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The Economics of Parenting

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Abstract

Parenting decisions are among the most consequential choices that people make throughout their lives. Starting with the work of pioneers such as Gary Becker, economists have used the tool set of their discipline to understand what parents do and how parents' actions affect their children. In recent years, the literature on parenting within economics has increasingly leveraged findings and concepts from related disciplines that also deal with parent–child interactions. For example, economists have developed models to understand the choice among various parenting styles that were first explored in the developmental psychology literature and have estimated detailed empirical models of children's accumulation of cognitive and noncognitive skills in response to parental and other inputs. In this review, we survey the economic literature on parenting and point out promising directions for future research.

1. INTRODUCTION

Among the distinct characteristics of humans is extraordinarily slow development. We are born helpless and then go through a prolonged phase of childhood and adolescence before reaching full maturity decades into our lives. As a consequence, young humans depend on their parents. Child rearing or parenting refers to everything that parents do to support the development of their children, from basics such as providing food and shelter to guiding their emotional and intellectual development.

In the past parenting was mostly studied in other social sciences such as sociology and developmental psychology; however, in recent years, a large literature on parenting has developed within economics. In part, this reflects the growing reach of economics, which in the case of the study of parenting goes back to Gary Becker's work on the family (see Becker 1981). However, an equally important factor is the fact that recent research shows that parenting decisions have profound economic implications. In modern economies, approximately two-thirds of total income goes to workers as wages, and most of this income reflects the return to accumulated human capital rather than raw labor. A key factor in the accumulation of human capital, in turn, is parenting decisions that start in the very first years of life and continue through a child's development to adulthood. Economists who want to study the role of human capital in economic development, determinants of social mobility, and the drivers of long-run inequality must take parenting decisions into account.

Choices that matter for parenting start long before a child is born. In the marriage market, for example, one criterion in choosing a partner is what she or he has to offer in terms of expected future investments in children. Several papers on the economics of marriage analyze how future parenting plans affect premarital investments and the matching patterns in the marriage market (see, for example, Chiappori et al. 2017). In turn, these choices influence the parenting choices that take place after a relationship is formed. Even more directly, the choice of how to raise each individual child is closely linked to the choice of how many children to have in the first place. One of the central concepts in the economics of fertility is Becker's quantity–quality trade-off, i.e., the notion that a larger number of children (quantity) tends to lower investment in each individual child (quality).[1] This trade-off is inevitable, particularly in regard to parents' time: For parents with many children, it is simply not possible to spend hours of one-on-one time each day with each individual child, whereas parents of only children have more flexibility. Fertility and other parenting decisions are therefore closely linked.

Nevertheless, in this review, we focus more narrowly on child-rearing decisions that take place after parents have formed a relationship and have had a child. In part, this is because the study of the economics of marriage and fertility has a longer history, and many surveys are available.[2] Moreover, to date, the literatures on marriage, fertility, and narrowly defined parenting have mostly developed in isolation, with a lack of research that considers, say, a joint decision involving how many children to have and with which parenting style to raise them. We believe considering interactions among different choices that affect child rearing to be an important direction for future research, and we discuss some specific issues (such as the role of single parenting) at the end of the review.

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[1] Becker (1960) provides the initial statement of the quantity–quality tradeoff, and Doepke (2015) provides an overview of the role of this concept in the economics of fertility.

[2] For an overview of the economics of marriage and the family and some recent directions in this literature, the reader is referred to Browning et al. (2014), Lundberg & Pollak (2007), and Lundberg et al. (2016). Surveys with a focus on the macroeconomic implications of family decisions are provided by Doepke & Tertilt (2016) and Greenwood et al. (2017). For the economics of fertility, the reader is referred to, for example, Hotz et al. (1997) and Doepke & Zilibotti (2019, chapter 7).

We develop our discussion of the economic literature on post-birth parenting around three main themes. First, we focus on the choice of a parenting style. The term parenting style stems from developmental psychology and refers to the broad strategies that parents follow in raising their children, such as an obedience-based authoritarian style versus permissive parenting that grants more independence to children. We describe how the economics of parenting can be used to derive predictions on how economic conditions affect the choice of parenting style, and we point to empirical evidence suggesting that variation in parenting practices over time and across space lines up well with these predictions.

Second, we focus on technology, and in particular on the production function allowing children to acquire and accumulate skills. Some of the issues discussed in the underlying literature are the relative importance of parental and other inputs, the effect of early versus late inputs as children develop, and the complementarity among inputs over time and across different types of inputs.

Third, we focus on the effects of the environment. It has long been recognized that peer effects count for a lot in child development, especially during adolescence. This suggests that parents' impact on their children may work in large part through their influence on their children's environment, rather than through their direct interactions with them. For example, parents choose the neighborhood in which a family lives and the schools that their children attend. We discuss how these choices can be framed as an integral part of the economics of parenting.

We organize our discussion by presenting a general model that captures the main aspects of the economics of parenting. We model the decision problem of parents who care about their own utility and the welfare of their children. Following the work of Doepke & Zilibotti (2017), the concern for children allows for both altruism (parents care about their children's utility) and paternalism (parents care about their children's actions in ways that potentially conflict with the children's own preferences). Parents face a set of constraints that include not only standard budget and time constraints, but also technological constraints. For example, there is a production function that specifies how children's skills and attitudes evolve as a function of endowments and parental inputs. The framework also allows for environmental influences outside the immediate family, such as peer effects in schools and neighborhood effects, to affect child development.

Using this general framework, we discuss the economic literature on the three main issues outlined above, and we relate theoretical results to empirical evidence. Much of the literature on the economics of parenting is recent; the research frontier is constantly evolving, and many new questions raised by current research are yet to be addressed. We therefore conclude by outlining a few areas for future research on the economics of parenting that we consider particularly promising.

In Section 2, we present our economic model of parenting. In Section 3, we use this model to discuss the economics of choosing a parenting style and compare the predictions of the theory to data. In Section 4, we relate the recent literature on children's skill acquisition to our model of parenting. Neighborhood and peer effects are discussed in Section 5. Conclusions and directions for future research are discussed in Section 6.

2. AN ECONOMIC MODEL OF PARENTING

In this section, we outline a general economic model of parenting that we use below to discuss parenting styles, skill formation, and neighborhood and peer effects. What we mean by economic model is that we conceive of parenting decisions in the same way that economists conceive of any other decision: Parents pursue particular objectives that are summarized by a utility function; they act rationally and purposefully in pursuing these objectives; and they are subject to various constraints such as limits to their financial resources, their knowledge, their time, and the underlying technology of child development. Given that much of parenting is about parent–child interactions, the model also allows for children to have a say and take actions on their own. The main

elements of the model are a combination of work on parenting style by Doepke & Zilibotti (2017) with the notion of a multistage production function for skills, as in James Heckman's recent work with different coauthors (e.g., Cunha & Heckman 2007, Cunha et al. 2010).

In the model, we limit attention to a single parent and a single child. We start with the parent's objectives. The parent derives utility during two periods of adulthood, and also cares about the child. The value function that the parent seeks to maximize is given by

$$V = U_1(C_1, L_1|A) + U_2(C_2, L_2|A) + Z[(1 - \gamma)v + \gamma\tilde{v}].$$ 1.

We use the convention that upper-case variables refer to the parent, and lower-case variables to the child. Accordingly, C_t and L_t are the parent's consumption and leisure in period t, and A is a vector of preference parameters for the parent. The overall weight that the parent attaches to the welfare of the child is given by the parameter $Z > 0$. The parent derives utility from the child in two different ways. First, she cares about the child's actual lifetime utility v, i.e., the parent displays altruism, as in Gary Becker's work on dynastic utility (e.g., Becker & Barro 1988, Barro & Becker 1989). Second, we also allow for the possibility that the parent may evaluate the welfare of the child through a different function $\tilde{v}$ that does not coincide with the true utility of the child. This feature captures paternalism, i.e., a utility derived from the child's choices and outcomes that reflects the parent's own distinct views on what is good for the child. Paternalistic preferences (and the related concept of imperfect empathy) play a central role in the economic literature on cultural transmission.[3] The parameter γ measures the relative importance of altruism versus paternalism in the parent's preferences. We abstract from uncertainty during the two periods of adulthood, but the setup allows for shocks that affect the child before she reaches adulthood. The utility derived from the child is therefore an expected utility.

The value function that the child seeks to maximize (and that enters into the parent's altruistic utility) is

$$v = u_1(c_1, l_1|a_1) + u_2(c_2, l_2|a_2) + zV'.$$ 2.

In this case, c_t and l_t are the consumption and leisure of the child; a_t is the child's preference vector at age t; and V' is the expected continuation utility of the child after reaching adulthood, which, in a dynastic model, would be of the form in Equation 1. Unlike the parent's preferences A, the child's preferences a_t evolve during childhood, which captures the gradual formation of attitudes and noncognitive skills such as patience and perseverance. Leisure l_t can be a vector of different activities from which the child derives enjoyment. The parameter $z \in (0, 1)$ denotes the weight that the child attaches to future adult utility.

The parent's paternalistic concern about the child $\tilde{v}$ is given by

$$\tilde{v} = \tilde{u}_1(c_1, l_1|A) + \tilde{u}_2(c_2, l_2|A) + zV';$$

that is, the parent's paternalistic utility is defined over the same objects as the child's actual utility but with a potentially different functional form for utility that may depend on the parent's preferences A.

The key implication of the paternalistic component in preferences is that the parent may disagree with the actions of the child; this scope for disagreement turns out to play a central role in the economics of parenting. In particular, parenting styles relate to how the disagreement between parent and child is resolved. Our representation is rather general and can capture different

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[3] Bisin & Verdier (2001) provide a seminal contribution to this literature; Bisin & Verdier (2011) provide a survey.

sources of disagreement, ranging from different views regarding risk aversion or work ethic to the consumption of particular goods such as alcohol and cigarettes.

