

Bartels, Charlotte; König, Johannes; Schröder, Carsten

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Born in the land of milk and honey: The impact of economic growth on individual wealth accumulation *

Charlotte Bartels Johannes König Carsten Schröder

February 25, 2021

Abstract

Economic growth varies substantially across regions and over time. This paper shows that economic growth in a person's birth place is an important determinant for wealth in adulthood. We exploit a new dataset that oversamples wealthy individuals in Germany and includes information on birth district, current residence, individual wealth, gifts and inheritances and parental background. To identify the effect of economic growth on children's wealth we match the population of heirs to statistically equivalent non-heirs. We use regression analysis to determine the effect of regional economic growth on this inherited fraction of wealth. At an average level of GDP at birth, a one standard deviation higher per capita GDP growth at birth increases wealth in adulthood by roughly 130,000 Euro.

Keywords: wealth distribution, regional inequality, intergenerational transmission

JEL Classifications: XXX

*Bartels: DIW Berlin/SOEP, Mohrenstr. 58, Berlin 10117, Germany (cbartels@diw.de), corresponding author; König: DIW Berlin/SOEP, Mohrenstr. 58, Berlin 10117, Germany (jkoenig@diw.de); Schröder: DIW Berlin/SOEP & School of Business and Economics, Free University Berlin, Boltzmannstraße 20, Berlin 14195, Germany (cschroeder@diw.de). Acknowledgements: We would like to thank the German Federal Ministry of Education and Research and the German Federal Ministry of Labour and Social Affairs for financial support of our field work to collect the new subsample, P, of the Socio-Economic Panel. The authors acknowledge financial support by Deutsche Forschungsgemeinschaft (project "Wealthholders at the Top" (WATT), project number: 430972113).

1 Introduction

How does economic growth affect wealth inequality? The evidence of increasing wealth inequality over the past few decades has fueled a growing interest among policymakers and researchers in the mechanisms behind the wealth distribution. The growing literature on the intergenerational correlation of wealth distinguishes between genetically inherited abilities and preferences (selection) and the effect of parents' actions (causation).¹ This paper adds a new channel affecting individual wealth accumulation exogenously: economic activity in one's birth place. What is the effect of the level and growth of GDP per capita in a person's birth place (hometown-GDP-wealth nexus) on wealth in adulthood?

Economic activity and its dynamics vary substantially across regions and over time. Structural changes in the economy can reshape the geography of the wealth distribution. For example, real GDP per capita more than doubled in South Germany between 1950 and 2018, while real GDP per capita only grew by a factor of 1.3 in the West-German Ruhr area. Economic growth increases business and labor income and, thereby, parents' ability to save and invest. At the same time, house prices especially increase in regions with high economic growth enriching homeowners in these regions. Hence, the birth place of the child, which is exogenous to the child, is closely connected to the possibilities to further accumulate wealth for both parents and children.

Our study speaks to the growing literature documenting the intergenerational correlations in wealth across countries (see e.g. [Charles and Hurst \(2003\)](#); [Boserup et al. \(2014\)](#); [Adermon et al. \(2018\)](#)). In particular, our results relate to [Chetty et al. \(2014\)](#); [Connora and Storper \(2020\)](#) who highlight (changing) geographic differences of social mobility in the United States.

Our study also contributes to the literature examining the relationship between demographic milestones and wealth. Several studies show that homeownership significantly increases long-run wealth, while divorce, health shocks, and disability carry long-run reductions in wealth ([Goda and Streeter, 2021](#); [Di et al., 2007](#); [Killewald and Bryan, 2016](#)).

