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PARENTING WITH STYLE: ALTRUISM AND PATERNALISM IN INTERGENERATIONAL PREFERENCE TRANSMISSION

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Parenting with Style: Altruism and Paternalism in Intergenerational Preference Transmission
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ABSTRACT

We develop a theory of intergenerational transmission of preferences that rationalizes the choice between alternative parenting styles (as set out in Baumrind 1967). Parents maximize an objective function that combines Beckerian altruism and paternalism towards children. They can affect their children's choices via two channels: either by influencing children's preferences or by imposing direct restrictions on their choice sets. Different parenting styles (authoritarian, authoritative, and permissive) emerge as equilibrium outcomes, and are affected both by parental preferences and by the socioeconomic environment. Parenting style, in turn, feeds back into the children's welfare and economic success. The theory is consistent with the decline of authoritarian parenting observed in industrialized countries, and with the greater prevalence of more permissive parenting in countries characterized by low inequality.

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1 Introduction

From time immemorial, parents have been looking for advice on how to best raise their their children. The Bible urges parents to be strict and to dispense generous corporal punishment.[1] Discipline and rigor are advocated also by John Locke in *Some Thoughts Concerning Education*. Well-being during childhood is of little concern to the British philosopher, who views child rearing as an instrumental process that should elevate children out of immaturity, forging a strong adult personality early on.[2] In his celebrated *Émile*, Jean-Jacques Rousseau reverses Locke's perspective, and encourages parents not to interfere with children's freedom and happiness, and rather to cater to their inclinations and to let them learn from experience.[3] After Rousseau, the debate on child rearing has raged on with unrelenting intensity, culminating in recent decades in major shifts in widely held views of parenting. If radical anti-authoritarian parenting and schooling practices became fashionable in the 1960s and the 1970s, the "Tiger Mom" (Amy Chua) has recently become the icon of a strict, rule-oriented parenting which is supposedly at the root of the success of many Asian children.[4]

What drives these shifts in the doctrine and practice of child upbringing? In this article, we argue that child-rearing practices are shaped by economic incentives and constraints. We build a positive theory of parenting that accounts for broad changes in parenting styles in industrialized countries over time, and for variation in parenting styles across countries. Our theory is motivated by a growing literature showing that preferences and non-cognitive skills can be molded by parents and educators from early childhood (see, e.g., Heckman, Stixrud, and Urzua 2006), and that these attributes play an important role for human and social capital accumulation.

More formally, we construct a dynamic model of parenting where parents are driven by a combination of Beckerian altruism (i.e., a concern for the well-being of the child) and a paternalistic motive. Paternalism captures the extent to which parents disagree with their children's natural preferences and inclinations. Parents can affect their children's

[1] "He who spares the rod hates his son, but he who loves him is careful to discipline him . . . " (Proverbs 13:24); "Folly is bound up in the heart of a child, but the rod of discipline will drive it far from him" (Proverbs 22:15).

[2] ". . . liberty and indulgence can do no good to children; their want of judgment makes them stand in need of restraint and discipline . . . " (Locke 1800, p. 40).

[3] "Zealous teachers, be simple, sensible, and reticent; be in no hurry to act unless to prevent the actions of others . . . Children should never receive punishment merely as such; it should always come as the natural consequence of their fault" (Rousseau 1762, Book II).

[4] Chua presents her argument in "Battle Hymn of the Tiger Mother," Penguin Press, 2011.

choices in two ways: either by molding children's preferences, or by imposing direct constraints on their choices. Echoing the classification of "parenting styles" in developmental psychology,[5] we define as *permissive* a parenting style that allows children to make free choices according to their natural inclinations, in the spirit of Rousseau.[6] We define as *authoritative* a parenting style where parents attempt to mold their children's preferences, with the aim of inducing choices that parents view as conducive to future success in life. Finally, we define *authoritarian* a style where parents restrict children's choices, i.e., the parent directly imposes her will on the child rather than taking the indirect route of molding the child's preferences. In our theory, the choice of parenting style hinges on the interaction between parental preferences and the characteristics of the socioeconomic environment.

We apply our theory to the transmission of time preference (patience) and risk aversion, two preference traits that have been shown to be important for human capital and wealth accumulation (see, e.g., Doepke and Zilibotti 2008 and Dohmen et al. 2015). In the case of patience, we identify paternalism as the innate tendency of parents to care relatively more about their children's future-oriented investments than do the children themselves, as witnessed by the relentless struggle of many parents to push their reluctant children to study diligently for school. From the parent's standpoint, the child has a natural tendency to seize the day and shirk in educational effort. Parents can deal with this moral hazard issue by monitoring their children and coercing them to work hard (authoritarian parenting). The downside of the authoritarian strategy is that it limits the child's freedom, and this has its own costs in terms of human capital investment. For example, some independence may be necessary for the child to discover her true talents. Alternatively, parents can mold their children's preferences so as to align them with their own (authoritative parenting). The downside of authoritative parenting is that it imposes an immediate welfare cost on the child. Permissive parenting avoids these costs, but does not resolve the moral hazard problem. Similarly, in the case of risk aversion, we identify paternalism as the tendency of parents to protect children from risky activities, often more than children themselves would like. Parents can exercise a mixture of moral suasion and direct monitoring to avoid that their children engage in activities that parents regard as too dangerous. As in the case of patience, there are

[5]In her seminal contributions, Baumrind (1967, 1971, 1978) proposes a threefold classification of parenting styles into authoritarian, permissive, and authoritative; see Section 7.

[6]In recent times, the term "permissive" has acquired a negative connotation. Here, we refer to the original notion in Baumrind. Permissive parents do not neglect their children, but they are lenient and refrain from imposing strict supervision and discipline.

tradeoffs: molding children's preferences so as to make them more fearful imposes a welfare cost on them, and both being overly fearful and being constantly monitored may preclude the child from benefiting from opportunities that arise from independent decision making and risk taking.

Building on these ideas, we can envision societies as being distinguished by the return to human capital investment and by the comparative advantage of parents in transmitting skills to their children (or its opposite, the economic return to independence). In traditional societies with a strong incumbency advantage and low social and occupational mobility, children usually do well by adopting their parents' profession. In such societies, the returns to independence are low, and hence we would expect authoritarian parenting to dominate. In contrast, authoritative parenting should prevail in societies with a high economic value of making independent choices (for example, because of a high return to matching one's occupation with one's talents) and a high return to human capital. Finally, permissive parenting is attractive if the return to human capital investment is low.

The theory is consistent with historical trends in parenting styles in industrialized countries. Authoritarian parenting, as measured by practices such as corporal punishment, has been declining over time. In the 1960s and 1970s, anti-authoritarian (i.e., permissive) parenting gained in popularity. In recent decades, we observe a new trend towards more engaged and intrusive parenting (especially among the well educated) aimed to foster children's achievements in education and other endeavors. For instance, time use surveys show a marked increase in the time parents spend on educating their children, despite the fact that parents also work more (Ramey and Ramey 2010). By and large, the nature of this new form of intensive parenting is authoritative and shuns the coercive methods of yesteryear.

We argue that the decline in authoritarian parenting is driven by rising economic returns to independence. The continuous increase in the division of labor in industrialized societies has greatly increased the number of occupations, making it less likely that a child's talents are well matched with the occupation of the parent. In addition, as emphasized by Galor and Tsiddon (1997) and Hassler and Rodriguez Mora (2000), even within professions the specialized knowledge of the parent may have less value when there is rapid technological change. For example, in agriculture long-held practices and techniques became less valuable when agriculture was mechanized with the spread of the tractor. Similarly, the knowledge acquired by a clerical worker before the information-

technology revolution is of little use to their children entering similar occupations today. These trends imply that parents have incentives to grant their children more independence by letting them acquire general human capital through formal education. This erodes the direct control over children that is a precondition for an authoritarian parenting style.

Regarding the rise of authoritative parenting in recent decades, our theory suggests that this trend is driven by an increase in the return to education and effort. In the 1960s and early 1970s, economic inequality had reached a historic low, and there was little unemployment. In those days, the returns to pushing children to exert effort were moderate relative to the value of granting them freedom and independence. For sure, the "hippie" movement that is often identified with the trend towards anti-authoritarian parenting also had other (e.g., political) motives, but our analysis suggests that broad economic trends played an important role in its success.[7]

The decades since the 1980s brought about a reversion in economic trends and an accompanying waning of the hippie values. Inequality has risen, in large part due to an increase in the returns to education and skill. Our theory predicts that this change should induce a shift towards more intrusive parenting aimed at increasing children's drive for education and achievement while protecting them from various forms of juvenile risk that can harm their future. Consistent with this prediction, we observe a decline in anti-authoritarian parenting and the arrival of a new model of intensive (at instances, obsessive) child-rearing practices that is often referred to as "helicopter parenting." While comprising some elements of prohibition, helicopter parenting is predominantly authoritative in nature, as its goal is to form responsible children who will "do the right thing" and become high achievers on their own accord.