A particularly common source of disagreement between parents and children (which we focus on below) stems from time preferences: The parent may wish the child to focus more on long-run success rather than instant gratification. More formally, the parent (in the paternalistic utility $\tilde{v}$) places relatively more weight on the child's future utility V' (compared to the young-age utility) than does the child in her own utility function v. Notice that, even though the same discount factor z appears in $\tilde{v}$ and v, our setup still incorporates the possibility of disagreement about intertemporal trade-offs through the dependence of the utility functions $u_t(\cdot)$ and $\tilde{u}_t(\cdot)$ on the preferences A and a of the parent and the child. As a specific example, we can capture such a difference in patience by setting the utility of the child to

$$v = a_1 u(c_1, l_1) + a_2 \beta u(c_2, l_2) + \beta^2 V', \qquad\qquad 3.$$

whereas the paternalistic preference of the parent is given by

$$\tilde{v} = u(c_1, l_1) + \beta u(c_2, l_2) + \beta^2 V', \qquad\qquad 4.$$

where we define $\beta \equiv \sqrt{z}$. In this case, β is the parent's discount factor, whereas the child's (scalar) preference parameters $a_1 \geq 1$ and $a_2 \geq 1$ capture additional weight that the child places on experiences early in life relative to the later-in-life expected utility V'.[4]

Next, we turn to choices and constraints. The parent's choices at time t include her own consumption C_t, the child's consumption c_t, her own leisure L_t, and her own labor supply N_t. We are particularly interested in parenting choices, i.e., choices aimed at affecting the development of the child. The parent's investment in the child's development is represented by a vector I_t, where

$$I_t = \{X_t, E_t\}.$$

In this case, X_t is a time investment in child rearing, and E_t is a monetary investment (expense) in child rearing. The parent can also affect the influence of peers on the child's development by choosing the district of residence d_t where the family lives. Finally, the parent can determine the choice set $\mathcal{X}_t$ for the child, which determines how much freedom of choice the child has.

The parent is constrained by an intertemporal budget constraint,

$$C_1 + c_1 + E_1 + q(d_1) + \frac{1}{R}\left[C_2 + c_2 + E_2 + q(d_2)\right] = w_1(S)N_1 + \frac{1}{R}w_2(S)N_2, \qquad 5.$$

and by a time constraint,

$$L_t + N_t + X_t = 1.$$

Here, R is the gross interest rate, S is the skill vector of the parent, $w_t(S)$ is the wage, and $q(d_t)$ is the rental cost of living in neighborhood d_t. Neighborhoods may differ for exogenous reasons, such as the quality of public schools. There may also be peer externalities, namely, the quality of neighborhood is a function of the average skills of the residents. If households cannot borrow, then the intertemporal budget constraint is replaced by two sequential constraints.

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[4]These utilities can be mapped into Equations 1 and 2 by setting $u_1(c_1, l_1|a_1) = a_1 u(c_1, l_1)$, $u_2(c_2, l_2|a_2) = a_2 \beta u(c_2, l_2)$, $\tilde{u}_1(c_1, l_1|A) = u(c_1, l_1)$, and $\tilde{u}_2(c_1, l_1|A) = \beta u(c_2, l_2)$. In Section 3.2, we focus on the case where $a_2 = a > 1$ and $a_1 = a^2$. This case yields a constant intertemporal trade-off, where the child's discount factor β/a is smaller than the adult discount factor β. In this case, we can write $v = a^2\left[u(c_1, l_1) + bu(c_2, l_2) + b^2 V'\right]$ and $\tilde{v} = u(c_1, l_1) + \beta u(c_2, l_2) + \beta^2 V'$, where $b = \beta/a < \beta$.

The child's choices are leisure l_t and a vector of own investment in skills x_t. The choices of the child are constrained by the choice set imposed by the parent:

$$\{l_t, x_t\} \in \mathcal{X}_t.$$

The choice set reflects time constraints as well as additional restrictions potentially imposed by the parent. In turn, the parent's choice of $\mathcal{X}_t$ has to respect technological constraints, i.e., there is a set of feasible choice sets $\mathbb{X}_t$, and the parent must satisfy $\mathcal{X}_t \in \mathbb{X}_t$. The feasible set $\mathbb{X}_t$ may in turn depend on the investments I_t, capturing the idea that restricting or expanding the child's choice may be costly (e.g., time spent monitoring the child). For example, the parent may spend effort to force the child to study more for school and to spend less time playing video games, or the parent may force the child to adopt a particular occupation (e.g., accountant instead of circus performer). Conversely, the parent may expose the child to role models or activities that broaden the range of actions among which the child can choose.[5]

The final set of constraints for both parent and child concerns the technology of skill accumulation. The child's skills consist of cognitive skills b_t and noncognitive skills (e.g., preferences, attitudes, and values) a_t. Let $s_t = \{b_t, a_t\}$ denote the entire skill vector of the child. Let s_1 denote the initial skill vector of the child. In the first period of childhood, the child's skills evolve as a function of initial conditions, the parent's investment, the environment, and the child's effort x_1:

$$s_2 = f_1(S, s_1, I_1, d_1, x_1). \qquad 6.$$

In the second period (adolescence), we have

$$S' = f_2(S, s_2, I_2, d_2, x_2), \qquad 7.$$

where $S' = \{H', A'\}$ is the child's skill vector at the beginning of adulthood, which in turn determines the child's utility as an adult V'.

We now have all the pieces in place to discuss the three specific elements of the economics of parenting outlined in the introduction (Section 1). In Section 3, we focus on parenting style, which relates to how the disagreement between parent and child is resolved. In Section 4, we deal with the technology of skill formation, which relates to the specific properties of the technology in Equations 6 and 7 and how these properties interact with other aspects of parenting. The role of the choice of a neighborhood d_t in parenting is analyzed in Section 5.

3. THE ECONOMICS OF PARENTING STYLE

The framework outlined in Section 2 can shed light on a variety of aspects of parent–child interactions. In developmental psychology, starting with the seminal work of Baumrind (1967), the concept of parenting style takes a central place in categorizing types of parenting. For us, the choice of parenting style describes the extent to which parents interfere with their children's own inclinations and how they go about getting children to conform to their own wishes.

3.1. Parenting Styles in the General Model

In the general framework above, consider the child's choices x_t in period $t = 1, 2$, which may include actions such as effort put into studying for school, but also other choices with potential

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[5]The parent's control over the child's choice set relates our model to Bandura's (1986) social cognitive theory. According to this theory, children learn from role models to which they are exposed. Saez Marti (2018) incorporates this notion into an economic model of cultural transmission through endogenous parental influence.

long-run consequences, such as drinking alcohol, having unprotected sex, and similar risky behaviors. In the analysis of Doepke & Zilibotti (2017), parenting styles come down to whether, and how, parents interfere with the child's choice. If the child can choose x_t freely, then she will do this with the objective of maximizing her own utility in Equation 2. How will the parent feel about this choice? If the parent is purely altruistic (i.e., if $\gamma = 0$, so that only the altruistic component enters Equation 1), then the parent will necessarily agree. Such a parent simply wants the child to be happy and thus approves of anything that contributes to the child's happiness. However, if the parent is at least somewhat paternalistic ($\gamma > 0$), then there may be disagreement. For example, if the parent places relatively more weight on the child's future relative to the enjoyment of the present, then the parent will wish the child to put more effort into education than what the child would choose of her own accord. Similarly, if the parent's paternalistic preferences incorporate more risk aversion than the child's own utility, the parent may wish the child to stay away from certain risk-taking activities that the child would like to engage in.

The three traditional parenting styles in developmental psychology can be understood as archetypes of resolutions of this conflict between parent and child.[6] The permissive parenting style is one where the parent lets the child have her way and refrains from interfering in the choices x_t. The authoritarian style is one where the parent imposes her will through coercion. In the model above, coercion (i.e., authoritarian parenting) is captured through the notion of restricting the choice set $\mathcal{X}_t$. An authoritarian parent chooses a small set $\mathcal{X}_t$ that leaves little or no leeway to the child. The third parenting style, authoritative parenting, is also one where the parent aims to affect the child's choice. However, rather than using coercion, an authoritative parent uses persuasion: She shapes the child's preferences a_2 through investments I_1 in the first period of life. For example, such a parent may preach the virtues of patience or the dangers of risk when the child is little, so that the child ends up with more adult-like preferences when the child's own decisions matter during adolescence.

What determines the trade-off among these parenting styles? All parenting styles come with costs and benefits. Permissive parenting maximizes the utility of the child, but the child may end up making choices that go against the paternalistic drive of the parent. An authoritarian parent directly influences the child's choice, but this lowers the happiness of the child and may have other repercussions, particularly if there are economic benefits (in terms of the child's future expected utility) to making independent decisions. An authoritative parent also influences the child's choice, but this parenting style requires costly effort on the part of the parent and may also reduce the child's welfare. How these trade-offs are resolved depends in part on the level of paternalism γ. More importantly, for a given level of paternalism, what matters are the economic conditions that shape the impact that a given decision will have on the child's future.

3.2. The Impact of Economic Conditions on Parenting Style

We illustrate the interaction between economic conditions and parenting styles with a specialized version of the model in Section 2 in which the dimension of child preferences that parents aim to influence is patience.[7] Patience is a natural starting point for a theory of parent–child transmission of preferences, both because disagreement about how to weigh immediate gratification versus future payoffs is a particularly salient aspect of parent–child interactions and because patience

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[6]Neglecting parenting is sometimes considered to be a fourth parenting style. We abstract from this parenting style in this review (for a discussion, see Doepke & Zilibotti 2017).