We analyze the hometown-GDP-wealth nexus with the German Socio-Economic Panel (SOEP) including a new subsample of top-wealth individuals (SOEP-P). Our dataset is unique as it oversamples wealthy individuals and also includes information on birth district, current residence,

¹On the one hand, genetically inherited abilities and preferences generate intergenerational links in income, savings behavior or financial risk taking. On the other hand, parents' actions affect children's accumulation of wealth. The investigated channels include direct transfers of wealth (inter vivos or through inheritance), parental investment in children's human capital and earnings capacity, or learning of attitudes and traits that influence children's savings propensity or financial risk taking ([Fagereng et al., 2021](#)).

detailed information on wealth and inherited wealth at the individual level. By linking the birth district to the district’s GDP per capita growth we can examine how economic conditions shape the persistence of wealth across generations. Our measure of wealth includes housing wealth net of outstanding debt, financial assets, insurance assets and business assets. We follow [Heckman et al. \(2013\)](#) in applying mediation analysis to quantify the empirical importance of alternative channels. We construct two measures of intergenerational wealth to tease out effect of the level of birth-region specific GDP at birth and GDP growth since birth: 1. Capitalized inheritances 2. Wealth gaps between matched heirs and non-heirs.

We find a strong hometown-GDP-wealth nexus. Heirs coming from a region with both high initial GDP and high GDP growth have substantially higher intergenerational wealth. At an average level of GDP at birth, a one standard deviation increase in per capita GDP growth at birth increases capitalized inheritances by roughly 130,000 Euro and the wealth gap by roughly 347,000 Euro.

The hometown-GDP-wealth nexus varies greatly across the population. Heirs who are entrepreneurs, i.e. own relevant shares in private companies, are shown to be affected much more strongly by GDP growth capturing substantial wealth gains than other individuals barely capturing any effect.

This paper is structured as follows. Section 2 describes our database. Section 4 assesses the importance of different parental background variables for children’s wealth across wealth groups. Section 5 analyzes hometown-GDP-wealth nexus. Section 6 concludes.

2 Data

Our analysis is based on the Socio-Economic Panel (SOEP). SOEP is a representative survey of German households ([Goebel et al., 2019](#); [Schröder et al., 2020](#)). Along with many questions on socio-demographics, education, labor market status, and more, the SOEP-questionnaire contains a module about individual and household wealth, which is rotated into the questionnaire every five years since 2002. The SOEP also collects data on an individual’s place of birth on the “Kreis”-level and information on their parents when the individual was 15 years old.

Top-Wealth Sample First collected in 2019, the SOEP has added a new high-wealth subsample, SOEP-P, which enables analysis of the top end of the wealth distribution (see [Schröder et al., 2020](#)). High wealth individuals were located using company register information on share-

holding and a random sample was drawn from the top end of the population owning the most valuable shares. SOEP-P is built on the same interviewing method and the same questionnaire as SOEP and is a fully integrated subsample of the SOEP. Thus, variables are fully harmonized between the two datasets, which makes our dataset ideal for comparisons of wealthy and non-wealthy populations.

The fully integrated dataset, which we call SOEP v36_beta², comprises about 1,956 individuals with strictly positive private business holdings, of which 817 hold an individual net worth of at least one million euro.

Focal Variables *1. Net Wealth:* Surveyed assets include the primary residence, other real estate, financial assets, building-loan contracts, life and private pension insurance, tangible assets, vehicles, and, unincorporated businesses. The respondents are asked about their individual share if a house or a firm is owned by multiple individuals. The survey also collects liabilities: outstanding debt on the primary residence, outstanding debt on other real estate, consumer debt, and education debt.

We capture an individual’s position in the net wealth distribution in two indicator variables: First, we construct a categorical variable wc_i , where category 1 consists of individuals from the bottom 50% of the wealth distribution, category 2 consists of the next 25%, category 3 consists of the next 23%, and category 4 consists of the top 2%, that is the millionaires. Second, we construct a millionaire dummy M_i equal to one if the individual’s net wealth equals or exceeds one million Euros.

2. Inheritance: Respondents are asked about the time they received and how much they received in inheritances and gifts. These questions were asked in 2001, 2017, and 2019 and we collect all of the responses into one inheritance amount. We capitalize the inheritances and gifts received in different years using the database on bond-rates provided by [Jordà et al. \(2019\)](#) to make them comparable in 2019. For our regression analyses we winsorize this variable at the first and 99th percentile.

