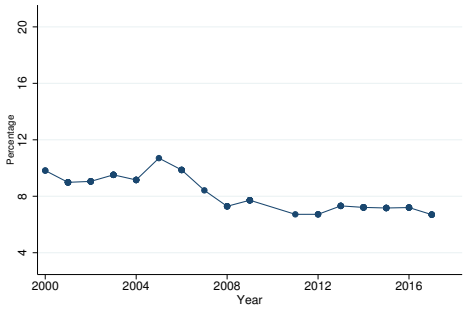
(l) Thuringia



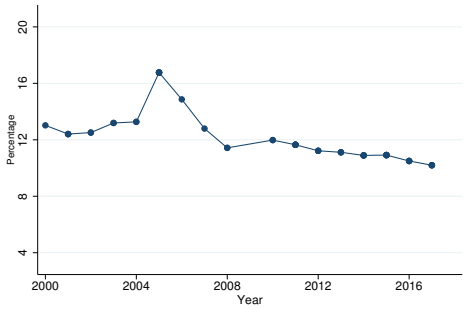
(m) Hamburg



(n) Mecklenburg-Vorpommern



(o) Saarland



(p) Bremen

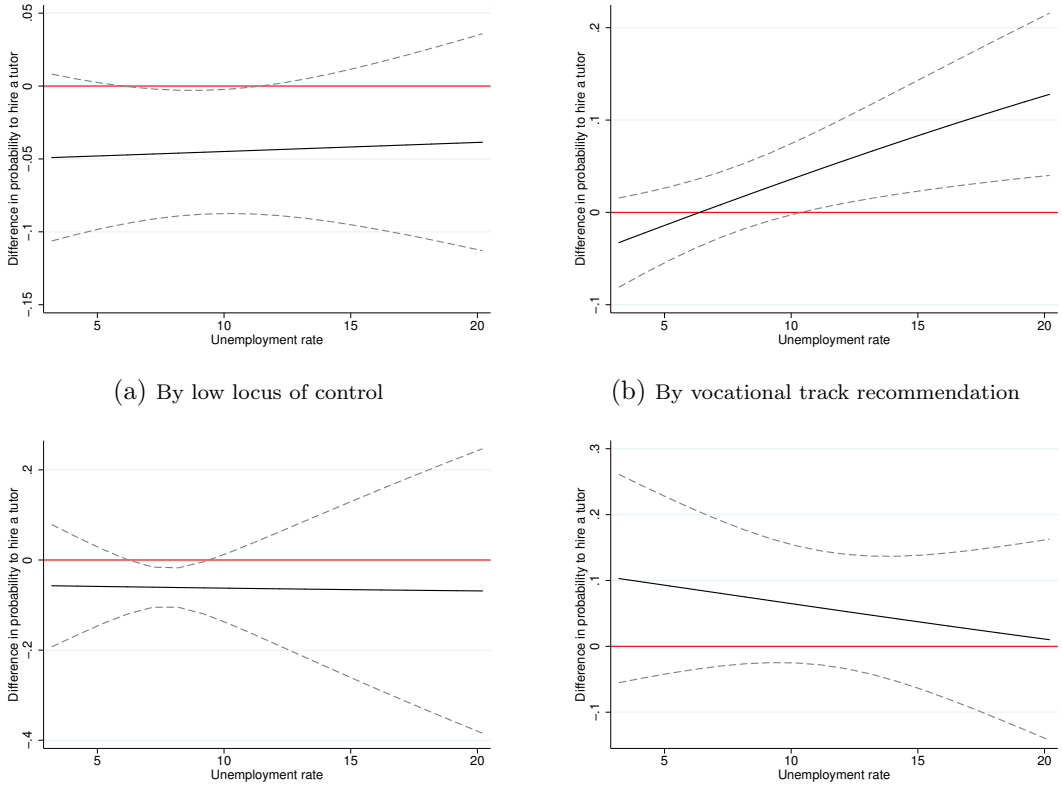
Notes: Figure A1 shows the development of the unemployment rate for each German state from 2000 to 2017 (BBSR, 2017a).

Table A2: The effect of regional unemployment and background characteristics on parental investments

	(1) Maternal support	(2) Paternal support	(3) Academic interest	(4) Homework help	(5) Paid tutor	(6) Contact with school
Unem. rate	0.018**	0.012	0.011**	0.015***	-0.004	-0.005
	(0.008)	(0.015)	(0.005)	(0.005)	(0.005)	(0.006)
Boy	-0.111***	0.062**	0.050***	-0.025***	0.002	0.094***
	(0.021)	(0.027)	(0.010)	(0.009)	(0.017)	(0.024)
Income vig.	-0.001	0.002	0.002**	0.002	0.005**	0.006**
	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.003)
No. of children	-0.053***	-0.021	-0.023***	-0.015**	-0.030***	-0.023
	(0.009)	(0.015)	(0.007)	(0.007)	(0.006)	(0.018)
Unemployed	-0.030	-0.096**	-0.003	-0.006	-0.070***	-0.017
	(0.028)	(0.035)	(0.019)	(0.015)	(0.020)	(0.033)
Middle voc. edu.	-0.081	0.011	0.059***	0.079***	0.062**	0.224**
	(0.077)	(0.079)	(0.018)	(0.024)	(0.027)	(0.100)
Higher voc. edu.	-0.008	0.129*	0.073***	0.087**	0.071**	0.266**
	(0.079)	(0.070)	(0.021)	(0.034)	(0.028)	(0.110)
Higher edu.	0.051	0.179**	0.054**	0.124***	0.059	0.384***
	(0.072)	(0.070)	(0.021)	(0.021)	(0.038)	(0.091)
Native parent(s)	-0.062	-0.187***	0.032	0.178***	0.017	0.304***
	(0.042)	(0.053)	(0.030)	(0.027)	(0.020)	(0.085)
Mother's age	-0.001	0.011**	-0.002**	-0.000	-0.000	0.005*
	(0.005)	(0.004)	(0.001)	(0.002)	(0.002)	(0.003)
Locus of control	0.063***	0.076***	0.019***	0.009*	0.017**	0.012
	(0.009)	(0.013)	(0.005)	(0.005)	(0.008)	(0.016)
Highest track	0.179***	0.174***	-0.089***	-0.079***	-0.044**	-0.047
	(0.032)	(0.031)	(0.009)	(0.016)	(0.020)	(0.038)
Single parent	-0.035	-0.921***	-0.082***	-0.047***	0.036	0.039
	(0.040)	(0.054)	(0.018)	(0.015)	(0.027)	(0.036)
N	5009	5009	5009	5009	5009	5009
State & Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table A2 shows the effect of the state unemployment rate and all control variables on measures of parental investment. Maternal and paternal support are standardized as a Z-score. Academic interest, homework help and paid tutor are binary variables. Contact with school is measured on a five-point scale. Columns 1, 2 and 6 are estimated by means of OLS, while columns 3 and 4 are estimated by logit regressions. The logit coefficients are displayed as average marginal effects. Standard errors are clustered at the federal state level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A2: Heterogeneous effects of regional unemployment on hiring a tutor