[7]Models of endogenous patience were first applied by Becker & Mulligan (1997) and Doepke & Zilibotti (2005, 2008).

matters for future-oriented investments such as education.[8] The stylized model is based on the work of Doepke & Zilibotti (2017) and Agostinelli et al. (2019). The model is stripped down to the essential elements needed to bring out the main trade-offs involved in choosing a parenting style. We abstract from goods consumption and labor supply. For the parent, the period utility function is linear in leisure, given by $L_1 = 1 - X_1$, where X_1 is parenting effort. There is no parenting effort in the second period, so that (ignoring constants) the utility in Equation 1 takes the form

$$-X_1 + Z\left[(1 - \gamma)v + \gamma\tilde{v}\right].$$

For the child, we abstract from utility during the first (early childhood) period. During the second (adolescence) period, the child gets linear utility from leisure l_2, which depends on the child's vector x_2 of education investments. There is disagreement about the intertemporal trade-off between the child and the paternalistic parent, as in Equations 3 and 4. Given that utility is only derived in the second period, we can rewrite Equations 3 and 4 as

$$v = a_2 l_2 + \beta V', \qquad \qquad 8.$$

$$\tilde{v} = l_2 + \beta V', \qquad \qquad 9.$$

where $a_2 \geq 1$ is the extent to which the child places more weight on fun in the present versus welfare in the future.

Next, we turn to the technology of skill formation. In the first period, the technology in Equation 6 for the accumulation of the skill vector $s_2 = \{h_2, a_2\}$ takes the form

$$h_2 = f_{h,1}(S, d_1),$$

$$a_2 = f_{a,1}(S, X_1, d_1).$$

That is, the child's cognitive skills in adolescence h_2 evolve passively depending on endowments (represented by the parent's skill vector S) and the environment (represented by the neighborhood quality d_1, taken as fixed in this case). We abstract from investment in cognitive skills by both the parent and the child at this stage. Instead, parental involvement is crucial for the acquisition of noncognitive skills, represented in this case by the child's preference parameter a_2. In addition to S and d_1, this parameter depends on the parent's time investment X_1. Intuitively, increasing the child's patience (in this case, by lowering the enjoyment of the present a_2) requires a socialization effort that is costly in terms of time. In the first period, the parent also chooses the choice set $\mathcal{X}_2$ that constrains the child's choice in the second period.

In the second period (adolescence), adult skills are formed. At this stage, parents make no further direct investment, and the ball is in the child's court. The child is now called on to make decisions x_2 in two dimensions: the choice of an occupation k and an investment in human capital $x_{h,2}$, i.e., $x_2 = \{k, x_{h,2}\}$. The acquisition of adult skills $S' = H'$ hinges on $x_{h,2}$ and the values and skills that the child has acquired in the early period:

$$H' = f_{h,2}(S, h_2, d_2, x_{h,2}).$$

In this case, H' is strictly increasing in the educational effort $x_{h,2}$.

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[8]Figlio et al. (2016), Heckman et al. (2006), and Sutter et al. (2013) provide evidence at the micro level, and Dohmen et al. (2018) provide a country-level analysis of the relationship between patience and development. Doepke & Zilibotti (2017) also consider the transmission of risk preferences, which have been shown by Dohmen et al. (2012) to be strongly correlated between parents and children. Zumbuehl et al. (2013) find that risk attitudes are particularly correlated between parent and child when parents invest a lot in child-rearing effort, which is consistent with the general model of parenting described in this review.

The occupations k differ in the relative importance of talent and effort. Specifically, each occupation k is defined by a triplet $\{\bar{x}_k, \bar{w}_k, \psi_k\}$ determining the time $\bar{x}_k$ required to learn the basics of the occupation, the basic wage $\bar{w}_k$ in the occupation, and the return ψ_k to human capital H'. The potential income that a child would realize in occupation k is given by

$$\xi_k \left\{ \bar{w}_k + \left[\psi_k H' w_H + (1 - \psi_k H') w_L \right] \right\},$$

where ξ_k is an independent and identically distributed individual talent shock capturing a Roy-model-type comparative advantage at different occupations with unit mean and finite variance, and $w_L > 0$ and $w_H > w_L$ capture the overall return to education. The talent shock is realized in the second (adolescence) period, before the child decides on x_2 (so that the child does not face uncertainty) but after the parent's choice of X_1 and $\mathcal{X}_2$ in the first period.

The setup captures the idea that, in some occupations, success hinges primarily on the child's talent and intrinsic motivation (e.g., becoming an artist or an elite sports player) and thus on her choosing something that she is good at. Such occupations are characterized by a high variance of the talent shock ξ_k across individuals but a low return ψ_k to formal education. In other occupations, such as becoming an engineer or a business manager, cognitive human capital, and thus success in education, is more important. In such occupations, the talent shock ξ_k has little variance or may even be constant, and the basic wage $\bar{w}_k$ is low, but the return to educational effort ψ_k is high. Professions also differ in how difficult it is to learn the basics; children may find it more pleasant to train to become an actor (low $\bar{x}_k$) than to study math or economics (high $\bar{x}_k$). Overall inequality is captured by $w_L > 0$ and $w_H > w_L$: When the gap between w_H and w_L is small, both inequality and the return to education are low.

The child chooses the vector x_2 (i.e., the occupation k and educational effort $x_{b,2}$) so as to maximize her own utility in Equation 8:

$$\max_{x_2 \in \mathcal{X}_2} a_2 \left[1 - (x_{b,2} + \bar{x}_k) \right] + zV',$$

where

$$V' = \xi_k \left\{ \bar{w}_k + \left[\psi_k H' w_H + (1 - \psi_k H') w_L \right] \right\};$$

recall that

$$H' = f_{b,2} \left(S, b_2, d_2, x_{b,2} \right).$$

Consider how economic conditions affect the choice of parenting style. The basic parent–child conflict underlying this choice is that the parent attaches a higher weight to the future utility V' of the child. As a result, the parent would like the child to exert a greater educational effort $x_{b,2}$ than the child would do on her own accord. While Doepke & Zilibotti (2017) allow for intensive margins in parenting (e.g., parents can be more or less authoritative and more or less authoritarian), in this section, we simplify the analysis by restricting parents to a discrete choice between the three parenting styles: permissive (PE), authoritative (AV), and authoritarian (AR). Each parenting style $P \in \{PE, AV, AR\}$ comes with a specific effort cost X_P for the parent.

The permissive parent PE does not interfere with the child's preferences, so that $a_2 > 1$ and the child gets full enjoyment of adolescence, and also does not restrict the choice of occupation. In principle, a permissive parent might even spend effort to expand the children's choice set, for example, by offering more opportunities for entertainment. However, we abstract from this possibility and set the effort cost of permissive parenting to zero, $X_{\mathrm{PE}} = 0$.

The authoritative parent AV does not restrict the child's choice set but molds her preferences. Specifically, this parent socializes the child into adult-like preferences, $a_2 = 1$. This indoctrination reduces the child's enjoyment of adolescence while inducing her to make more forward-looking choices x_2, to the extent that the child ends up choosing just what her parent would like her to. Indoctrinating the child requires effort $X_{AV}(S, d_1) > 0$, which is decreasing in both the skill of the parent and the quality of the neighborhood. This assumption reflects the idea that better-educated parents possess superior soft skills to persuade their children (e.g., they use more convincing arguments to convince them that working for school is a good idea). In addition, the parental effort can be reinforced by a positive neighborhood culture, including good teachers and peers who share work-oriented values.

Finally, the authoritarian parent AR forces the child into a particular occupation (i.e., the choice set $\mathcal{X}_2$ given to the child only includes the occupation k preferred by the parent). Authoritarian parents also impose control on the child's effort choice $x_{b,2}$. Imposing these restrictions requires costly monitoring on the part of the parent, which is captured by a positive effort cost $X_{AR} > 0$. Depending on the parent's skill and the neighborhood, X_{AR} may be larger or smaller than the cost of the authoritative style $X_{AV}(S, d_1)$. Unlike authoritative parents, authoritarian parents do not change their children's preferences. For them, the problem is not what children think but what they do. Therefore, they force them to do as parents like rather than attempting to persuade them of the validity of the adult standpoint. A downside of the authoritarian style is that the parent locks the child into a particular occupation before the child's occupation-specific talent shock is realized.

As an example of this kind of authoritarian parenting, Doepke & Zilibotti (2017) discuss a setting in which parents force their children to stay at home and work in the family business instead of allowing them to move to the city and study. Doepke & Zilibotti (2019) discuss other forms of control over the process of skill formation. For instance, a young child wishing to become a professional soccer player may be denied the opportunity to practice that sport at an early age. Conversely, a child may be forced to play piano or tennis for many hours so as to induce specialization to an extent that it delimits the choice set of the child when she grows up.

Table 1 summarizes the features of the three parenting styles. We can assess how economic conditions affect the choice between them. Consider, first, a low-inequality society, where the gap between w_H and w_L is small. In such a society, there is limited incentive for children to put effort $x_{b,2}$ into education. Parents are also less concerned about children's effort, and thus there is little scope for disagreement between parents and children. Therefore, most parents adopt a permissive parenting style, namely, they keep young children happy and foster their sense of independence so that they can discover what they are good at in their adult life. There may still be a small fraction of highly paternalistic parents (high γ) who want to influence their children's occupational choice. Among them, those with low skills S will be authoritarian, i.e., resort to restrictions on the choice set. The downside of this parenting strategy is that it prevents children from learning professions in which they have a strong comparative advantage ex post. For instance, talented painters may become not-so-well-paid engineers. Highly paternalistic parents with high skills S will instead be authoritative.

Table 1 Three parenting styles

Parenting style	Indoctrinate child?	Restrict child's choice?	Cost to parent
Permissive	No ($a_2 > 1$)	No	0
Authoritarian	No ($a_2 > 1$)	Yes	$X_{AR} > 0$
Authoritative	Yes ($a_2 = 1$)	No	$X_{AV}(S, d_1) > 0$

Consider, next, a high-inequality society. There, the disagreement between parents and children is more salient because parents would like to see their children work hard in school and choose professions with a high return to human capital. In this society, a larger share of parents will be authoritative, and fewer will be permissive. Moreover, because of the comparative advantage of rich and educated parents in authoritative parenting, there will be a stronger socioeconomic sorting into parenting styles. Since an authoritative parenting style is conducive to more economic success, this sorting will hamper social mobility.