3. Biographical information: Respondents are asked about a large list of biographical information that informs us about their life course before they entered the SOEP and which is update each year they are surveyed. The most relevant items for this study are: 1) the place of birth recorded at the district-level (*Kreis*), 3) education categorized by ISCED (2=lower secondary,

²This is because the official data release is still to come. We have generated the variables relevant to our analysis, but many more variables must be generated before the official release.

3-5=upper secondary, ≥ 6 tertiary) 2) the school education of the father and mother coded into three categories (primary, lower, and upper secondary school completion), and 4) the profession of father and mother coded into five categories (no job, blue-collar worker, white-collar worker, self-employed, civil servant).

4. *Historical, Regional GDP series:* We use the historical GDP per capita series on the NUTS2-level from the Rosés-Wolf database version 6 (2020) spanning 12 benchmark years between 1900 and 2015. From 1900-1950, they use regional variation in employment and wages to estimate GDP by region at country factor cost. From 1960 to 1990, their series is based on national statistical office’s statistics and, since 1990, on Eurostat statistics. NUTS2 comprises 38 regions in Germany.

We use this series to construct a measure of the individual’s birth-region specific growth rate between birth year b and survey year t , i.e. $g_i = \frac{GDP_{t,r}}{GDP_{b,r}} - 1$. More specifically, we assign individuals to birth decades centered around the year in which we measure GDP. For example, we assign the birth year 1960 (we have a measure of GDP from the Rosés-Wolf database for 1960) to individuals born between 1956 and 1965.

Estimation Sample Our sample is an integrated SOEP dataset with all subsamples, but excludes the three refugee samples (M3-5) since they were not asked about their assets. Table 1 presents the descriptive characteristics of our estimation sample listing the top-wealth sample SOEP-P and SOEP (excl. SOEP-P) separately. Compared to SOEP (excl. SOEP-P), the top-wealth sample SOEP-P consists of more men, is older, more likely with a university degree and more likely to be working. The top-wealth sample also has significantly higher mean disposable household income and higher net wealth: disposable household income is about three times higher, net wealth is about 14 times higher.

3 Estimation strategy

Can we detect a systematic relationship between high individual wealth and economic activity in the region of the birth place? What portion/amount of net wealth is explained by economic growth in the birth region when the individual was born? To what extent to higher levels of GDP per capita in the birth region at birth translate into higher wealth in adulthood?

Following Heckman and Pinto (2015), we will conduct a mediation analysis. Our treatment is having received an inheritance or gift. Let H denote treatment assignment with $D = 1$, if an

Table 1. Sample Descriptives for SOEP and SOEP-P

	SOEP		SOEP-P	
	Mean	SD	Mean	SD
female	0.54	0.50	0.37	0.48
age	50.74	17.08	54.35	11.56
tert. education	0.32	0.47	0.59	0.49
working	0.66	0.48	0.90	0.30
disp. household income	3,489	2,768	8,634	36,185
net wealth	134,443	830,283	1,815,628	6,092,578
heirs	0.23	0.42	0.38	0.48
mean pos. inheritance	146,101	296,205	394,137	608,188

Note: Unweighted means and standard deviations for SOEP excluding the SOEP-P and SOEP-P. Tertiary education dummy is based on ISCED11 classification of at least 6.

individual is treated, and $H = 0$ otherwise. Let W_1 and W_0 be counterfactual wealth when H is fixed at 1 and 0, respectively.

Wealth W is generated through a production function whose arguments are both measured and unmeasured inputs in addition to an auxiliary set of baseline variables \mathbf{X} . Variables in \mathbf{X} are assumed not to be caused by treatment H that affects output W in either treatment state. The wealth production function for each treatment regime is

$$W_h = f_h(\theta_h^m, \theta_h^u, \mathbf{X}), h \in \{0, 1\} \quad (1)$$

where θ_h^m denotes measured inputs and θ_h^u unmeasured inputs.