A general implication of our theory is that permissive parenting is less attractive when the stakes are high, i.e., when adult-style behavior is especially important for children's future success. Thus, we should expect little permissive parenting in unequal societies where early effort can have a large effect on one's position later in life. In contrast, in more equal societies parents should be more inclined to grant children independence and room for self-discovery. This prediction is in line with the evidence from the World Value Surveys, which provide information on which attitudes or values parents emphasize in child rearing. We document that, in accordance with the predictions, in countries

[7]This cultural tendency is well captured by Pink Floyd: "We don't need no education; we don't need no self-control; no dark sarcasm in the classroom; teacher, leave the kids alone!"

with low inequality (such as Germany and the Scandinavian countries), parents emphasize values such as "independence" and "imagination" over "importance of hard work" or "obedience." The opposite pattern is observed in more unequal countries such as the United States and China.

In the following section, we discuss evidence on variation in parenting styles over time and across countries that motivates our study. In Section 3 we develop our general framework of preference transmission in a dynastic model. In Sections 4, 5 and 6 we apply the model to the transmission of time preferences, risk aversion, and social preferences across generations. In Section 7, we relate our paper to the existing literature in economics and psychology. Section 8 concludes. All proofs are contained in the mathematical appendix.

2 Motivating Evidence

In this section, we lay out motivating facts on variation in parenting across countries and over time that a positive theory of parenting style ought to explain. We focus primarily on variation in parent's objectives in raising their children across OECD countries, and differential trends in parenting across social classes in the United States from the 1970s to the present.

2.1 Differences in Parenting Styles Across Countries

To document cross-country differences, we consider data from the World Value Survey, where people are asked which attitudes or values they find most important in child rearing.[8] These parenting values can be related to the three main parenting styles (authoritarian, authoritative, and permissive) that the developmental psychology literature focuses on and that also arise in our theory. The value most closely associated with an authoritarian parenting style is "obedience." In addition, fostering "independence" in children is the opposite of controlling them, and hence should be inversely related to authoritarian parenting. Parents who want their children to value "hard work" and

[8]The data is from the 5th wave of the World Value Survey (corresponding to survey years 2005–2007). Parents can choose up to five of the following values: "independence;" "hard work;" "feeling of responsibility;" "imagination;" "tolerance and respect for others;" "thrift and saving money;" "determination and perseverance;" "religious faith;" "unselfishness;" and "obedience."

"thrift and saving money" can be considered to exhibit an authoritative style, because these parents would like their children to make specific choices that the parents value, but on their own accord rather than by being coerced. Finally, emphasizing the values of "imagination" and "independence" represents a more permissive (or less intrusive) parenting style.[9]

Parenting values are systematically related to the level of development and to the degree of inequality in a country. Consider first the parenting values that are associated with the margin between authoritarian and non-authoritarian parenting styles. The correlation between the fraction of parents emphasizing obedience and GDP per capita is -0.52, and for independence the correlation is 0.42.[10] Succinctly put, parents in poor countries are authoritarian, whereas in rich countries authoritative and permissive parenting styles are widespread. To the extent that economic development goes hand-in-hand with the decline of traditional societies where the incumbency advantage is strong, this observation is consistent with the thrust of our argument.

Next, we consider the effect of inequality on the choice between the authoritative and permissive parenting styles. Given the prevalence of authoritarian parenting in poor countries, here we focus on OECD countries, which also has the advantage that these countries are broadly similar in terms of educational institutions and attainment. Inequality is measured by the income Gini coefficient in 2005.[11] Hard work is positively related to inequality (correlation coefficient of 0.80), whereas the correlation with inequality is negative for independence (-0.55) and imagination (-0.56). All these correlations are highly significant. Scatter plots of these relationships are displayed in Figure 1. The results are robust to several checks: (i) excluding Turkey, a poorer country than the rest of the OECD; (ii) controlling for GDP per capita; (iii) including the countries that joined the OECD after 1994.[12] The correlation between the inequality measure and thrift

[9] The values of "feeling of responsibility" and "determination" are not clearly identified with one of the parenting styles; in particular, these values may be emphasized by authoritative parents, but are also related to independent thinking and thus the permissive parenting style. We therefore omit these values from the main analysis, and show later that our results are robust to including them.

[10] The data on GDP per capita is for the year 2005 from the Penn World Tables 7.1. Both correlations remain highly significant after controlling for religious faith, which could be argued to be a cultural determinant of parenting attitudes.

[11] Data on Gini coefficients are from the OECD. We restrict the baseline sample to countries that were OECD members before 1994. This yields data for sixteen OECD countries: Australia, Canada, Finland, France, Germany, Great Britain, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, Turkey, and the United States. We also report the results when five countries that became members since 1994 (Chile, Korea, Mexico, Poland and Slovenia) are added.

[12] In case (iii), the correlation between hard work and Gini turns insignificant. The weaker relationship

Table 1: Principal component analysis for values that parents can emphasize in raising children among 16 OECD countries.

Principal Component	1	2
Loading on Independence	0.55	-0.19
Loading on Imagination	0.58	0.24
Loading on Hard Work	-0.58	-0.15
Loading on Thrift	-0.13	0.94
Percent of Variance Explained	0.64	0.26
Correlation with Gini Coefficent	-0.69	-0.07

Notes: Data from 5th wave of World Value Surveys, 2005–2007.

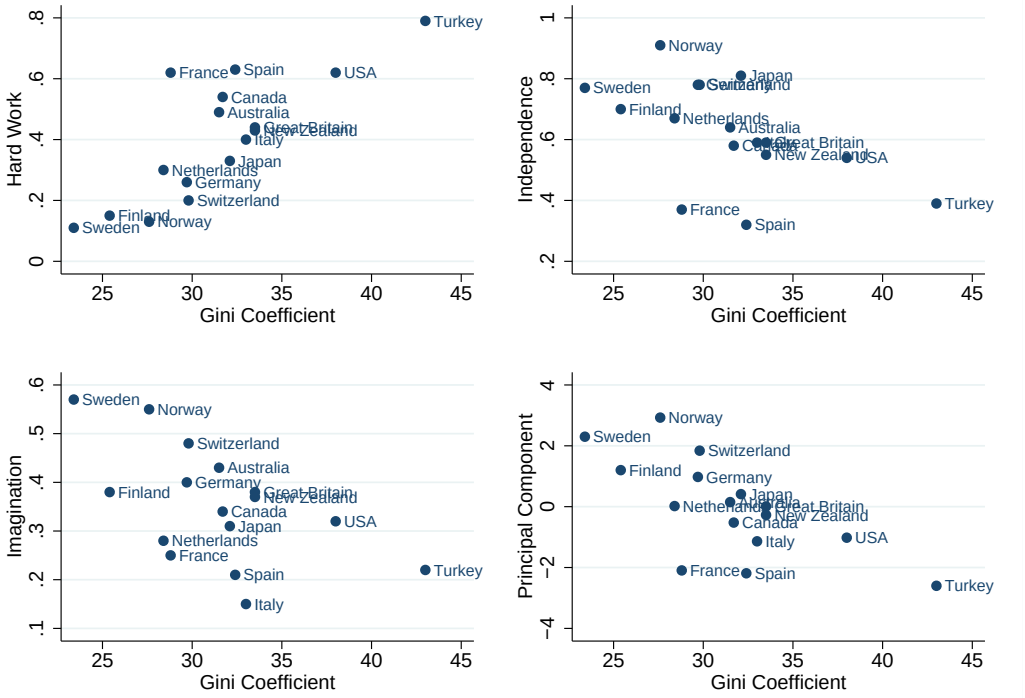
is positive but low and insignificant. Hence, the results suggest that conditional on being in an industrialized country, parents in high-inequality countries are more likely to be authoritative, whereas parents in low-inequality countries are more permissive.