While inequality drives the choice margin between permissive and authoritative parenting style, other factors determine the appeal of authoritarian parenting. Doepke & Zilibotti (2017) discuss the role of the return to incumbency. In traditional societies, most children adopt their parents' profession and learn the necessary skills inside the family. Thus, parents have little incentive to be permissive to let children discover what they are good at. Nor do they need to spend effort in socializing children into adult-like values (i.e., to be authoritative), since they can achieve the same result by simply monitoring them. As the economy develops, occupational mobility grows, the return to incumbency falls, and the appeal of authoritative parenting declines.

In our model, we can parameterize the value of independence by the variance of the talent shock ξ_k. When this variance is low, the opportunity cost of authoritarian parenting is small. As the variance of ξ_k increases, so does the value of letting children discover their talent. Thus, fewer and fewer parents will be authoritarian and restrict their children's occupational choice.

3.3. Empirical Evidence on Economic Conditions and Parenting Styles

The discussion in Section 3.2 generates several testable predictions. Doepke & Zilibotti (2019) show that, in many industrialized countries, the trend of rising income inequality over recent decades has been accompanied by more intensive (authoritarian or authoritative) parenting, while permissive parenting has declined. Evidence from the Multinational Time Use Study shows that, in all countries for which a sufficient number of observations is available (Canada, Italy, the Netherlands, Spain, the United Kingdom, and the United States), time diaries display a significant increase in the time that parents spend with their children over the past few decades. For the United States and the Netherlands, we have long time series, which makes these two cases especially informative. In both countries, college-educated parents have increased the time spent on child care much more than have high-school graduates. In the 1970s, low- and high-educated parents in the United States spent approximately the same amount of time on child care. Today, there is a gap of more than three hours per week between more and less educated parents. Ramey & Ramey (2010), who were the first to note this diverging behavior, suggest that this trend is explained by increased competition for admission to top colleges.

A large share of the increase in child care time is related to educational activities. In 1976, US couples spent an average of two hours a week on playing with, reading to, and talking to their children and approximately 17 minutes a week on helping them with homework. In 2012, the average went up to six and a half hours a week for playing, reading, and talking to children and more than 1.5 hours for helping them with homework. Overall, US parents now spend 3.5 times more time on these education-related child care activities. This shift to more intensive and less permissive parenting styles is reflected in children's experiences. The percentage of kids walking or biking alone to school fell from 41% in 1969 to 13% in 2001. Among 6-to-8-year-old US children, unsupervised play time decreased by 25% between 1981 and 1997, whereas time spent on homework more than doubled. This is consistent with parents pushing children toward academic achievement.

This rise in child care time is associated with the widely discussed phenomenon of helicopter parenting, i.e., the trend (especially pronounced among the upper and middle classes) toward an

increasingly intrusive and protecting parenting style, with a mix of authoritarian and authoritative elements. Below, we relate these trends to changing macroeconomic conditions in areas such as income inequality, the return to education, and redistributive policies, following the investigation of Doepke & Zilibotti (2017, 2019).

First, we document that parents are less permissive (and, especially, more authoritative) in countries with higher inequality across Organisation for Economic Co-operation and Development (OECD) countries.[9] We use information from the World Value Survey (WVS), in which people are asked to select five values (out of a list of ten) that children should be encouraged to learn at home.[10] To simplify the discussion of the evidence, we use a binary classification of parenting styles. We classify as intensive parents who single out either obedience (a value typically associated with an authoritarian parenting style) or hard work (which is associated with an authoritative parenting style). We classify as relaxed those who mention either independence or imagination and neither obedience nor hard work. Intensive parenting corresponds to a combination of authoritarian and authoritative methods, and relaxed parenting corresponds to permissive methods.[11] This classification covers 91% of a sample of 66,632 respondents from OECD countries. Among them, 63% are classified as intensive, and 37% are classified as relaxed. We exclude from the analysis the 9% of respondents who remain unclassified because they do not mention any of the four above-mentioned values.

We study the correlation between intensive parenting and measures of pretax earnings inequality and government-mandated redistribution. In particular, we use (*a*) the 90th-to-10th percentile ratio in the pretax earnings of full-time dependent employees, (*b*) the return to tertiary education (Montenegro & Patrinos 2014), (*c*) a measure of tax progressivity that captures the marginal rate progression up to an income level equivalent to four times a country's per-capita GDP (Andrew Young School Policy Stud. 2010), and (*d*) a measure of aggregate social expenditure as a percentage of GDP from the OECD Social Expenditure Database.[12]

Figure 1 plots the results for Wave 5 of the WVS, which was carried out in 2005 and has the largest number of countries. As predicted by the theory, the share of intensive parents increases with pretax inequality and the return to education and decreases with the extent of redistribution through tax progressivity and social expenditure. For instance, 79% of US respondents are classified as intensive—and the United States has both high earnings inequality and a high return to education and low tax progressivity and social expenditure. Among the US respondents, 49% are authoritative, and 30% are authoritarian in the classification of Doepke & Zilibotti (2017). In contrast, only 26% of the Swedes are intensive parents, whereas 74% are relaxed—and Sweden has low inequality and high redistribution. Countries with moderate inequality, such as Germany and Japan, fall in between. The overall pattern conforms well with the prediction of the theory for all measures of inequality.

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[9]The sample includes all countries with available data that were OECD members as of 1994: Australia, Canada, Finland, France, Germany, Italy, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. The cross-country pattern is robust if we include the nine countries with available data that became OECD members after 1994 (Chile, the Czech Republic, Estonia, Hungary, Israel, Korea, Mexico, Poland, and Slovenia).

[10]The question is worded as follows: "Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five!" The values among which parents can choose are independence, hard work, feeling of responsibility, imagination, tolerance and respect for others, thrift and saving money, determination and perseverance, religious faith, unselfishness, and obedience.

[11]Doepke & Zilibotti (2017) show that the results are robust to other classifications, such as defining as authoritative all nonauthoritarian parents who mention either hard work or determination and perseverance among the top five values.

[12]Note that the third and fourth measures are inverse measures of inequality.
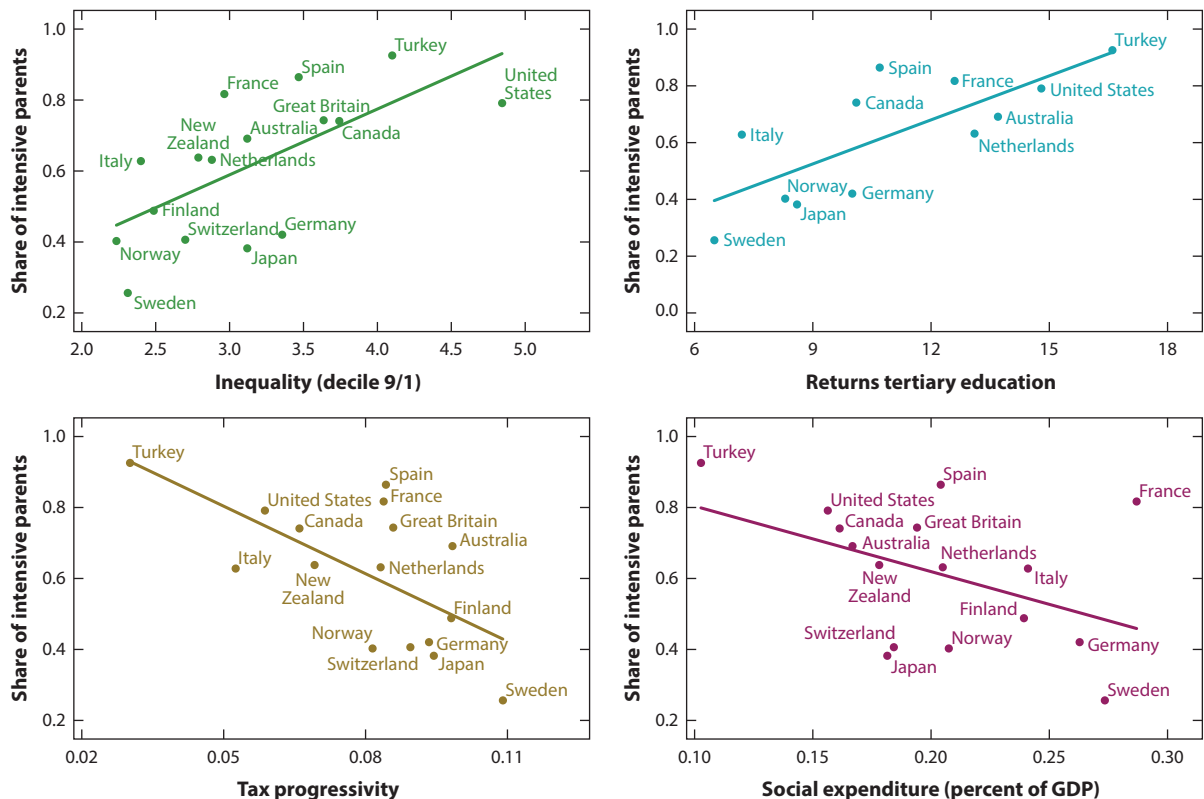
Figure 1

Inequality, redistribution, and intensive parenting across countries.

The cross-country results still leave open the possibility that parenting styles are mostly due to some unchanging local tradition, and that the correlation with inequality is due to omitted variables. It is therefore important to verify the results using changes in inequality and parenting styles within countries over time. In this section, we focus on changes in pretax earnings inequality, for which we have information at a higher frequency. We expect that intensive parenting increases in countries where inequality increases and decreases in countries that become less unequal.