The average treatment effect between treatment and control is then given by

$$ATE = E(W_1 - W_0) = E(f_1(\theta_1^m, \theta_1^u, \mathbf{X}) - f_0(\theta_0^m, \theta_0^u, \mathbf{X})) \quad (2)$$

Our input variables of interest are (1) the level of GDP per capita in the individual's birth region in birth year b , $GDP_{t=b,r}$, and (2) individual's birth-region specific growth rate between birth year b and survey year t , i.e. $g_i = \frac{GDP_{t,r}}{GDP_{t=b,r}} - 1$. Our treatment group has received an inheritance or gift. Economic growth increases business and labor income and, thereby, parents' ability to save and invest. At the same time, house prices especially increase in regions with high economic growth enriching home-owners in these regions. Hence, the birth place of the child, which is exogenous to the child, is closely connected to the possibilities to further accumulate wealth for both parents and children.

Our set of baseline variables consists of parental background variables and individual variables. Parental background variables include parents' school education coded into three categories (primary, lower, and upper secondary school completion) and parents' profession coded into five categories (no job, blue-collar worker, white-collar worker, self-employed, civil servant), which are exogenous to the individual. Individual variables include age, gender, education, migration background, and marital status.

We first analyze the role of different parental background indicators for the individuals' likelihood to belong to a particular wealth group controlling for individual variables. For this, we estimate two models of an individual's position in the wealth distribution.

The first model is based on the categorical variable of an individual's wealth position.

$$P(wc_i = j) = \frac{1}{1 + \exp(-\kappa_j + \mathbf{X}_i\beta)} - \frac{1}{1 + \exp(-\kappa_{j-1} + \mathbf{X}_i\beta)}, \quad (3)$$

where wc_i is the wealth group of individual i ranging from one (bottom 50%) to four (millionaires). \mathbf{X} is the set of baseline variables explained above. β is a vector of coefficients to be estimated, and κ are offset terms to be estimated.

The second model uses the millionaire dummy as the outcome variable.

$$P(M_i = 1) = \Phi(\mathbf{X}_i\beta), \quad (4)$$

where M_i is the millionaire dummy variable, $\Phi(\cdot)$ is Probit function, \mathbf{X} is the set of auxiliary variables explained above, and β is a vector of coefficients to be estimated.

To identify the effect of economic growth on children's wealth, we match the population of heirs to statistically equivalent non-heirs using a Mahalanobis matching procedure. We compute the Mahalanobis distance measure based on our set of baseline variables \mathbf{X} with exact matching on gender, five age groups and four German regions (North, West, South, East).

In our main analysis, we regress the wealth gap between heirs and matched non-heirs on our input variable of interest g_i assuming no variation in unmeasured inputs conditional on the treatment. Under this assumption, measured and unmeasured inputs are statistically independent and the effect of unmeasured inputs are fully summarized by the treatment indicator.

$$W_1 - W_{0,matched} = g_i + \mathbf{X}_i\beta + \epsilon_i \quad (5)$$

where $W_1 - W_{0,matched}$ denotes the wealth gap between heirs and matched non-heirs, \mathbf{X} is the set of auxiliary variables explained above, β is a vector of coefficients to be estimated and ϵ_i is the error term. We winsorize the wealth gap at the first and 99th percentile to make our results more robust to outliers.

To pin down the effect on inheritances more neatly, we regress inheritances (and gifts) received by the treatment group on our input variable of interest g_i .