The patterns for specific countries accord well with the general picture. Sweden and Norway have low inequality, and they have among the highest shares of respondents valuing imagination and independence in child rearing. The situation is similar in Germany and Switzerland. Scandinavians, Germans, and the Swiss also attach the least importance to transmitting the value of hard work to their children. In the much more unequal United States, parents place more emphasis on the value of hard work and less on that of independence. Imagination is also valued less by American parents. The main outlier from the general pattern is France, where inequality is at an intermediate level, but parents emphasize hard work. Outside of the OECD, China has among the most extreme parenting values: the score of imagination is very low, whereas the value of hard work is emphasized by 90 percent of the respondents (compared to 62 percent in the United States and only 11 percent in Sweden). This once again accords with the overall pattern, as China exhibits high inequality and underwent a dramatic increase in the return to education over the two last decades (see Ge and Yang 2014). A similar pattern is also displayed by Russia.

To summarize the data, we run a principal component analysis among the four val-

is due to two outliers, Chile and Mexico, displaying large inequality but a low emphasis on hard work. The relationship is stable across the other recent OECD members.

Figure 1: Parenting values and inequality across OECD countries.



Notes: Parenting values are measured by fraction of parents that consider a given "quality that children can be encouraged to learn at home" especially important, from 5th wave of the World Value Surveys, 2005–2007. Income inequality is measured by Gini coefficient in 2005, from OECD.

ues of interest. The first principal component, accounting for 64 percent of the variation in the data, loads positively on independence and imagination, and negatively on hard work and thrift (see Table 1). This component thus indicates a more permissive parenting style. We find that, consistent with the theoretical predictions, the first component is negatively correlated with income inequality, with a correlation coefficient of -0.69.[13] The scatter plot for inequality and the first principal component is displayed in the bottom-right panel of Figure 1. The second component already explains much less of the variance, and loads mostly on thrift. This component is uncorrelated with the Gini coefficient, suggesting that additional factors drive the transmission of this value.

Our results are robust to including additional variables that cannot be mapped as di-

[13]The results again are robust to excluding Turkey, controlling for GDP per capita, and including the countries that became OECD members after 1994.

rectly into Baumrind's classification of parenting styles. The values of "determination" and "responsibility" could equally be linked to the permissive and authoritative parenting styles. In the case of "obedience," one might suspect that this value proxies for an authoritative style in countries where the authoritarian parenting style is obsolete.[14] Adding these values to the principal component analysis does not significantly change the results. The first principal component (which now explains 56 percent of the variance) loads negatively on hard work and obedience, and positively on the other variables (with the score of thrift being close to zero). With a correlation of -0.66, the first principal component is still strongly correlated with inequality.

In summary, the analysis of the World Value Survey data indicates that in countries with low inequality (such as Germany, Netherlands, and the Scandinavian countries), parents emphasize values related to permissive parenting such as "independence" and "imagination" over "importance of hard work." The opposite pattern with an emphasis on authoritative parenting values is observed in more unequal countries such as the United States and China.

Beyond inequality, the institutional features of the education system may also affect parenting styles. In some countries, vertical teaching and the memorization of facts are emphasized in secondary schools, and access to the best universities is rationed by high-stakes university entrance exams. In such countries, parents have a stronger incentive to push their children towards hard work during adolescence. Depending on other factors, this could take the form of either authoritative or authoritarian parenting. In contrast, in other countries (such as the Scandinavian countries and Germany) secondary schooling is less intense and access to higher education less competitive. Emphasizing values such as "imagination" and "independence," which may pay off later on, should be more attractive in such places. This dimension might help explain, for example, the case of France. Teaching in French schools is vertical, and access to the country's elite system of *grandes écoles* highly restricted. Hence, parents emphasize hard work at the expense of

[14] In practice, the distinction between authoritative and authoritarian parenting is not always clear cut. A proactive and engaged parenting style aiming at induce high achievements is often intertwined with some prohibitions. For instance Amy Chua, the "Tiger Mom" and icon of helicopter parenting, writes (Wall Street Journal, January 8, 2011): "A lot of people wonder how Chinese parents raise such stereotypically successful kids. ... Well, I can tell them, because I've done it. Here are some things my daughters, Sophia and Louisa, were never allowed to do: attend a sleepover; have a playdate; be in a school play; complain about not being in a school play; watch TV or play computer games; choose their own extracurricular activities; get any grade less than an A; not be the No. 1 student in every subject except gym and drama; play any instrument other than the piano or violin; not play the piano or violin."

independence and imagination, even though overall inequality is relatively low.[15]

2.2 The Evolution of Parenting Style over Time in Western World

We now document changes in parenting over time in Western countries, with a particular focus on recent changes in the United States. While survey evidence of specific parenting practices is only available for the last few decades, historical evidence suggests that in the pre-industrial period authoritarian parenting was the norm, including the widespread use and approval of corporal punishment. Based on a sample of autobiographies and diaries, Pollock (1983) documents that in terms of the range of disciplinary techniques, "surprisingly little changed from 1500 to 1699" (p. 156). His findings are echoed by Plumb (1975), who notes that of "two hundred counsels of advice on child rearing prior to 1770, only three, Plutarch, Palmieri, and Sadoleto, failed to recommend that fathers beat their children" (p. 65). With regard to parenting style in North America, Kaestle and Vinovskis (1980) report that "the early Puritans had stressed that children were innately evil ... The only proper response for parents was to watch their children closely and to discipline them at very young ages." Our theory can account for these observations given that traditional societies are characterized by high incumbency premia. Until the onset of industrialization, most people in the Western world were engaged in agriculture, a sector where children work with their parents and incumbency (e.g., through land ownership) is important. There was relatively more mobility among city dwellers working as artisans or craftsmen, but even there much of skill acquisition took place within the family, and incumbency advantage was often protected formally through guilds. These factors provided incentives for parents to exert direct control over their children.

With the rise of industrialization in Western Europe and North America in the nineteenth century, an increased division of labor brought about a rise in occupational specialization and occupational mobility. Moreover, from the middle of the nineteenth century education increasingly took place in schools and universities. These trends increased the importance of choosing an occupation based on talent rather than following in a parent's footsteps, and as we will see our theory predicts that these changes, over time, should make authoritarian parenting less attractive. And, indeed, social historians

[15]The importance of teaching practices for the accumulation of social capital is emphasized by Algan, Cahuc, and Shleifer (2013).

document a gradual change in attitudes towards children and parenting in these times. Pollock (1983) argues that some changes already began in the late eighteenth century, mostly in the middle and upper ranks of society. Influenced by Rousseau and subsequent reformers (e.g., Pestalozzi, Froebel, Montessori, and Dewey), the view of "children ... as innocent beings that had to be protected and nurtured," and of childhood as a "distinct phase of human development that required special attention and training" gained ground in the more progressive sectors of society (Kaestle and Vinovskis 1980, p. 192).[16]

The same trends continued in the twentieth century: the practice of corporal punishment slowly declined as close-knit patriarchal families gradually were replaced by a new model where children received formal education outside the home, and only few children continued in their parent's occupation.[17] Even within occupations, the more rapid pace of technological change led to a faster depreciation of knowledge, which reduced the amount of useful knowledge that parents could teach to their own children.[18] The decline of authoritarian parenting accelerated in the 1960s with the rise of the anti-authoritarian "hippie" culture. At this time, inequality measures, which had been falling from the late nineteenth century, reached an all-time low (see Piketty and Saez 2003). In addition, educational attainment was rising, but the college premium fell (Katz and Murphy 1992, Gottschalk 1997). According to our theory, the combination of an increasing return to independence, waning direct control of parents over children (due to education moving from the family to formal institutions) and a low return to human capital investment made permissive parenting attractive during this time.

Hsieh et al. (2013) document that since the 1970s, U.S. society has become significantly more fluid, namely, there is more occupational mobility, there are fewer gender- and

[16]Yet, the change was slow, and significant differences in parenting styles across geographical areas and social groups emerged during the nineteenth century. According to Guttormsson (2002), the influence of enlightened educators was stronger in the industrial areas of northwestern Europe, where changes in parent-child relations were intimately related to the development of urban, middle-class families. Among these groups, "the mood was shifting away from beating as a routine punishment ... towards the application of moral and emotional pressures developing in children a capacity for self-government" (Guttormsson 2002, p. 267–268). In contrast, the authoritarian parenting style remained unquestioned within the working class, often accompanied by abuses related to widespread drunkenness.