To examine this prediction, we perform regression analysis based on individual data. We estimate the following equation:

$$\text{INT\_PAR}_{ict} = \alpha_c + \alpha_t + \beta \cdot \text{INEQ}_{ct} + X'_{ict} \cdot \gamma + \varepsilon_{ict},$$

where i, c, and t stand for individual, country, and time (wave). The dependent variable INT_PAR is an indicator for parenting style, where INT_PAR $= 1$ means that the parent is intensive, whereas INT_PAR $= 0$ means that the parent is relaxed. Among the right-hand side variables, α_c is a country fixed effect, α_t is a wave fixed effect, INEQ_{ct} is a time-varying measure of inequality (the 90–10 earnings ratio), X is a vector of individual and country characteristics including gender, age, age squared, and the (log of) GDP, and ε is an error term.

We estimate a logistic regression on 45,482 individual observations. **Table 2** displays the estimates for β, expressed as odds ratios. All regressions include wave fixed effects with standard errors clustered at the country level. Column 1 displays the basic specification. Column 2 adds

Table 2   Inequality, redistribution, and parenting styles

	(1) Logit intensive	(2) Logit intensive	(3) Logit intensive	(4) Logit intensive	(5) Logit intensive	(6) Logit intensive
Inequality	2.38***	2.50***	2.12**	1.74***	1.74***	27.22**
	(0.44)	(0.29)	(0.72)	(0.37)	(0.28)	(35.21)
Tax progressivity				0.20**	0.24**	5.35
				(0.13)	(0.17)	(5.88)
Social expenditure				0.70	0.58	0.21**
				(0.29)	(0.25)	(0.14)
Controls	No	Yes	Yes	No	Yes	Yes
Country fixed effects	No	No	Yes	No	No	Yes
Observations	45,482	45,482	45,482	32,196	32,196	32,196

The dependent variable is intensive parenting style (indicator). All the models are logistic models, and the displayed coefficients are odds ratios. All the models include wave fixed effects. Models in columns 2, 3, 5, and 6 include controls for gender, age, age squared, and log of GDP per capita (based on expenditure-side real GDP at chained purchasing power parities, from Penn World Table 9.0). Models in columns 3 and 6 also include country fixed effects. Inequality is defined as the ratio between the 90th and 10th percentile of gross earnings of full-time dependent employees. Tax progressivity is from the Andrew Young School of Policy Studies (Andrew Young School Policy Stud. 2010). Safety nets are expressed as the aggregate social expenditure as a percentage of GDP. Standard errors (in parentheses) are clustered at the country level. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

the control variables X_{ict}. Column 3 also adds country fixed effects. The odds ratio is significantly larger than unity and stable across specifications. In all cases, higher inequality increases the probability of intensive parenting. In columns 4, 5, and 6, we repeat the analysis while also including the measures of tax progressivity and social expenditure. The results in columns 4 and 5 confirm that each of the three variables of interest has the predicted effect: Inequality increases the intensive parenting style, while tax progressivity and social expenditure reduce it (although the effect of the latter is not statistically significant). In the regression in column 6, the three effects are less well identified. The effects of inequality and social expenditure conform with the prediction of the theory, but the odds ratios are very high and low, respectively. Tax progressivity is not statistically significant. The results in the regression in column 6 reflect the limited time variation for the measures of redistribution, which makes it difficult to obtain reliable estimates in fixed-effect regressions.[13]

The correlations are quantitatively large. Consider, for instance, a hypothetical parent born in a country where the 90-to-10 measure of inequality is three, close to the average for European countries. Suppose that the individual characteristics of this parent and the country fixed effect are such that her probability of being intensive is 40% (approximately the average value for countries like Germany, Japan, and Switzerland). Now consider an increase of inequality from three to five, close to the US value, holding other characteristics—including the country fixed effect—constant. Then the probability for this parent to be intensive increases from 40% to 75%. Although this estimated change cannot be interpreted as causal, this is a large effect, moving the likelihood of being an intensive parent close to the proportion of intensive parents in the United States.

Above, we focus on the relaxed versus intensive margin (or, equivalently, permissive versus nonpermissive), showing that high inequality induces parents to become less relaxed. Consider next the margin of authoritarian versus nonauthoritarian parenting (i.e., parents who emphasize

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[13] All results hold true irrespective of whether we include all respondents or only those who are actually parents. They are also robust to the inclusion of a self-reported dummy for religiosity. Finally, they are robust to an alternative definition of parenting style, where we classify as intensive parents who mention either hard work or determination and perseverance among the preferred parenting values.
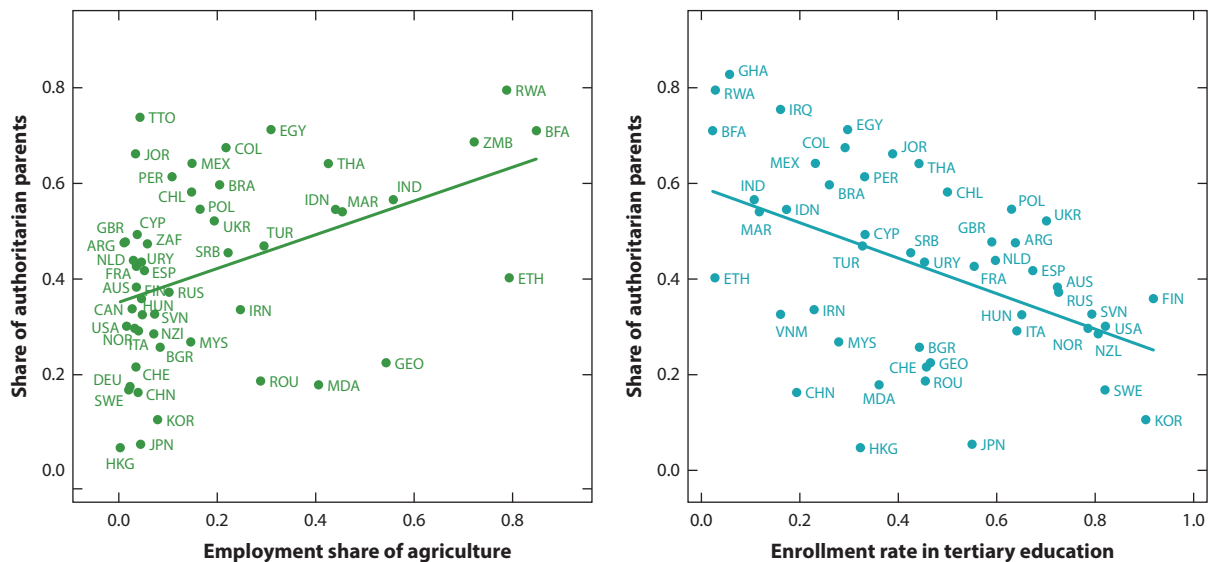
Figure 2

Share of agriculture, higher education, and authoritarian parenting.

obedience versus those who do not). In this case, the key variables are (*a*) whether the effort of children can be easily monitored and (*b*) the extent of occupational mobility (which affects the return to independence and thus the choice between authoritarian and authoritative parenting). Two (highly correlated) proxies for macroeconomic conditions that affect this margin are the share of agriculture and the enrollment rate in tertiary education. In traditional agricultural societies, most children live and work under the parents' direct supervision. Moreover, most of them are expected also to become farmers and to learn skills from their parents. In such societies the return to independence is low. Conversely, in societies where many children receive higher education, they are expected to work hard on their own initiative, as students often live far from their families and must make important independent decisions, such as which subject to major in and how hard to study. Therefore, we should expect parents to be more authoritarian in traditional agricultural societies where the share of enrollment in higher education is low. **Figure 2** shows that these predictions are borne out in the data: Across countries, the share of authoritarian parents is increasing in the employment share of agriculture and decreasing in the enrollment rate in tertiary education.

Doepke & Zilibotti (2019) also examine the effect of religiosity on parenting. They show that religious people are significantly less permissive and more authoritarian than nonreligious people. This finding is consistent with the hypothesis that many traditionally religious parents believe that the world is regulated by a never-changing order, and that it is their duty to transmit to their children an immutable set of values and truths.[14] The result is based on US data from the Child Development Supplement (CDS) of the Panel Study of Income Dynamics (PSID). In the initial survey of the PSID-CDS in 1997, parents are asked whether they have ever spanked their children. In addition, they are asked whether religion is very important in their life. The data set also contains information on parenting styles. Religious parents have a more positive

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[14]According to Bartkowski & Ellison (1995, p. 25), such parents do not emphasize creativity and intellectual curiosity, but instead believe that, "to succeed in adult roles, children must be trained to embrace the divinely-ordained principles of authority and hierarchy." Therefore, religious parents may be more prone to being authoritarian.

attitude toward corporal punishment: 70% of religious parents report spanking their children, compared to 58% of nonreligious parents. These results are robust to controlling for a variety of socioeconomic characteristics, such as income or education, that may be related to both religiosity and the use of corporal punishment. In addition, nonreligious parents are significantly more permissive than religious ones, especially Protestants. The effect is quantitatively large. Consider a nonreligious parent whose probabilities of being permissive, authoritative, and authoritarian are, respectively, 50%, 25%, and 25%. The probabilities that an otherwise identical parent who is an observant Protestant will embrace each of the three parenting styles are, respectively, 30%, 25%, and 45%. Similar patterns are observed in a cross-country analysis based on the WVS.

Overall, the evidence lines up very well with the predictions of our simple model of the economics of parenting. Empirically, economic factors can account for a substantial fraction of the variation in parenting practices over time and across space. Clearly, the results do not rule out that noneconomic factors also matter, as in the role of religiosity discussed above. Also, the evidence is at the level of correlations, and more work toward causal identification is needed to confirm the results. Nevertheless, the results are indicative that the economic approach can be quite successful in explaining what parents do.