$$I_1 = g_i + \mathbf{X}_i\beta + \epsilon_i \quad (6)$$

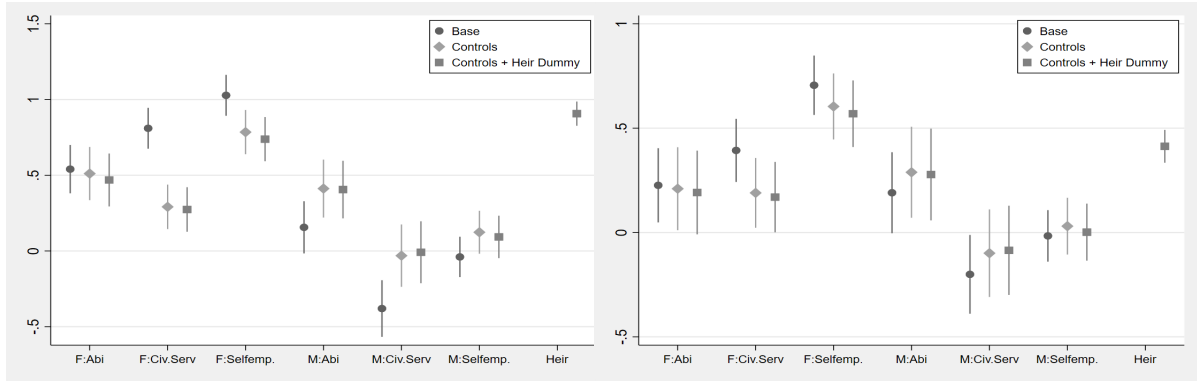
where I_1 denotes inheritances (and gifts) received by our treatment group, \mathbf{X} is the set of auxiliary variables explained above, β is a vector of coefficients to be estimated and ϵ_i is the error term.

4 The role of parental background for children's wealth

Figure 1 summarizes the results from the ordered logit regression following Eq. (A.1) (left-hand graph) and from the probit regression following Eq. (4) (right-hand graph). The first column shows the base model solely including parental variables. In the second column, we additionally control for individual variables such as a quadratic in age, gender, education, migration background, federal state, and marital status. In the third column we add an inheritance dummy to the control.

Parents' education exhibits a highly significant association with individual wealth. The same applies to father's employment status in the case of being self-employed, or a civil servant. The results are robust to the inclusion of the individual controls. In the third column we add an inheritance dummy to the control. None of the relevant results change.

For the millionaire status many of the same parental variables are relevant in the same way as they are for the ordinal logit model, however, they are not always robust to the inclusion of individual controls. After the inclusion of the heir dummy, only the dummies for the father being selfemployed (positive), and the father being a civil servant (positive) are statistically significant.



(a) Ordered Logit

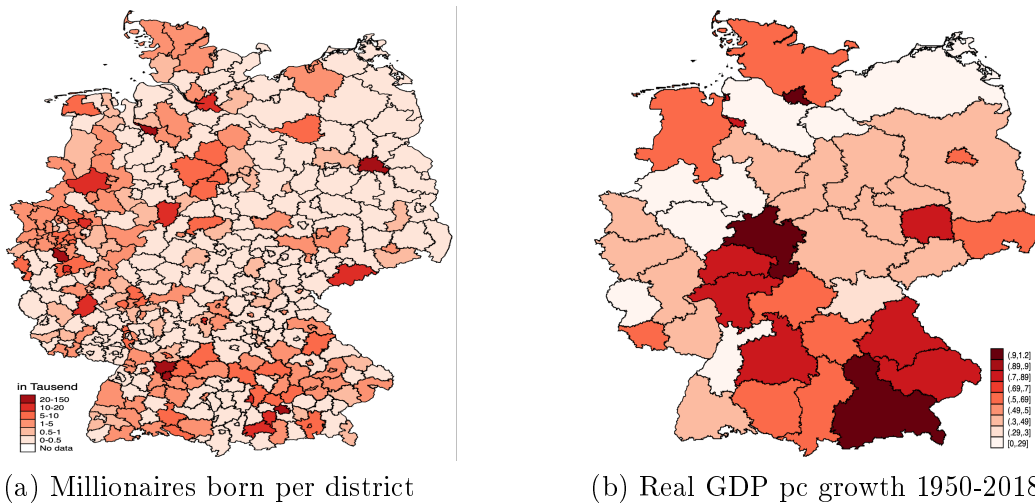
(b) Probit

Note: Selected coefficients regressing individual wealth on parental background variables and socio-demographics. Abi denotes upper secondary school completion. See Appendix Tables A.1 and A.2 for a full list of coefficients and standard errors.

Figure 1. The role of parental background variables for children's wealth

5 The impact of economic growth on individual wealth

We now investigate the contribution of economic growth to children's wealth. Figure 2 shows a map German regions highlighting geographical clustering of millionaires' birth places (left-hand graph) and accumulated GDP growth between 1950 and 2015 (right-hand graph). The area around Frankfurt in West Germany, around Munich in South Germany and Hamburg in North Germany shows both an elevated number of millionaire daughters and sons and strong economic growth throughout the post-war period.