(a) By low locus of control

(b) By vocational track recommendation

(c) By low parental education

(d) By low parental income

Notes: Figure A2 shows the difference in the marginal effect of a one percentage point increase in state unemployment on the probability of parents hiring a tutor by certain background characteristics. Panel A presents the difference between parents with a locus of control measure in the lowest quartile versus parents with a measure belonging to one of the three highest quartiles. Panel B shows the difference between children who received a vocational track recommendation and children receiving an academic track recommendation. Panel C displays the difference based on whether parents have less than a secondary school qualification. Finally, panel D presents the difference between households with a disposable income in the lowest quartile versus households with an income belonging to one of the three highest quartiles. The dotted gray lines represent the 90 percent confidence intervals.

Table A3: Heterogeneous effects of regional unemployment on paternal support and school contact

	Paternal support				Contact school			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unem. rate	0.013	0.021	0.014	0.016	-0.002	-0.009	-0.003	-0.001
	(0.015)	(0.016)	(0.015)	(0.015)	(0.007)	(0.007)	(0.007)	(0.007)
Unem.*Low loc	0.005				-0.002			
	(0.006)				(0.006)			
Unem.*Vocational track		-0.010*				0.012**		
		(0.005)				(0.005)		
Unem.*Low educated			-0.046				-0.070***	
			(0.033)				(0.016)	
Unem.*Low income				-0.009				-0.013
				(0.016)				(0.013)
N	5009	5009	5009	5009	5009	5009	5009	5009
State & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table A3 shows the interaction effects of the state unemployment rate and several background characteristics on the paternal support and school contact measure. Paternal support is standardized as a Z-score. Contact with school is measured on a five-point scale. The set of controls include: children's gender, secondary school track, household income vigintile, number of children within the household, single-parenthood, parents' unemployment status, parents' education, immigrant background, mother's age and locus of control. In addition, I included indicators of low maternal locus of control, vocational track recommendation, low parental education, and low household income. The regressions are estimated by means of OLS. Standard errors are clustered at the federal state level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Robustness of the effect of regional unemployment on parental investments

	Paternal support			Paid tutor			Contact school		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unem. rate	0.012	0.013	0.012	-0.004	-0.005	-0.003	-0.005	-0.009	-0.011
	(0.015)	(0.016)	(0.015)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.009)
N	5009	4648	5009	5009	4648	5009	5009	4648	5009
State & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specification	Baseline	Not moved	RoR	Baseline	Not moved	RoR	Baseline	Not moved	RoR

Notes: Table A4 shows the robustness of the state unemployment rate on parental investments. Paternal support is standardized as a Z-score. Paid tutor is a binary variable. Contact with school is measured on a five-point scale. Columns 1, 4 and 7 present the baseline specification. Columns 2, 5 and 8 restrict the sample to families who did not move municipalities during the last three years. Columns 3, 6 and 9 measures the unemployment rate at the regional economic center level, and accordingly includes regional economic center fixed effects. The set of controls include: children's gender, secondary school track, household income vigintile, number of children within the household, single-parenthood, parents' unemployment status, parents' education, immigrant background, mother's age and locus of control. Columns 1 to 3 and 7 to 9 are estimated by means of OLS, while columns 4 to 6 are estimated by logit regressions. The logit coefficients are displayed as average marginal effects. Standard errors are clustered at the federal state level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: The effect of regional inequality on parental investments

	(1) Maternal support	(2) Paternal support	(3) Academic interest	(4) Homework help	(5) Paid tutor	(6) Contact with school
Ineq. ratio	0.007	-0.016	-0.007	-0.002	0.012	0.034
	(0.024)	(0.037)	(0.018)	(0.011)	(0.010)	(0.037)
N	5009	5009	5009	5009	5009	5009
State & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table A5 shows the effect of the state inequality ratio on measures of parental investment. Maternal and paternal support are standardized as a Z-score. Academic interest, homework help and paid tutor are binary variables. Contact with school is measured on a five-point scale. The set of controls include: children's gender, secondary school track, household income vigintile, number of children within the household, single-parenthood, parents' unemployment status, parents' education, immigrant background, mother's age and locus of control. Columns 1, 2 and 6 are estimated by means of OLS, while columns 3 and 4 are estimated by logit regressions. The logit coefficients are displayed as average marginal effects. Standard errors are clustered at the federal state level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.