[17]Long and Ferrie (2013) report that in the United States, which had exceptionally high occupational mobility already in the nineteenth century, intergenerational mobility across broad categories (farmer, white collar etc.) actually fell going into the twentieth century. However, occupations also became more differentiated, so that parental experience was less likely to be relevant even for children who stayed within the parent's broad category.

[18]For example, a parent who works as an accountant may lack the computer skills necessary for new entrants in the occupation; see Hassler and Rodriguez Mora (2000) and Galor and Tsiddon (1997).

race-related barriers in the labor market, and the allocation of talent has improved. During the same period, wage inequality across workers of a given education level started increasing. Marimon and Zilibotti (1999) and Violante (2002) interpret this fact as evidence of a growing importance of matching individual talent and occupation. Both the reduction in frictions in the labor market and the increased role of individual talent imply a lower relative importance of incumbency. In terms of the return to human capital, however, the trend towards lower inequality has reversed since the 1970s. Since the 1980s income inequality has increased, largely driven by increasing returns to education and within-group earning inequality, especially in the United States and the United Kingdom. This new trend raises the stakes in parenting, in the sense that acquiring education and putting in high effort throughout one's career gain in importance for economic success.

In the data we also observe a new trend towards more involved parents. Ramey and Ramey (2010) show that in the United States, weekly hours spent in child care by mothers and fathers have increased markedly from the mid-1980s.[19] This rise in child care has given rise to the widely discussed phenomenon of helicopter parenting, i.e., the observation that parents "hover" over their children at various activities to guide and protect them. At the same time, the support for coercive methods and corporal punishment has continued to slide; instead, the modern parenting style is authoritative in nature.[20]

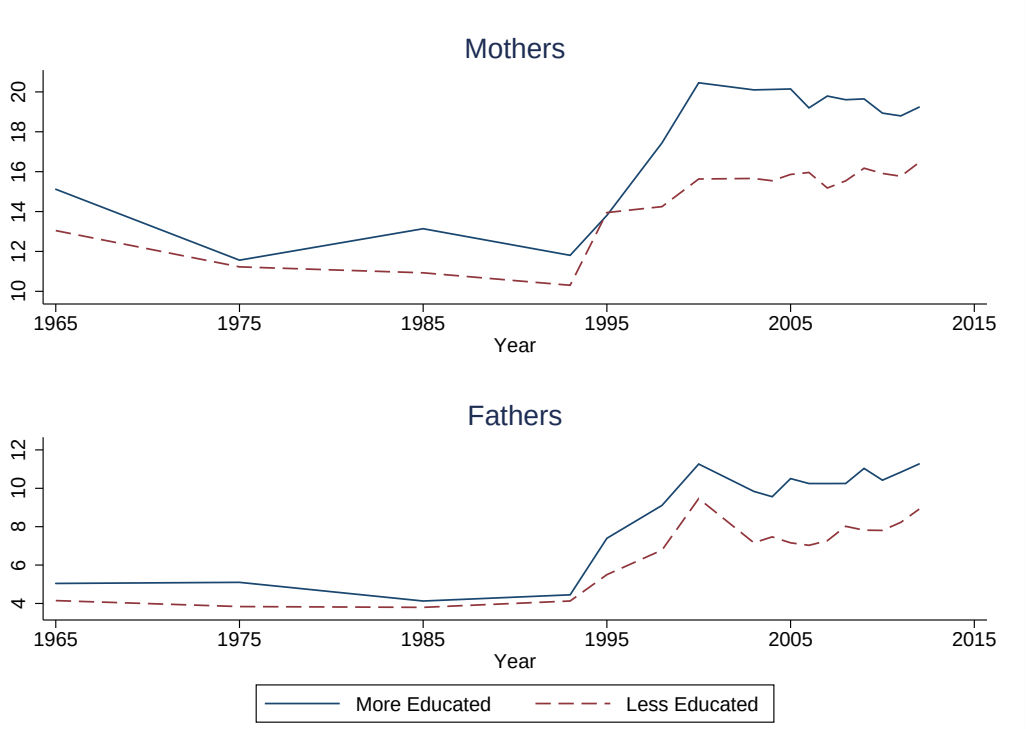
Figures 2 and 3 show that the trend towards more involved parenting (in terms of time use) and towards lower approval of corporal punishment are more pronounced among more educated parents. In the 1970s, there was little difference in these dimensions between parents with at most high school education and parents with a university degree. In the 2000s, educated parents spend significantly more effort on raising their children, and many fewer of them approve of the use of corporal punishment by parents.[21] The

[19] Ramey and Ramey (2010) suggest that this trend may be driven by increased competition for admission to top colleges (see also Sevilla and Borra 2015 for a study on the effect of competition for university places in the U.K.). We formalize a similar mechanism, although here the broad return to education matters, rather than competition for spots at the most elite institutions. We also explain the increase in competition through rising inequality.

[20] The waning appeal of permissive parenting is also reflected in the debate on teaching practices. Over the last two decades, we observe a new shift of emphasis in school authorities towards tests and high achievement. Yet, this counterrevolution did not reinstate, for the most part, the coercive methods of the 1950s. Rather, the combination of motivational and learning goals resemble characteristics of authoritative parenting (see Darling 1994).

[21] In a similar vein, Ramey and Ramey (2010) document that in neighboring Canada parenting time has increased much less than in the United States. Interestingly, the return to education also increased much less in Canada, which according to our theory could result in a more relaxed approach to parenting.

Figure 2: Time spent on child care by mothers and fathers in the United States, by education (hours per week).



Notes: Data from American Time Use Survey. Child care time comprises the same categories used in Ramey and Ramey (2010). Average time use is computed by regressing individual time use on interacted dummy variables for gender, survey year, education category, and age category. "More Educated" corresponds to B.A. degree or higher, "Less Educated" to high school degree or less. Plotted results are average time use for parents in age group 25–34.

Figure 3: Approval of use of corporal punishment in the United States, by education (percent of adult population).

Notes: Data from General Social Survey (GSS, 1986–2014) and from "Study of Political Violence Attitudes, Personal Experiences with Violence, Emotional Reactions to Assassination and Violence in the Media, 1968" (ICPSR Study No. 7354). Displayed is fraction of adults who approve use of corporal punishment in a given year, averaged over five-year intervals. The survey question in the 1968 survey is: "Are there any situations that you can imagine in which you would approve of a parent spanking his or her child assuming the child is healthy and over a year old?" The survey question in the GSS is: "Do you strongly agree, agree, disagree, or strongly disagree that it is sometimes necessary to discipline a child with a good, hard spanking?" Approval is defined as sum of fraction of parents who strongly agree or agree.

observed changes are quantitatively large. For example, in 1975 an average college-educated couple aged 25–34 spent 16.6 hours on child care per week (mother and father combined). By 2012, that same couple would have spent 30.5 hours, an increase of more than 80 percent.[22] Meanwhile, spanking was met with almost universal approval in the late 1960s, whereas among the highly educated now almost half disapprove.

One interpretation of these trends is that in college-educated families the return to education is higher (due to inheritability of skill and oblique transmission in the family), making these families more responsive to the rise in the education premium. A complementary explanation is that there are differences across education groups in the technology of preference transmission. Specifically, a college education may improve parents' ability to motivate their own children and instill education-oriented values in them, i.e., educated parents may have a comparative advantage at authoritative parenting. This accords with a literature in developmental psychology showing that authoritative methods are used more frequently in educated families, whereas less educated parents are more prone to resort to authoritarian methods and respond less to the rising skill premium in their parenting choices (Kohn 1977, Straus and Stewart 1999).[23]

3 A Dynastic Model of Preference Transmission

In this section, we introduce our general model of parenting choices, and describe how it gives rise to distinct "parenting styles" that mirror similar concepts used in developmental psychology. Later on, we apply this model to the intergenerational transmission of patience and risk aversion, and link the results to the empirical regularities on parenting style documented in the previous section.

3.1 The Decision Problems of Parents and Children

The model economy is populated by overlapping generations of people who live for two periods, childhood and parenthood. Each parent has one child. The period utility

[22] This change is not due to a change in the number of children; conditional on having at least one child, the average number of children in this group was 1.94 in 1975 and 1.85 in 2012.