3.4. Additional Mechanisms for the Choice of a Parenting Style

The economic literature on parenting has identified additional mechanisms that are relevant for the choice of a parenting style but that are not captured by the model outlined in Section 3.2. Among the earliest contributions is that of Weinberg (2001), who focuses on the role of monetary incentives in raising children. In his model, richer parents can use monetary rewards to get their children to comply with their wishes. Poor parents lack the resources to do the same and thus may be more likely to resort to authoritarian methods such as corporal punishment. Thus, the mechanism can contribute to our understanding of the distribution of parenting styles in the population and also help explain the impact of parental income on child achievement.

Another interesting dimension is information frictions. At least initially, children know a lot less than parents do, and part of the challenge of parenting is to convince children of what the parents know is right. Information transmission from parent to child may be distorted for several reasons; for example, the child may mistrust the parent and believe that she is being fed wrong information for strategic reasons ("If you don't eat your vegetables, you will never grow big!"), or it may simply be difficult to convey complex, tacit, or informal knowledge. In their model, Lizzeri & Siniscalchi (2008) focus on the polar case where the parent is unable to directly convey information, and the child learns entirely from experience. The parent faces a trade-off between letting the child learn from her own mistakes or correcting the child at the cost of inhibiting learning. As in the model above, how much is at stake in these decisions matters for the optimal parenting strategy. In a recent paper, Seror (2019) combines the principal-agent approach followed by Lizzeri & Siniscalchi (2008) with some of the trade-offs incorporated in the model described in Section 3.2.

Other recent studies involving a choice of parenting strategies include those of Burton et al. (2002), who focus on how a parent responds to bad behavior by a child; Cobb-Clark et al. (2019), who introduce a distinction between parents' time and attention as inputs in child rearing; Cosconati (2013), who considers the contrast between a strict and a permissive parenting style in a setting where parent and child disagree on the relative importance of the child's leisure; Zhang & Ikeda (2016), who let a central role be played by a process of habit formation of which only the parent is fully aware; Hao et al. (2008), who focus on strategic interplay between strict and lenient

parenting in families with multiple children; and Lundberg et al. (2009) and Romich et al. (2009), who analyze the noncooperative interaction between paternalistic parents and myopic children. Cunha (2015) considers the role of information frictions on the part of parents, who may differ in their subjective assessment of the productivity of different parenting styles. The self-interest of parents takes center stage in the work of Becker et al. (2016), where parents may attempt to manipulate their children's preferences to receive more support in old age. None of these studies attempt to account for variation in parenting styles across countries and over time. Instead, they introduce a broad range of mechanisms and forces that are potentially relevant in the choice of a parenting style and that could be included in more encompassing future models of parenting behavior.

4. THE ECONOMICS OF CHILDREN'S SKILL ACQUISITION

Skills and abilities are important determinants of an individual's life and economic success. In economics, the process of skill acquisition first took center stage in the early literature on human capital that was pioneered by Gary Becker and Jacob Mincer, among others. Initially, the analysis of human capital accumulation was focused on cognitive skills that traditionally have been deemed relevant for shaping outcomes such as education and earnings (Murnane et al. 1995, Cawley et al. 2001). More recent literature has also shown how noncognitive skills such as perseverance, patience, sociability, and other personality and behavioral traits are important determinants of outcomes in childhood and adulthood (Heckman & Rubinstein 2001; Heckman et al. 2006, 2013).

Different disciplines such as economics, psychology, and sociology share the view that childhood is a critical period in an individual's life because this is when many of the attributes that will affect adult outcomes are acquired. In economics, the consideration of family influences during childhood was popularized by the work of Becker & Tomes (1979, 1986), who analyze the role of endowments versus investment in the determination of intergenerational mobility. Since then, a large literature has aimed to understand the process through which children acquire skills in detail.

In our parenting model in Section 2, the technology of skill acquisition is represented by Equations 6 and 7, reproduced here for easy reference:

$$s_2 = f_1(S, s_1, I_1, d_1, x_1),$$
$$S' = f_2(S, s_2, I_2, d_2, x_2),$$

where the skill vectors during childhood s_t and adulthood (S for the parent, S' for the child) include both cognitive and noncognitive skills. This formulation of skill acquisition already incorporates some central insights of the recent literature on skill acquisition. For example, the technology gives a role to both endowments (represented by the parent's skills S and the child's initial skills s_1) and later investments in skills. The technology also allows for investment on the part of both parent (I_t) and child (x_t), and the environment (such as schools, neighborhoods, and peers) also matters (d_t). An important feature of this formulation is that it allows for the cumulative formation of skills. The skills b_2 acquired during childhood are one of the inputs in skill acquisition during adolescence. The model allows for different degrees of complementarity or substitutability of early and late investments in skills.

A focal point of the literature on skill formation is to pin down the technology in Equations 6 and 7 in more detail, beyond the general functional form. Some of the central questions in this literature are:

- What is the relative importance of endowments, parental investment, own investment, and the environment for the acquisition of cognitive and noncognitive skills?
- During which phase of childhood are investments in cognitive and noncognitive skills most effective?
- Are early and late investments in skills complements or substitutes?

All of these questions are relevant for parents who want to decide which parenting style to adopt and how to best invest in the skills of their children. What is more, these questions are also crucial for the design of public policy. The timing of skill acquisition helps determine at what ages public investments in school and child care are likely to be most effective. The issue of substitutability versus complementarity matters for whether early deficits (say, regarding children from socially disadvantaged backgrounds) can be offset by interventions later on (say, training and tutoring during high school) or should be addressed as early as possible. The substitution relationship between parental and other inputs (such as public schooling) determines whether public programs that aim to foster skill acquisition can concentrate on providing public inputs, or whether support and tutoring for parents should be a central plank of such programs.

A large body of research during the past two decades provides answers to many of these questions. Recent comprehensive overviews of this literature are provided by Heckman & Mosso (2014) and Attanasio (2015). We focus on the main insights of this literature and some of the most recent developments.

The work by James Heckman and his coauthors represents a central part of our understanding of the process of skill formation. Building on the framework of Becker & Tomes (1979, 1986), this research describes the complex process of skill formation through the formalization of a multistage technology of skill formation. The combination of a theory for the technology of skill formation (Cunha & Heckman 2007) with estimates of the skill production function (Cunha & Heckman 2008, Cunha et al. 2010) makes it possible to characterize the process of human development and to rationalize the available empirical evidence. First, as reflected in the technology in Equations 6 and 7, skills are multidimensional (Almlund et al. 2011). Cognition and IQ are not the only determinants of success in life; personality traits such as perseverance, conscientiousness, and sociability are equally important in shaping future outcomes. Second, skills are malleable, and genetics is only one of the main possible determinants of the set of individual skills and abilities.

Perhaps the most important finding in the recent literature is that early childhood (up to approximately four years of age) is a crucial phase for skill acquisition. Carneiro & Heckman (2003), Ermisch & Francesconi (2005), and Heckman & Mosso (2014) document that cognitive and noncognitive outcomes are largely shaped early in life.[15] The skill gaps that can be found among individuals from different socioeconomic backgrounds opens at very early stages of childhood. Moreover, early interventions have higher returns and are more effective in reducing achievement gaps than later interventions. Later investments are especially ineffective if not anticipated by at least some earlier investments (see Cunha et al. 2006, Knudsen et al. 2006).

Our theoretical representation of the technology of skill formation in Equations 6 and 7 is closely related to that of Cunha & Heckman (2007). A key feature is that childhood consists of multiple periods.[16] The model allows for two important features. The first feature is self-productivity of human capital. Skills acquired in a certain period persist and contribute to the creation of new

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[15] Works such as those of Carneiro & Heckman (2003), Heckman & Masterov (2007), and Cunha et al. (2006) show the important role of parents—through ability and engagement—in producing both cognitive and noncognitive skills.

[16] The recognition of different stages of child development was widely acknowledged in the child development literature (Erikson 1950) but initially neglected by the literature on the economics of child development.

skills in the following periods. The second feature is dynamic complementarity, namely, the observation that skills produced at a specific stage of life raise the productivity of investments at later stages. This implies that investments made at different ages foster each other. Moreover, complementarity suggests that early-in-life investments should be followed by later investments to increase their productivity.

Empirical evidence on these features is provided by Cunha & Heckman (2008) and Cunha et al. (2010). Cunha & Heckman (2008) estimate a linear dynamic factor model to identify the multistage investment technology under the assumption that early and late investments are perfect substitutes. Cunha et al. (2010) identify a more general nonlinear technology. Estimates are obtained through a dynamic factor model where both cognitive and noncognitive skills are modeled as low-dimensional latent variables. Estimates of these models show clear evidence of self-productivity and complementarity. Self-productivity becomes more evident as the child gets older. For cognitive skills, the complementarity between investments and skills tends to increase over the life cycle. As a result, compensating measures to offset adverse environments are less effective at later ages. Complementarity between noncognitive skills and investments displays a different pattern: The estimated effects are similar at different stages of child development, making it easier to intervene with later remediation. Investments are particularly productive for disadvantaged children. The recognition of disadvantaged children as the optimal target for interventions also stands out in the recent study of Agostinelli & Wiswall (2016).[17]

Another focus of the literature is the importance of household and family characteristics in shaping child development. Many papers, such as those of Duncan et al. (1998), Akee et al. (2010), Bernal & Keane (2011), Dahl & Lochner (2012), Løken et al. (2012), and Agostinelli & Sorrenti (2018), study the impact of a family's financial constraints on child development. Del Boca et al. (2014) estimate a production technology of child cognitive ability within an explicit model of household choices. Time inputs (both maternal and paternal) are found to be more important than monetary expenses in the child development process. Financial constraints matter more (and monetary transfers to a family are more effective) toward the end of the development process, during adolescence. Attanasio et al. (2018) exploit a randomized early childhood intervention in Colombia to estimate the technology of skill acquisition. Consistent with Del Boca et al. (2014), they find that the program led to positive effects on cognitive and socioemotional development primarily by inducing parents to increase their own investment in child development.[18]

How does the literature on skill formation relate to the economics of parenting styles? To start, we can view parenting style as yet another input in the production of skills by distinguishing different kinds of interactions between parents and children. A bigger difference is one of perspective. The literature on skill formation, for the most part, limits itself to estimating a production technology, such as Equations 6 and 7 in the model used in this review. The theory of parenting style outlined in Sections 2 and 3, in contrast, formulates a full choice problem in which both parents and children make optimal decisions given the environment they face. Whereas the skill formation literature primarily asks which skills children will end up with for given inputs, the analysis in Section 3 is about explaining why parents and children make certain investment decisions. In the parenting style model, a major part of the impact of parents occurs not through direct investment (the parental inputs I_1 and I_2 in Equations 6 and 7), but instead through influencing the child's own investment and choices (x_1 and x_2) through authoritarian or authoritative strategies.