(a) Millionaires born per district

(b) Real GDP pc growth 1950-2018

Source: SOEP-P and Rosés-Wolf Database, version 6 (2020).

Note: Panel a shows the weighted number of millionaires (according to their wealth in 2017/2018) per district. Panel b shows growth of real GDP per capita in percent. Birthplaces across 40x districts and GDP growth across 38 NUTS2-regions.

Figure 2. Millionaires' birth place and economic growth across German regions

Table 2 presents the results from our main regression analysis estimating Eqs. (5) and (6). Both the level of the birth place’s GDP per capita in the year of birth and the growth rate between the birth year and year of receiving the inheritance (or gift) show a statistically significant positive effect on the wealth gap between heirs and non-heirs. This means that initial GDP and high economic growth in children’s birth district are important determinants of wealth in adulthood. Note that, since the wealth gap contains returns to wealth earned above the bond rate that we use to capitalize inheritances, the effects we find using the wealth gap are larger.

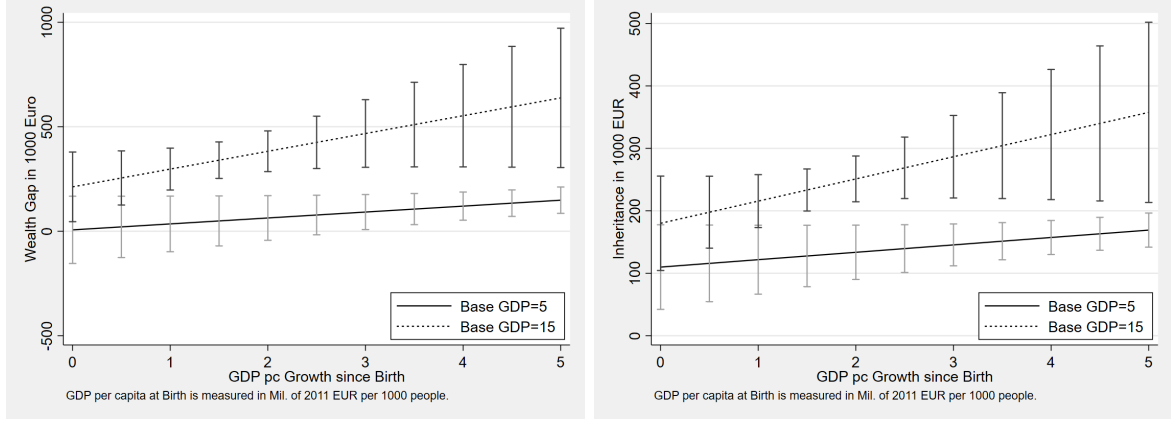
Table 2. Effect of GDP at Birth and GDP Growth on Inheritances and the Wealth Gap

	Inheritance		Wealth Gap	
	Coef	SE	Coef	SE
GDP	7.013	2.736	20.562	6.784
GDPXGrowth	2.369	1.416	5.676	3.155
P-Val of Joint Significance	0.0057		0.0026	

Note: Regressions coefficients and standard errors from OLS regressions controlling for socio-demographics and parental characteristics.

Figure 3 highlights the differential predicted effects of economic growth for children born in poor or rich districts. The right-hand graph displays results for the wealth gap between heirs and non-heirs as dependent variable. The left-hand graph displays results for inheritance as dependent variable, restricting our sample to our treatment group of heirs. The solid line shows the effect of the growth for children born in poor districts with ca. 5,000 GDP per capita (in 2011 Euros) in their birth year. The dotted line shows the effect of the growth for children born in rich districts with ca. 15,000 GDP per capita (in 2011 Euros) in their birth year. Both specifications confirm that the effect of economic growth on children’s wealth is substantial, and that it is higher if children are born in rich districts. The difference between the effects for children of rich and poor districts is significant if GDP growth rates exceed 200%, i.e. if GDP per capita tripled in their birth district since birth. The results for the wealth gap between heirs and non-heirs are likely to present an upper bound of the growth effect, because only part of the wealth gap is due to inherited wealth. The results for inheritances are likely to present a lower bound of the growth effect, because our in-time harmonization of inheritance using a common bond interest rate for all probably underestimates the size of inheritances received from parents in high-growth districts.