[23] A complementary argument is put forward by Weinberg (2001), who argues that poorer parents have limited ability to affect their children through pecuniary incentives.

function is defined on a consumption vector c and a preference vector a. Children's preferences can be influenced by parents through child-rearing effort. The preference vector a is acquired during childhood and affects utility in both periods of life. Age has also an independent effect on preferences. For instance, children may be intrinsically less patient or less risk averse than adults. Thus, there are separate period utility functions for children $U^y(c|a)$ and for parents $U^o(c|a)$, where in general $U^y(c|a) \neq U^o(c|a)$.[24]

Children make economic decisions denoted by $x \in X$, where X is the set of feasible choices. Their choices are affected by three state vectors: (i) their own preference vector a; (ii) a vector of economic state variables h such as human capital; (iii) the realization of a stochastic state variable s that captures the role of uncertainty, for example regarding luck in the labor market or the realization of an ability shock.

Parents make two child-rearing choices. First, they mold their children's preferences by choosing the preference vector $a' \in A$, where A is a fixed set of feasible preferences. Second, they can take actions that restrict or expand the set $X \in \mathcal{X}(h,s)$ from which their children will be able to choose, where $\mathcal{X}(h,s)$ is the set of feasible choice sets, which may depend on the parent's state variables h and s. Child rearing entails an effort cost $e(X,a'|h,s)$, assumed to be separable from the adults' utility from consumption choice.

Our main focus is on the interaction between parenting choices and the child's economic choices. We therefore abstract from other economic decisions of adults such as labor supply or retirement choices. Thus, consumption is pinned down directly by the state vector through the function $C^o(h,s)$, which captures budget and other constraints.

We formulate the parent's and child's decision problems recursively. The parent's value function is given by:

$$v^o(a,h,s) = \max_{c^o,a',X} \{U^o(c^o|a) - e(X,a'|h,s) + \delta w(X,a'|a)\}$$

subject to:

$$\begin{aligned} c^o &= C^o(h,s), \\ X &\in \mathcal{X}(h,s). \end{aligned}$$

Here $w(X,a'|a)$ is utility parents derive from their children's experience, and δ measures the overall degree of altruism.

[24] The superscripts y and o refer to the child (young) and adult (old) periods, respectively.

The child's value function is given by:

$$v^y(X, a') = \max_{c^y, x, h'} \left\{ E_{s'} \left[U^y \left(c | a' \right) + \beta v^o \left(a', h', s' \right) \right] \right\}$$

subject to:

$$c^y = C^y(x, s'), \tag{1}$$

$$h' = H(x, s'), \tag{2}$$

$$x \in X. \tag{3}$$

Parenting choices hinge on how children's choices enter the utility of the parents. If $w\left(X, a' | a\right) = v^y(X, a')$, this would be a standard altruistic-dynasty problem with investment in preferences (as in our earlier work, Doepke and Zilibotti 2008). However, here we allow for the possibility that the parents evaluate the children's consumption sequence differently than do the children themselves. We label such a difference as *paternalism*. Specifically, we postulate that the utility parents derive from their children's experiences is given by:

$$w\left(X, a' | a\right) = E_{s'} \left[\left(1 - \lambda\right) U^y \left(c^y | a' \right) + \lambda U^o \left(c^y | a \right) + \beta v^o \left(a', h', s' \right) \right]. \tag{4}$$

When evaluating (4), the parent takes into account that the child's preferences a' and choice set X jointly determine the child's choice of x. More formally, c^y, x and h' are given by a decision rule $(c^y, x, h' | X, a')$ that arises from the optimization problem of the child.

The function $w\left(X, a' | a\right)$ given in (4) comprises both an altruistic and a paternalistic component. Altruism is the standard enjoyment of the child's own utility as in Becker (1974), while paternalism is the evaluation of the child's actions through the lens of the parent's utility function. The altruistic and paternalistic components enter the parent's value function with weights $1 - \lambda$ and λ, respectively. Paternalism applies only to childhood, and not to the child's felicity when the child has grown up. Hence, the child's adult-age utility enters the parent's value function as $\beta\, v^o$, where β is the discount factor between the child and the adult period and v^o is the value function of the child when she reaches parenthood. Restricting paternalistic motives to childhood is broadly realistic because preferences change with age, implying that there is more scope for conflict with an adolescent than with a grown-up child. The formulation also has the advantage

that it implies a recursive representation of the choice problem, which is used widely in related dynastic settings (such as the endogenous fertility model of Barro and Becker 1989). Note that, contrary to the literature on imperfect empathy (e.g., Bisin and Verdier 2001), we do not assume that parents have an intrinsic drive to reproduce their own preferences. Even a perfectly paternalistic parent could desire her child to have different preferences from her own.

The decision rule $(c^y, x, h'|X, a')$ is determined by the utility maximization of the child, given her own preferences and the choice set imposed on her by the parent:

$$(c^y, x, h'|X, a') = \underset{c^y, x, h'}{\operatorname{argmax}} \left\{ E_{s'} \left[U^y \left(c^y | a' \right) + \beta v^o \left(a', h', s' \right) \right] \right\} \tag{5}$$

subject to the constraints (1)–(3).

We introduce two simplifying assumptions. The first is a simple tie-break rule for the choice of X.

Assumption 1. *If the parent is indifferent between two or more choice sets, she chooses the largest possible one.*

Given that the child always prefers a larger choice set, this amounts to respecting the preference of the child if the parent is indifferent.

The second assumption is that there exists a particular preference vector $a = \bar{a}$ such that for given c, the period utility is maximized in a cardinal sense. Moreover, this is the least costly choice of a'. We interpret $\bar{a}$ as the children's *natural inclination*. Letting this inclination prevail is less costly for parents than molding their preferences.

Assumption 2. *There exists a unique $\bar{a} \in \mathcal{A}$ such that for all $a, a' \in \mathcal{A}$, $h \in \mathcal{H}$ and $s \in \mathcal{S}$, and for all feasible c:*

$$\begin{aligned} U^o \left(c|\bar{a} \right) &\geq U^o \left(c|a \right) \\ U^y \left(c|\bar{a} \right) &\geq U^y \left(c|a' \right) \\ e(X, \bar{a}|h, s) &\leq e(X, a'|h, s) \end{aligned}$$

In a more general model, parents may wish to mold their children's preferences in order to increase their cardinal utility (e.g., by increasing their overall appreciation of life). In part, Assumption 2 can be regarded as a normalization of utility, in the sense that utility

and effort cost are defined relative to a point where mutually beneficial investments in improving cardinal utility have already been carried out. The assumption is restrictive in the sense that the same bliss point $\bar{a}$ is assumed to apply to utility in both and and old age and that young and old agree on this bliss point, which simplifies the analysis.

3.2 Parenting Styles

We are now ready to introduce a formal definition of parenting styles, based on the Baumrind classification in developmental psychology.

Definition 1. *Consider a parent who makes the parenting choices $a' = a^*$ and $X = X^*$. We define the following four parenting styles:*

1. ***Authoritarian**: A parent is authoritarian if there exists an $\tilde{X} \in \mathcal{X}$ such that $v^y(X^*, a^*) < v^y(\tilde{X}, a^*)$ and $e\left(X^*, a^*|h, s\right) \geq e(\tilde{X}, a^*|h, s)$. That is, an authoritarian parent spends effort to constrain the child's choice for a purpose other than making the child happy.*

2. ***Authoritative**: A parent is authoritative if there exists an $\tilde{a}' \in \mathcal{A}$ such that $v^y(X^*, a^*) < v^y(X^*, \tilde{a}')$ and $e\left(X^*, a^*|h, s\right) \geq e(X^*, \tilde{a}'|h, s)$. That is, an authoritative parent spends effort to mold the child's preferences for a purpose other than making the child happy.*

3. ***Neglecting**: A parent is neglecting if for all $\tilde{X} \in \mathcal{X}$ and $\tilde{a}' \in \mathcal{A}$, we have $e\left(X^*, a^*|h, s\right) \leq e(\tilde{X}, \tilde{a}'|h, s)$, with a strict inequality for at least one pair $\tilde{X}, \tilde{a}'$. That is, a neglecting parent makes the parenting choices that minimize parenting effort.*

4. ***Permissive**: A parent is permissive if she does not meet the definitions of at least one of the other parenting styles.*

If the choice sets X in the feasible set $\mathcal{X}\left(h, s\right)$ are nested, authoritarian parenting implies restricting the child's choice to a smaller set than the largest possible. Authoritarian and authoritative parents exert effort to affect their children's behavior, even at the cost of reducing their cardinal utility. Note that the authoritarian and authoritative styles are not mutually exclusive, as parents may exercise effort to both restrict the children's choice and change their preferences. We sometimes refer to parents who are either authoritarian or authoritative (or a combination of the two) as engaging in *intensive par-*

enting. Neglecting parents minimize parenting effort.[25] In contrast, permissive parents do spend effort on parenting, but they do so solely in order to increase the child's choice set and utility.