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[17]Other important contributions to the estimation of the technology of skill formation include those of Todd & Wolpin (2003, 2007), who model and estimate a dynamic child quality production function for cognitive skills to show the importance of both lagged and contemporaneous inputs on the production of current skills.
[18]Attanasio et al. (2017) provide a similar model for cognition and health of children aged 0–12 in India.

Combining the two approaches therefore results in a broader perspective on the role of parents in child development.

Conversely, the insights of the literature on skill formation are relevant for formulating better choice models of parenting style. The empirical analysis above is limited to broad classifications of types of parenting. In reality, there are many dimensions to parenting strategies, and parenting evolves over time as the child develops. For instance, the balance between coercion and persuasion in influencing children usually varies over time, depending on what is at stake and how the child's skills and abilities evolve. A research approach that combines the findings of the recent literature on skill formation with the choice-based approach of the literature on parenting styles should be productive for providing a deeper understanding of such issues. An explicit model of optimizing behavior of parents and children is also helpful for characterizing how decisions respond to public inputs; for example, in places where excellent public schools exist, and schools do not rely on additional investment at home (e.g., there is little homework), parents can relax more compared to places without such features. Lastly, the environment itself is also, to a large extent, a parental choice. Parents can decide in which neighborhood to live, with whom to socialize, and which schools their children should attend. This leads to a new set of interactions, which we explore in the next section.

5. THE INTERACTION OF PARENTING AND NEIGHBORHOODS IN CHILD DEVELOPMENT

In the past decades, an extensive and multidisciplinary literature has studied the importance of neighborhoods in shaping an individual's life opportunities (for reviews of neighborhood effects, see Jencks & Mayer 1990, Sampson et al. 2002). Most of the research focuses on children, especially children living in poor and distressed areas. Neighborhoods play an important role in part because, especially for older children, much of human capital accumulation takes place in schools, which may vary in quality and organization. Broadly defined neighborhoods also matter because they define the set of labor market opportunities that children face. Most young people start working in the same commuting zone in which they grew up. This affects the incentives for parents to adopt different parenting styles and to invest in their skill formation.

More generally, the developmental psychology literature has long pointed out the importance of peers for child development. This is especially true for older children during adolescence, when attachment to parents is loosened, and relationships with peers take center stage. These observations do not imply that parents no longer matter once a child enters adolescence; rather, the way in which parents influence their children shifts gradually from direct interactions to the parents' influence on the environment in which children live. For this reason, an encompassing theory of the economics of parenting should take into account how parents help determine the peers with whom their children interact, the schools that they attend, and the neighborhoods in which they live. We first discuss these issues from an empirical perspective, focusing on neighborhood effects in child development. We then outline how a choice of the child's environment can be incorporated into more general models of the economics of parenting.

5.1. Empirical Evidence on Neighborhood Effects in Child Development

Children who grow up in distressed areas tend to reach lower outcomes and display less upward mobility when compared to children from wealthier areas (Brooks-Gunn et al. 1993, Cutler & Glaeser 1997, Chetty et al. 2014). This stylized fact makes the analysis of neighborhood and peer effects a key point of theories of social capital accumulation (Coleman 1988) and human

capital externalities and growth (Benabou 1993, Lucas 1988).[19] One potential explanation underlying neighborhoods effects (Wilson 1987, Akerlof 1997, Glaeser & Scheinkman 2001) is that children in better neighborhoods are exposed to adults acting as role models who shape aspirations and adherence to social norms. Social networks and peer effects also play a role. For example, higher-income peers may have more information about labor market opportunities to be shared with the surrounding children (once grown up) and their parents (Manski 2000, Durlauf 1996). Neighborhoods may also affect the human capital accumulation process through community resources such as schools or libraries (Jencks & Mayer 1990).

The empirical study of neighborhood effects is a challenging task. If people's location choices are driven in part by unobservable characteristics, then measured neighborhood effects based on observational data do not have a causal interpretation. One way to overcome this issue is to look at policies and interventions that induce experimental or quasi-experimental relocation of families. Perhaps the most studied intervention in this context is the Moving to Opportunity (MTO) experiment of the US Department of Housing and Urban Development. In the mid-1990s, the MTO program offered vouchers to a randomly selected group of families living in high-poverty housing projects that allowed them to relocate to areas with lower poverty rates. The experiment took place in the cities of Baltimore, Boston, Chicago, Los Angeles, and New York. Relocation generated large variation in neighborhood composition for otherwise similar families.[20]

Katz et al. (2001) analyze the short-run impacts of the MTO in the city of Boston. While individual economic self-sufficiency was unaffected by the displacement of families from higher- to lower-poverty areas, treated families experienced improvements in quality of life factors such as health, safety, and children's behavioral outcomes. Kling et al. (2007) extend the analysis to all five cities involved in the MTO experiment and confirm the absence of effects on economic self-sufficiency.[21] However, unlike in the Boston-only study, adult physical health did not improve in response to the intervention. Other outcomes for youths (such as health and risky behaviors) were differentially affected by gender. Heterogeneous effects of the MTO experiment also arise in the analysis of youth crime and delinquency by Kling et al. (2005). Ludwig et al. (2012, 2013) focus on longer-term outcomes and show that the MTO experiment positively affected adult mental and physical health and subjective well-being, whereas the impact on economic self-sufficiency or child achievement in education was negligible.

One explanation for the limited measured impact of the MTO experiment is that not only neighborhood characteristics matter, but also when and how long one has lived there. Chetty et al. (2016) study the duration of exposure to a new neighborhood as a possible determinant of long-term effects on children.[22] They find that (a) moving to a lower-poverty area improves long-term outcomes of those children who moved at young ages, (b) the positive effect induced by the move tends to decline with a child's age at the time of the move, and (c) individuals moving during adolescence report negative outcomes induced by the move. Specifically, children moving to less

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[19]For more information regarding the importance of peer effects, social interactions, and neighborhood effects, the reader is also referred to Case & Katz (1991), Borjas (1995), and Glaeser et al. (1996). Econometric issues that arise when there are unobserved neighborhood and individual characteristics in the presence of sorting are addressed by Altonji & Mansfield (2018) and Agrawal et al. (2019).

[20]Sanbonmatsu et al. (2011) provide a comprehensive description of the MTO experiment.

[21]These results are consistent with those of Oreopoulos (2003), who exploits differences in neighborhood quality of housing projects in Toronto to show little role for neighborhood effects in determining youths' long-term earnings, unemployment status, and dependence on the welfare system.

[22]Long-term outcomes of disadvantaged children relocated to lower-poverty areas are also the object of study of Chyn (2018). By exploiting public housing demolition in Chicago during the 1990s, Chyn shows that moving out of disadvantaged neighborhoods increased a child's employment and earnings in adulthood and reduced arrests for violent crimes.

poor areas before the age of 13 considerably increase their earnings in the mid-20s, are more likely to attend a college (and also a better college), are less likely to live in high-poverty areas, and (for women) are less likely to be single mothers. Conversely, moving when the child is between ages 13 and 18 has small or even negative effects on a child's future outcomes. This finding suggests that the cost of moving (e.g., disruption of social networks and friendships) weighs more heavily once a child has reached adolescence.

The importance of childhood exposure to neighborhoods is further investigated in recent papers studying tax records of millions of US families moving across different areas (Chetty & Hendren 2018a,b). Motivated by evidence that a child's income conditional on parents' income varies substantially with the area in which the child grew up (Chetty et al. 2014), Chetty & Hendren (2018a) exploit variation in the age of children when a family moves from one commuting zone to another to estimate the impact of neighborhoods on intergenerational mobility.[23] They find that, "on average, spending an additional year in a commuting zone where the mean income rank of children of permanent residents is 1 percentile higher (at a given level of parental income) increases a child's income rank in adulthood by approximately 0.04 percentiles" (Chetty & Hendren 2018a, p. 1110).[24]

Chetty & Hendren (2018b) examine the causal effect of each county in the United States on children's outcomes in adulthood to provide insights about the mechanism underlying neighborhood effects. Previous analyses by Sampson et al. (2002) and Chetty et al. (2014) show correlations between upward mobility and factors such as residential segregation, income inequality, demographic characteristics (fraction of single mothers and racial composition), and the availability of good primary schools. Although these correlations are informative, they fail to disentangle the causal effect of a specific neighborhood from endogenous sorting. The evidence of Chetty & Hendren (2018b) suggests that the association between upward mobility and group-level characteristics such as racial and income segregation or income inequality is mostly driven by the direct effect of neighborhoods, whereas the relationship between upward mobility and average individual-level characteristics (such as family structure) is due to sorting.

Summing up, the literature suggests that neighborhoods are important determinants of a child's future opportunities. Understanding the mechanisms underlying neighborhood effects remains a research priority.[25]

5.2. Neighborhood Choice in a Model of Parenting

From the perspective of the economics of parenting, the results of this literature suggest that parents have a major impact on their children through determining their environment, including (but not limited to) the choice of which neighborhood to live in. To date, there is little work from a modeling perspective on neighborhood choice as an aspect of parenting, and none that considers

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[23]The causal interpretation of their results relies on the assumption that the selection effect (e.g., a child's unobservable characteristics) associated with a move to a better neighborhood is invariant with respect to the child's age at the time of the move.