Figure 4 presents predictive margins of economic growth differentiating between individuals with business wealth (entrepreneurs) and others. Again, the left-hand graph displays results



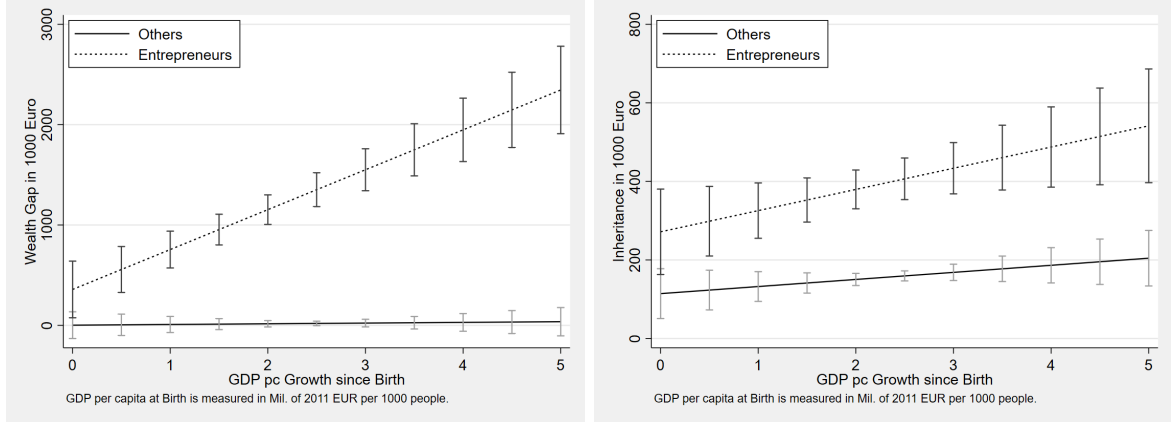
(a) Wealth gap

(b) Inheritances

Note: Panel a shows predictive margins and 95% CIs from OLS regressions of Eq. (5). Panel b shows predictive margins and 95% CIs from OLS regressions of Eq. (6). Standard errors are robust.

Figure 3. Wealth effect of economic growth by initial GDP

for the wealth gap and the right-hand graph results for inheritances. GDP growth particularly contributes to the wealth of entrepreneurs who received an inheritance. This suggests that parents of entrepreneurs (who are likely entrepreneurs themselves) benefited much more from economic growth in the region where their child was born, what they were able to pass on to their child.



(a) Wealth gap

(b) Inheritances

Note: Panel a shows predictive margins and 95% CIs from OLS regressions of Eq. (5). Panel b shows predictive margins and 95% CIs from OLS regressions of Eq. (6). Standard errors are robust.

Figure 4. Wealth effect of economic growth by wealth type

6 Conclusion

In this paper we have investigated the importance of one's place of birth and its economic trajectory for wealth later in life. We show that both parental characteristics, such as the father

being self-employed or the education of the mother, and the inheritor status are positively associated with an individual's position in the wealth distribution.

We honed in on one of the drivers of these associations: regional economic development. We constructed two measures of intergenerational wealth to tease out this effect: 1. Capitalized inheritances 2. Wealth gaps between matched heirs and non-heirs. We regressed these measures on the level and growth of regional GDP per capita at birth of the individual. The growth measure tallies the cumulative growth in the region from the year of birth to the present.

Both measures of intergenerational wealth are strongly positively affected by both of these variables. The bottom line is that, heirs coming from a region with both high initial GDP and high GDP growth have substantially higher intergenerational wealth. At an average level of GDP at birth, a one standard deviation increase in per capita GDP growth at birth increases capitalized inheritances by roughly 130,000 Euro and the wealth gap by roughly 347,000 Euro.