Our model articulates specific motives that induce parents to choose a particular parenting style among those in Definition 1. Even without further specializing the model, we can state a number of results on the conditions under which each style arises.

Proposition 1. *If $\lambda = 0$, then the parent is neither authoritarian nor authoritative.*

When $\lambda = 0$ parents are fully altruistic (in a Beckerian sense) and have no motive for exercising effort in a way that lowers their children's utility. So, paternalism is a necessary condition for intensive parenting.

Proposition 2. *Suppose $\lambda \in (0, 1)$. If the parent is authoritarian and $\tilde{X}$ is a feasible choice set such that $X^* \subset \tilde{X}$ and $e(X^*, a^*|h, s) > e(\tilde{X}, a'|h, s)$, then we have that $\left(c^y, x, h'|X^*, a^*\right) \neq \left(c^y, x, h'|\tilde{X}, a^*\right)$. Likewise, if the parent is authoritative and $e(X^*, a^*|h, s) \geq e(X^*, \bar{a}|h, s)$, then we must have $\left(c^y, x, h'|X^*, a^*\right) \neq \left(c^y, x, h'|X^*, \bar{a}\right)$.*

This proposition speaks to the motivation of intensive parenting: restricting children's choices or molding their preferences is not an end in itself, but a means to affect their behavior. The following corollary states that if the child has only one feasible choice, the parent has no reason to mold her preferences, as this would only reduce her utility.[26]

Corollary 1. *If the optimal X is a singleton, then the parent is not authoritative.*

Proposition 3. *If the optimal a' is such that $U^y\left(c|a'\right) = U^o\left(c|a\right)$, then the parent is not authoritarian.*

If the parent molds her child's preferences to the extent that there is no disagreement about what the child should do, there is no point to restricting her choice set. Corollary 1 and Proposition 3 establish limit cases in which authoritarian and authoritative parenting are substitutes: it is not necessary to engage in both strategies when children either have no choice or already do exactly what their parents want.

[25] The condition that there is at least one choice of $\tilde{X}, \tilde{a}'$ that would require higher effort in the definition of neglecting parenting is imposed to capture the case where there is no effort cost for molding the children's choices and preferences (an example of this kind will be given below). Without the requirement of at least one strict inequality, in such a case all parents would be neglectful by definition, which would not be a desirable feature of a model of parenting styles.

[26] The result follows immediately from Proposition 2, and the proof is therefore omitted.

3.3 The Differentiable Case

Additional characterization of the decision problem is possible when the problem is differentiable. To analyze this case, we assume that U^o and U^y are continuous, twice differentiable, and concave in c. In addition, we assume that all choice and state variables are unidimensional, i.e., $[c, h, x, a] \in (R^+)^4$. We also introduce the following assumptions.

Assumption 3. *The set $\mathcal{X}(h,s)$ can be expressed as $\mathcal{X}(h,s) = \{X(h,s,r) \,|r \in [0,1]\}$, where for any $r, \tilde{r}$ such that $\tilde{r} > r$, $X(h,s,r) \subset X(h,s,\tilde{r})$.*

Assumption 4. *The function e is separable, namely, $e(X(h,s,r), a'|h,s) = e^r(r|h,s) + e^A(a'|h,s)$, where e^r and e^A are twice differentiable convex functions of r and a', respectively, with minima at $\bar{r}$ and $\bar{a}$.*

Assumption 3 allows us to index choice sets by the real variable r, such that all choice sets are nested and a larger r indicates a more restricted choice set. Assumption 4 simplifies the analysis by requiring separability. Convexity ensures that the problem is concave and first-order conditions are necessary for interior solutions.

The decision problem of choosing a' and r can now be written as:

$$v^o(a,h,s) = \max_{a' \in \mathcal{A}, r \in [0,1]} \Big\{ U^o\left(C^o(h,s)|a\right) - e^r\left(r|h,s\right) - e^A(a'|h,s) + \delta E_{s'}\big[(1-\lambda) U^y\left(C^y(x(r,a'),s')|a'\right) + \lambda U^o\left(C^y\left(x(r,a'),s'\right)|a\right) + \beta v^o\left(a', H(x(r,a'),s'),s'\right) \big] \Big\},$$

where

$$x(r,a') = \underset{x \in X(h,s,r)}{\operatorname{argmax}} \left\{ E_{s'}\left[U^y\left(C^y(x,s')|a'\right) + \beta v^o\left(a', H(x,s'),s'\right) \right] \right\}.$$

If the child's choice of x is interior, the first-order condition for her problem yields:

$$E_{s'}\big[U^y_{c^y}\left(C^y(x(r,a'),s')|a'\right) C^y_x(x(r,a'),s') + \beta v^o_{h'}\left(a', H(x(r,a'),s'),s'\right) H_x(x(r,a'),s') \big] = 0.$$

Consider now the parent's choice of a'. If the optimal choice of a' is interior and the

function $x\left(r,a'\right)$ is differentiable at the optimum, the first-order condition yields:

$$
\begin{aligned}
&e^{A}_{a'}\left(a'|h,s\right)= \\
&\delta E_{s'}\Bigg[\left(1-\lambda\right)\left(U^{y}_{c^{y}}\left(C^{y}(x\left(r,a'\right),s')|a'\right)C^{y}_{x}(x\left(r,a'\right),s')x_{a'}\left(r,a'\right)+U^{y}_{a'}\left(C^{y}(x\left(r,a'\right),s')|a'\right)\right) \\
&\qquad\qquad+\lambda\left(U^{o}_{c^{y}}\left(C^{y}(x\left(r,a'\right),s')|a\right)C^{y}_{x}\left(x\left(r,a'\right),s'\right)x_{a'}\left(r,a'\right)\right)\Bigg] \\
&+\delta\beta E_{s'}\Bigg[v^{o}_{a'}\left(a',H(x\left(r,a'\right),s'),s'\right)+v^{o}_{h'}\left(a',H(x\left(r,a'\right),s'),s'\right)H_{x}(x\left(r,a'\right),s')x_{a'}\left(r,a'\right)\Bigg].
\end{aligned}
$$

Two cases are possible here. First, if $x_{a'}\left(r,a'\right)=0$ at the optimal choice of a', the parent sets:

$$
e^{A}_{a'}(a'|h,s)=\delta\left(1-\lambda\right)E_{s'}\left[U^{y}_{a'}\left(C^{y}(x\left(r,a'\right),s')|a'\right)\right]+\delta\beta E_{s'}\left[v^{o}_{a'}\left(a',H(x\left(r,a'\right),s'),s'\right)\right]. \quad (6)
$$

In this case, the optimal choice is to set $a'=\bar{a}$. To see why, note that Assumption 2 implies that (i) $e^{A}_{a'}(a'|h,s)$ is minimized at $\bar{a}$, and that (ii) $U^{y}\left(c^{y},s'\right)|a')$ and $v^{o}\left(a',h',s'\right)$ are maximized at $\bar{a}$. The case of $x_{a'}\left(r,a'\right)=0$ covers the possibilities that $X\left(h,s,r\right)$ is a singleton and that the child's choice is at a corner.

The second case is when $x_{a'}\left(r,a'\right)\neq 0$ at the optimal choice of a'. In this case, the first-order condition of the child holds with equality. Then, applying the envelope theorem yields:

$$
\begin{aligned}
&e^{A}_{a'}(a'|h,s)=\delta E_{s'}\Bigg[\left(1-\lambda\right)U^{y}_{a'}\left(C^{y}(x\left(r,a'\right),s')|a'\right) \\
&\qquad\qquad+\lambda U^{o}_{c^{y}}\left(C^{y}(x\left(r,a'\right),s')|a\right)C^{y}_{x}\left(x\left(r,a'\right),s'\right)x_{a'}\left(r,a'\right)\Bigg] \\
&+\beta\delta E_{s'}\Bigg[v^{o}_{a'}\left(a',H(x\left(r,a'\right),s'),s'\right)+\lambda v^{o}_{h'}\left(a',H(x\left(r,a'\right),s'),s'\right)H_{x}\left(x\left(r,a'\right),s'\right)x_{a'}\left(r,a'\right)\Bigg].
\end{aligned}
$$

Consider now some special cases. First, if $\lambda=0$ (pure altruism), then the solution is again given by equation (6), so that parents set $a'=\bar{a}$. If $\lambda=1$ (pure paternalism), setting $a'=\bar{a}$ is generally not optimal as long as $x_{a'}\left(r,a'\right)\neq 0$. Purely paternalistic parents are especially prone to distort their children's choice, because they disregard the utility cost that children suffer when preferences are molded away from the natural inclination.