[24]Interestingly, while in the Chetty et al. (2016) study of the MTO experiment only young children benefit from a better neighborhood, Chetty & Hendren (2018a) find that the neighborhood effect persists until an individual reaches their early 20s. The difference can be rationalized as a consequence of the two different settings: In the MTO experiment, movers are compared to nonmovers, while Chetty & Hendren (2018a) compare movers across different commuting zones, which nets out fixed disruption costs of moving.

[25]Another recent contribution to this issue is that of Gibbons et al. (2013, 2017), who study the determinants of students' educational outcomes in England using a model with neighborhood fixed effects. Neighborhood composition is found to play only a limited role in teenagers' test scores, whereas turnover of same-school-grade students reduces value added for students who stay in their original neighborhood.

how this important dimension of parenting interacts with other parenting choices, such as that of a parenting style. Eckert & Kleineberg (2019) estimate a model of neighborhood choice where the value of the neighborhood is exogenous (and estimated). In the work of Fogli & Guerrieri (2018), endogenous neighborhood effects arise from a human capital spillover. Agostinelli (2018) estimates a dynamic model of skill formation where children choose their own peer groups, and parental investments respond to the children's peer groups (although the choice of neighborhood is not modeled). In ongoing work, Agostinelli et al. (2019) develop a model of endogenous neighborhood choice and endogenous neighborhood characteristics within a theory of parenting along the lines of the model described in Section 2.

In the work of Agostinelli et al. (2019), there are explicit peer effects, and there is endogenous sorting due to endogenous rental costs. To outline the main ideas, consider a version of the model described in Section 2 in which there are two neighborhoods, P (posh) and B (bohemian). Thus, the neighborhood variable d_t that enters the technology of skill formation in Equations 6 and 7 satisfies $d_t \in \{P, B\}$. Rental prices $q(d_t)$ that enter the budget constraint in Equation 5 may differ across these neighborhoods. The new element is that neighborhood choice and neighborhood quality are endogenous.

In choosing a neighborhood, parents consider their own preferences, the quality of the neighborhood as a place to raise children, and the cost of living in the neighborhood. Parents' own preferences are determined by a random preference shock for neighborhoods. For instance, parents may have a preference for the neighborhood in which they grew up. The quality of the neighborhood is driven by peer effects. As a simple example, suppose that the quality of the neighborhood depends on the average skills S of the adult residents. In more elaborate formulations, neighborhood quality can also depend on local public goods; parents' investments I; and the skills s and educational effort x of the local children, that is, peer effects.

The model implies that both parenting and neighborhood choice interact with economic conditions. The model displays a force toward economic segregation: Richer parents are more willing and more able to pay high rents to provide their children with a good environment. In the basic model, the strength of this force depends primarily on inequality. Consider first an environment with low inequality, which could be modeled as a low ratio w_H/w_L in the setup used in Section 3.2. The equilibrium will display some segregation, but only to a limited extent. In particular, there will be one neighborhood where rich people are more likely to live, and another that has more poor people. The poorer households are deterred from the rich neighborhood by higher rental costs. Nevertheless, with low inequality, the degree of sorting will also be low. If inequality is low, then so are the stakes of getting the best possible education for the children. Thus, providing the best possible environment for the children is a relatively weak force in choosing the neighborhood, and for many parents, their preference shock (which is uncorrelated with status) will drive the choice. The difference in the rental price across the neighborhoods will also be low, again because parents have a limited willingness to pay for a better environment for their children.

Now consider the same economy but with higher inequality. Parents will now be more concerned about their children's skill accumulation, and consequently, the willingness to pay for a better neighborhood goes up. The result is more segregation: There will be less mixing between rich and poor people, and the difference in the rental cost between the neighborhoods will increase. Notice that, while in this case we consider the underlying inequality as an exogenous force, spatial sorting has a self-reinforcing element. As the rich and poor become more separated, the difference in the educational environment in the two neighborhoods (which, recall, we relate to the average skill level S of the local population) will also increase. This further increases the willingness of the rich to pay for living in the better neighborhood.

Another self-reinforcing mechanism works through parents' investments in their children's skill accumulation. If neighborhood quality and parental investments are complementary, then increased segregation leads to even stronger parenting investments among the rich and less investment among the poor in the disadvantaged neighborhood. Such complementarities can arise from a variety of sources. For example, when children have many peers who are strongly focused on educational achievement, they may be more receptive to their parents' efforts compared to children in an environment where the peer group shows little interest in school. There are also interactions with the choice of parenting style. For instance, in poor and crime-ridden neighborhoods, parents are likely to emphasize risk aversion, since many of the risks that are present in the environment (such as juvenile crime and drugs) can have harmful long-term consequences. A side effect is that the children may end up so risk averse that they are less inclined to jump on economic opportunities that involve some risk taking. In contrast, in safer middle-class environments, parents can afford to be more permissive and risk tolerant, which translates into a more positive attitude of children toward opportunities that present some upside risk.

This discussion shows that even a relatively simple model of neighborhood choice and parenting based on the simple framework presented in Section 2 can address many of the trends over recent decades that we discuss above, such as the increase in economic inequality, rising residential segregation, and a rising gap in parental investments between families from different ends of the social spectrum. A better understanding of the mutual interactions that give rise to these trends will be helpful in formulating policy responses that can be used to prevent these trends from accelerating further.

6. CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

The economics of parenting has come a long way since the family first entered the realm of economics with the work of Gary Becker. Economic models turn out to be remarkably successful at explaining many dimensions of what parents do, ranging from fertility choice (which we do not discuss in detail in this review) and parenting style to the choice of a neighborhood for the family to live in. There has also been tremendous progress on understanding the technology of children's skill formation. The findings of this literature already play a crucial role in policy making; for example, the observation that many important skills are acquired during the first years of life has led to calls for more support for high-quality daycare and preschool, which is now being implemented in many places. As this example shows, the economics of parenting takes a central place in some major policy challenges of this age. Rising inequality; increased segregation; low social mobility; and, more generally, increased polarization in society are trends that most industrialized countries confront today. Further research on the economics of parenting will help advance our understanding of the root causes of these trends and can clarify options for public policy to address the resulting challenges.

There are many remaining research challenges for the economics of parenting. One example is the measurement of parenting styles. Existing measures, which derive from developmental psychology, only provide a broad classification, and different approaches can be incompatible with each other. It would be fruitful to combine detailed time-use data with other information on the relationships of parents and children to construct more finely graded measures that map more directly into economic models of parenting.

A broader challenge for future work is to combine the three strands of research on the economics of parenting discussed in this review. To date, the economics of parenting style, the technology of skill formation, and the role of neighborhood effects have been mostly studied in isolation. However, these dimensions are clearly closely related: Parenting style is a crucial input in

skill formation, and so is the choice of a neighborhood. Conversely, the neighborhood in which a family lives and thus the risks and opportunities that a child is exposed to matter for the choice of a parenting style. One recent paper that combines two of these elements is that of Deckers et al. (2017), who relate socioeconomic differences among children in IQ, patience, and other economic preferences to parental and family characteristics, parental time investments, and parenting style and show that parenting style and time investments play distinct roles. There is a lot of scope for future work that takes interactions between the different aspects of the economics of parenting into account.

Another limitation of existing research is that most theoretical models of parent–child interaction focus on the case of a single parent and a single child. In reality, there are two biological parents, but many children live with a single parent, and step-parents are also present in many families. It would be fruitful to take more account of interactions among multiple parents and caregivers in economic models of parenting. Likewise, in many families, there are multiple children, and we know from empirical work that birth order is an important determinant of children's outcomes (Black et al. 2005). For parents, it quickly becomes apparent that the choice of parenting style for, say, the third child is more constrained than for the first, given the competing needs of the older children (see Hao et al. 2008). Children also come with their own personalities (and genders), and parents use different strategies with different children in response to their characteristics. A lot of productive research could be done extending theoretical models of parenting beyond the single-parent, single-child case to capture the multifaceted interactions among many family members.[26]

Beyond refining the economics of parenting, more research is also needed to assess the implications of changes in parenting for broader economic issues. For example, if parenting gets more time intensive, then we might expect fertility rates to fall. The general relationship between investment in children and fertility is a major topic in the economics of fertility (i.e., the quantity–quality trade-off), but we are not aware of work that makes a direct connection between a rising intensity of parenting and the currently very low fertility rates in many industrialized countries (Doepke & Kindermann 2019), that reconsiders the income–fertility gradient from the perspective of parenting decisions, or that formulates a joint decision problem involving fertility and parenting style. Parenting also interacts with labor supply and careers, especially for mothers (Adda et al. 2017). Recent research on the gender wage gap has identified motherhood as the primary reason why women still get paid less than men (Gallen 2018, Kleven et al. 2018). For the impact of parenthood on careers, choices such as parenting style and time spent on parenting are surely important, which is another connection not yet explored in the literature.

Lastly, given the central role of parenting in the accumulation of skills and human capital, the economics of parenting is highly relevant for macroeconomic issues such as the dynamics of inequality, intergenerational mobility, and overall economic growth. There are only a few papers that take recent advances in research on the technology of skill formation into account while developing multigeneration models to study determinants of the intergenerational transmission of economic status (Yum 2015, Caucutt & Lochner 2017, Lee & Seshadri 2019). We are aware of only a single paper, namely that of Daruich (2018), that examines the importance of early investments in children, a major theme in literature on the technology of skill formation, for the evolution of inequality and growth in a dynamic macroeconomic model. In the future, we expect that macroeconomic modeling will be one of the areas to particularly benefit from ongoing research on the economics of parenting.

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[26]Two recent examples of work along these lines are the work of Blandin & Herrington (2018), who consider the impact of family structure and early family investments on college completion rates, and Gayle et al. (2015), who analyze racial differences in human capital accumulation.

DISCLOSURE STATEMENT

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