The hometown-GDP-wealth nexus varies greatly across the population. Heirs who are entrepreneurs, i.e. own relevant shares in private companies, are shown to be affected much more strongly by GDP growth capturing substantial wealth gains than other individuals barely capturing any effect.

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A Appendix Tables

Table A.1. Wealth Category Ologit - Parental Variables

	(1) Base	(2) With Indiv Controls	(3) Heir Dummy + Controls	(4) GDP pc at birth + Heir Dummy + Controls
Father:Low Sec.	0.465*** (0.069)	0.334*** (0.078)	0.320*** (0.077)	0.340*** (0.097)
Father:Abi	0.540*** (0.081)	0.511*** (0.090)	0.469*** (0.089)	0.534*** (0.109)
Mother:Low Sec.	0.575*** (0.070)	0.303*** (0.080)	0.303*** (0.080)	0.305*** (0.102)
Mother:Abi	0.156* (0.088)	0.412*** (0.098)	0.406*** (0.097)	0.417*** (0.121)
Father:Blue Collar	0.095* (0.056)	-0.060 (0.063)	-0.034 (0.063)	-0.004 (0.076)
Father:Selfemp	1.028*** (0.069)	0.785*** (0.074)	0.738*** (0.074)	0.814*** (0.088)
Father:White Collar	0.347*** (0.059)	0.136** (0.065)	0.143** (0.065)	0.213*** (0.077)
Father:Civ. Serv.	0.810*** (0.069)	0.291*** (0.075)	0.274*** (0.075)	0.316*** (0.089)
Mother:Blue Collar	-0.356*** (0.042)	-0.204*** (0.048)	-0.192*** (0.048)	-0.226*** (0.057)
Mother:Selfemp	-0.039 (0.068)	0.124* (0.072)	0.093 (0.071)	0.114 (0.080)
Mother:White Collar	-0.405*** (0.035)	0.030 (0.040)	0.054 (0.040)	0.068 (0.046)
Mother:Civ. Serv.	-0.380*** (0.095)	-0.031 (0.105)	-0.008 (0.104)	-0.045 (0.120)
<i>N</i>	16448	16124	16124	11923

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.2. Millionaire Probit - Parental Variables

	(1) Base	(2) With Indiv Controls	(3) Heir Dummy + Controls	(4) GDP pc at birth + Heir Dummy + Controls
Father:Low Sec.	0.096 (0.083)	0.051 (0.093)	0.040 (0.094)	-0.001 (0.103)
Father:Abi	0.226** (0.091)	0.210** (0.101)	0.192* (0.102)	0.178 (0.113)
Mother:Low Sec.	0.179** (0.087)	0.113 (0.098)	0.109 (0.099)	0.041 (0.109)
Mother:Abi	0.191* (0.099)	0.289*** (0.111)	0.278** (0.112)	0.143 (0.127)
Father:Blue Collar	-0.039 (0.070)	-0.124 (0.078)	-0.122 (0.079)	-0.043 (0.090)
Father:Selfemp	0.706*** (0.073)	0.604*** (0.081)	0.569*** (0.081)	0.615*** (0.093)
Father:White Collar	0.125* (0.071)	-0.004 (0.078)	-0.016 (0.079)	0.022 (0.090)
Father:Civ. Serv.	0.393*** (0.077)	0.190** (0.085)	0.170** (0.086)	0.204** (0.098)
Mother:Blue Collar	-0.220*** (0.057)	-0.168*** (0.063)	-0.148** (0.064)	-0.155** (0.072)
Mother:Selfemp	-0.016 (0.063)	0.030 (0.069)	0.002 (0.070)	0.021 (0.077)
Mother:White Collar	-0.097** (0.038)	0.035 (0.043)	0.056 (0.044)	0.059 (0.049)
Mother:Civ. Serv.	-0.200** (0.096)	-0.099 (0.107)	-0.085 (0.109)	-0.050 (0.126)
<i>N</i>	16242	15919	15919	11748

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$