Consider, next, the choice of r. There are two possible cases. First, suppose that the

optimal r does not bind the child's choice. Namely, there exists an interval $[r', r'']$ with $r' < r < r''$ such that $x(r, a)$ takes on the same value for any $r \in [r', r'']$. In this case the choice of x is independent of r in a neighborhood of the optimum, and the parent sets $r = \bar{r}$.[27] Second, suppose that r does constrain the child's choice, i.e., there does not exist an interval around the optimal r where the child's choice is constant. In this case (generically) the parent sets $r \neq \bar{r}$. If, in addition, the policy function $x(r, a')$ is differentiable at the optimum, then a necessary condition for optimality is:

$$e_r^r(r|h,s) = \delta(1-\lambda) E_{s'} \underbrace{\left[\begin{array}{c} U_{c^y}^y \left(C^y(x(r,a'),s')|a'\right) C_x^y\left(x(r,a'),s'\right) \\ +\beta v_{h'}^o\left(a', H(x(r,a'),s'),s'\right) H_x(x(r,a'),s') \end{array} \right]}_{\leq 0} x_r(r,a')$$

$$+\delta\lambda E_{s'} \underbrace{\left[\begin{array}{c} U_{c^y}^o \left(C^y(x(r,a'),s')|a\right) C_x^y\left(x(r,a'),s'\right) \\ +\beta v_{h'}^o\left(a', H(x(r,a'),s'),s'\right) H_x(x(r,a'),s') \end{array} \right]}_{?} x_r(r,a').$$

The parent trades off the effort cost associated with choosing $r \neq \bar{r}$ with the benefits of expanding or restricting the choice set. Even though the lifetime utility of the child is decreasing in r, a paternalistic parent may still gain from restricting the child's choice set by increasing r. If $\lambda = 0$, the altruistic parent will never spend effort to restrict the choice set, as stated in Proposition 1 above, but may choose to expand the child's choice set to increase her utility. Conversely, if $\lambda = 1$, the parent may choose to expand or restrict the choice set so as to align better the child's choice with the parent's preferences. An authoritarian behavior requires (i) that the parent be paternalistic and (ii) that actively restricting the child's choice set increases the utility the parent derives from the child's choices.

4 Patience and Investment in Skills

To shed light on the socio-economic determinants of parenting style, in this section we apply the general model to a salient dimension of individual preferences: patience. The underlying friction is that children are innately less patient than their parents would like

[27] If, in addition, the parent chooses $a' = \bar{a}$, then she is a neglecting parent.

them to be. As a result, children may be unwilling to undertake investments, such as educational effort, at the level that their parents would consider optimal.

We assume that parents can increase their children's relative appreciation of future rewards by imbuing them with a sense of guilt about immediate gratification. This comes at the cost of lowering the child's utility. Alternatively, a parent can act in an authoritarian way, i.e., directly force her child to undertake the investment the parent desires. This option also comes at a cost: it stifles the child's independent discovery of her own talent and thus may diminish the child's success in the labor market.

4.1 Environment

We parameterize preferences by an isoelastic utility function. The parent's felicity is given by $U^o(c^o|a) = (c^o)^{1-\sigma} / (1-\sigma)$, where we assume $0 < \sigma < 1$, implying that utility is positive. The child's choice x is a two-dimensional vector comprising an occupational choice and an educational investment, which together imply a (stochastic) level of consumption. The child's felicity is given by:

$$U^y(c^y|a) = a\frac{(c^y)^{1-\sigma}}{1-\sigma}.$$

Here the parameter $a \in \mathcal{A} = [1, \bar{a}]$, where $\bar{a} > 1$ captures children's innate preference for instant gratification. The preference parameter a is chosen by the parent, and the possibility of choosing $a < \bar{a}$ captures the option for parents to stifle the child's enjoyment of young-age consumption. Although cardinal utility is maximized by setting $a = \bar{a}$, the parent may choose a lower a in order to make the child more patient.[28]

The child's choice vector x has two components: an occupational choice x^μ and an effort choice $x^e \in [0, 1]$, where the latter can be interpreted as effort in formal education and as the acquisition of skills on the job. Both choices, together with the realization of an exogenous stochastic shock s', determine the accumulation of human capital, $h' = (x, s')$, where $x = [x^\mu, x^e]$. The return to education effort x^e is determined by a parameter R.

[28]Note that in this application a affects only the young-age felicity. One could alternatively argue that patience also yields a better ability to enjoy future consumption. This could be captured by assuming that $U^o(x, a) = f(a)\frac{c^{1-\sigma}}{1-\sigma}$, where f is a decreasing function. This specification would give similar results.

The budget constraints and laws of motion for human capital are then given by:

$$\begin{aligned} c^y &= C^y(x, s') = (1 - x^e)\, y(x^\mu, s'), \\ c^o &= C^o(h, s') = h', \\ h' &= h(x, s') = (1 + Rx^e)\, y(x^\mu, s'). \end{aligned}$$

The function $y(x^\mu, s')$ captures individual productivity, determined by the occupational choice and the individual realization of the shock. The microfoundation for the impact of the occupational choice on productivity is as follows. There are different occupations that a child can choose from. The productivity of an individual in a given occupation has two components: first, there is her individual talent for that occupation, which may be high (y_H) or low ($y_L < y_H$); second, there is a premium for working in the same profession as one's parent, denoted by $\mu \geq 1$. This incumbency premium reflects the acquisition of skills within the family as well as entry barriers (e.g., guilds or professional associations that protect incumbent families). There are two possible strategies for choosing an occupation, given by $x^\mu \in \{x^{HOME}, x^{SEARCH}\}$. First, the child could stay at home and follow in the parents' footsteps, $x^\mu = x^{HOME}$. In this case the child benefits from the premium μ. However, this occupation may or may not be the best match with her talent, so that:

$$y\left(x^{HOME}, s\right) = \begin{cases} \mu y_H & \text{with probability } 0.5, \\ \mu y_L & \text{with probability } 0.5. \end{cases}$$

Alternatively, the child could leave home and search independently for her true calling. In this case, the child always finds an occupation for which she has talent, so that:

$$y\left(x^{SEARCH}, s'\right) = y_H$$

independently of s'.

Next, consider the parental choice of the child's choice set, X. Here, we assume that when the child stays at home, the parent can perfectly monitor her effort choice x^e. In contrast, when the child leaves home, she can choose x^e independently. This implies that the set of feasible choice sets $\mathcal{X}$ comprises two subsets, $\mathcal{X} = \{X^{HOME}, X^{FREE}\}$. Here X^{HOME} is the more restricted choice set for a child who stays at home. Since the parent retains control, it is optimal for the parent to assign the effort that is optimal from

the parent's perspective, which we denote by $\bar{x}^e$. In addition, the child is forced to adopt the parent's occupation. We therefore have:[29]

$$X^{HOME} = \left\{ \left(\begin{array}{c} x^\mu \\ x^e \end{array} \right) \middle| x^\mu = x^{HOME}, x^e = \bar{x}^e \right\}.$$

X^{FREE} can be interpreted as granting the child independence. For example, a child born on a farm may be allowed to study in the city, so as to ultimately find the occupation that best suits her. Once the child has moved to the city, however, the parent loses control over her choices, and the child may decide to slack off rather than invest in her future success.[30] Formally,

$$X^{FREE} = \left\{ \left(\begin{array}{c} x^\mu \\ x^e \end{array} \right) \middle| x^\mu \in \{x^{HOME}, x^{SEARCH}\}, 0 \leq x^e \leq 1 \right\}.$$

Note that $X^{HOME} \subset X^{FREE}$.

Since the parent's utility depends only on her human capital (the preference parameter a affects only young age utility, and the shock s affects future utility only through it's impact on h), we can write $v^o(a, h, s) = v^o(h)$ and $w(X, a'|a) = w(X, a')$. The parent's value function can be written as:

$$v^o(h) = \frac{h^{1-\sigma}}{1-\sigma} + \max_{a' \in \mathcal{A}, X \in \mathcal{X}} \{-e(X, a'|h) + \delta w(X, a')\}.$$

We first consider the case where parental effort is costless, $e(X, a'|h) = 0$. We can now analyze the optimal parenting choices of a' and X. It is useful to first consider optimal choices conditional on being authoritarian, and then compare authoritarian parenting to the other possible styles.

[29] In principle, another alternative would be for the parent to keep the child at home, but still let the child choose effort x^e freely. However, this choice set is (at least weakly) dominated from the parent's perspective by a choice set that prescribe the parent's preferred effort choice. Hence, we omit this additional possibility from the further discussion.

[30] Our parable is consistent with the recent findings of Bursztyn and Coffman (2012). They document in an experimental study that parents prefer transfers conditional on their children attending schools to larger unconditional transfers, while the result is reversed if they are offered a text message notification whenever their children miss school. They interpret the finding as evidence of an intergenerational conflict in schooling decisions, with lack of monitoring creating an agency problem similar to that captured by our theory.

4.2 Authoritarian Parenting

In this environment, a parent adopts an authoritarian parenting style if she chooses $X = X^{HOME}$. Since the choice set X of the child is now a singleton, the corollary of Proposition 2 implies that the parent will choose $a' = \bar{a}$. Since the parent is uncertain about her child's productivity in the parent's occupation, the continuation utility involves expectations:

$$\begin{aligned} w\left(X^{HOME}, \bar{a}\right) &= E_{s'}\left[(\lambda + (1-\lambda)\bar{a})\,\frac{\left((1-\bar{x}^e)\,y\left(x^{HOME}, s'\right)\right)^{1-\sigma}}{1-\sigma} + \beta v^o(h\,(x, s'))\right] \\ &= \tilde{w}\left(X^{HOME}, \bar{a}\right) + \beta\delta \max_{a''\in\mathcal{A}, X\in\mathcal{X}} w\,(X, a''), \end{aligned}$$

where

$$\tilde{w}\left(X^{HOME}, \bar{a}\right) = \frac{\mu^{1-\sigma}}{2}\left(y_H^{1-\sigma} + y_L^{1-\sigma}\right)\left((\lambda + (1-\lambda)\bar{a})\,\frac{(1-\bar{x}^e)^{1-\sigma}}{1-\sigma} + \beta\frac{(1+R\bar{x}^e)^{1-\sigma}}{1-\sigma}\right), \tag{7}$$

and the optimal effort choice from the parent's perspective $\bar{x}^e$ is given by:

$$\begin{aligned} \bar{x}^e &= \operatorname*{argmax}_{x^e}\left\{(\lambda + (1-\lambda)\bar{a})\,\frac{(1-x^e)^{1-\sigma}}{1-\sigma} + \beta\frac{(1+Rx^e)^{1-\sigma}}{1-\sigma}\right\} \\ &= \frac{1 - \left(\frac{(\lambda+(1-\lambda)\bar{a})}{\beta R}\right)^{\frac{1}{\sigma}}}{1 + R\left(\frac{(\lambda+(1-\lambda)\bar{a})}{\beta R}\right)^{\frac{1}{\sigma}}}. \end{aligned} \tag{8}$$

It is useful to note, for future reference, that $\bar{x}^e \to 1$ as $R \to \infty$. Thus, for large R, $\tilde{w}\left(X^{HOME}, \bar{a}\right)$ is determined entirely by the adult-age felicity.[31] Conversely, we have $\bar{x}^e = 0$ if $R = 0$: there is no point in exerting effort if the return to effort is zero.

4.3 Non-Authoritarian Parenting

We now describe the choice of a parent who grants independence to the child by selecting the choice set X^{FREE}. Unless the incumbency premium μ is very large, the child

[31] This result hinges on the assumption that $\sigma > 1$, implying that the substitution effect dominates over the income effect.

moves to the city and chooses the occupation according to her comparative advantage, thus $y = y_H$. We assume that even if the child eventually chooses the same occupation as her parent, the incumbency premium μ is available only if the child stays at home. The parent's continuation utility can be broken down as follows:

$$w\left(X^{FREE}, a'\right) = \tilde{w}\left(X^{FREE}, a'\right) + \beta\delta \max_{a'' \in A, X \in \mathcal{X}} w\left(X, a''\right),$$

where

$$\tilde{w}\left(X^{FREE}, a'\right) = y_H^{1-\sigma}\left(\left(\lambda + (1-\lambda)a'\right)\frac{\left(1 - x^e\left(a'\right)\right)^{1-\sigma}}{1-\sigma} + \beta\frac{\left(1 + Rx^e\left(a'\right)\right)^{1-\sigma}}{1-\sigma}\right) \tag{9}$$

and the effort choice $x^e\left(a'\right)$ chosen by the child is:

$$\begin{aligned} x^e\left(a'\right) &= \underset{x^e}{\operatorname{argmax}}\left\{a'\frac{\left(1-x^e\right)^{1-\sigma}}{1-\sigma} + \beta\frac{\left(1+Rx^e\right)^{1-\sigma}}{1-\sigma}\right\} \\ &= \frac{1 - \left(\frac{a'}{\beta R}\right)^{\frac{1}{\sigma}}}{1 + R\left(\frac{a'}{\beta R}\right)^{\frac{1}{\sigma}}}. \end{aligned} \tag{10}$$

Hence, while the parent cannot dictate a particular effort choice to the child, the parent can influence the choice through setting a'. We can now characterize the optimal choice of a', i.e., the degree to which the parent stifles the child's enjoyment of young-age consumption in order to induce more patience. It is convenient to define $c^y\left(x^e\left(a'\right)\right) = \left(1 - x^e\left(a'\right)\right) y_H$.

Lemma 1. *Conditional on a non-authoritarian parenting style, the optimal choice of the child's preferences a' satisfies the following condition:*

$$0 \geq \underbrace{\lambda\left(a'-1\right)c^y_{a'}\left(x^e\left(a'\right)\right)}_{\text{marginal benefit of decreasing } a'} - \underbrace{\left(1-\lambda\right)\frac{c^y\left(x^e\left(a'\right)\right)}{1-\sigma}}_{\text{marginal cost of decreasing } a'} \tag{11}$$

or:

$$0 \geq \lambda\left(a'-1\right)\left(\frac{1}{\sigma}\frac{1}{a'}\frac{1}{1+\left(\frac{a'}{\beta R^{1-\sigma}}\right)^{\frac{1}{\sigma}}}\right) - \frac{1-\lambda}{1-\sigma}, \tag{12}$$

where the strict inequality holds if and only if $a' = \bar{a}$.

The marginal benefit in (11) is positive since increasing the child's patience (i.e. lowering a') causes an increase in the human capital investment that the parent approves of (note that $c^y_{a'} > 0$). The marginal cost captures the utility loss suffered by the child from being "brain-washed" with responsible, adult-like values. How the parent weighs costs and benefits depends on the extent of paternalism λ. If $\lambda = 0$, the marginal benefit vanishes, and the optimal solution is a corner, $a' = \bar{a}$, corresponding to a permissive parenting style. By continuity, a permissive parenting style is also optimal for a range of low values for the paternalism parameter λ. In contrast, if $\lambda = 1$ the parent does not care about the utility loss inflicted on the child. In this case it is optimal to set $a' = 1$, i.e., the parent adopts a purely authoritative style, inducing the child to take the same action that the parent would choose. The following lemma summarizes the discussion.

Lemma 2. *Let a^* denote the optimal choice of a', defined implicitly by (12). There exists $\underline{\lambda} > 0$ such that, for all $\lambda \leq \underline{\lambda}$, $a^* = \bar{a}$ (permissive parenting style). For $\lambda = 1$, $a^* = 1$ (purely authoritative parenting style).*

We can now establish a key result regarding the role of the return to human capital investment R for the choice between permissive and authoritative parenting.

Proposition 4. *Suppose that $\lambda > \sigma \frac{\bar{a}}{\bar{a}-(1-\sigma)}$, and let $\bar{R} \equiv \left(\frac{\sigma\bar{a}(1-\lambda)}{\lambda(\bar{a}-(1-\sigma))-\sigma\bar{a}}\right)^{\frac{\sigma}{1-\sigma}} \left(\frac{\bar{a}}{\beta}\right)^{\frac{1}{1-\sigma}}$. The optimal a'^* is determined as follows:*

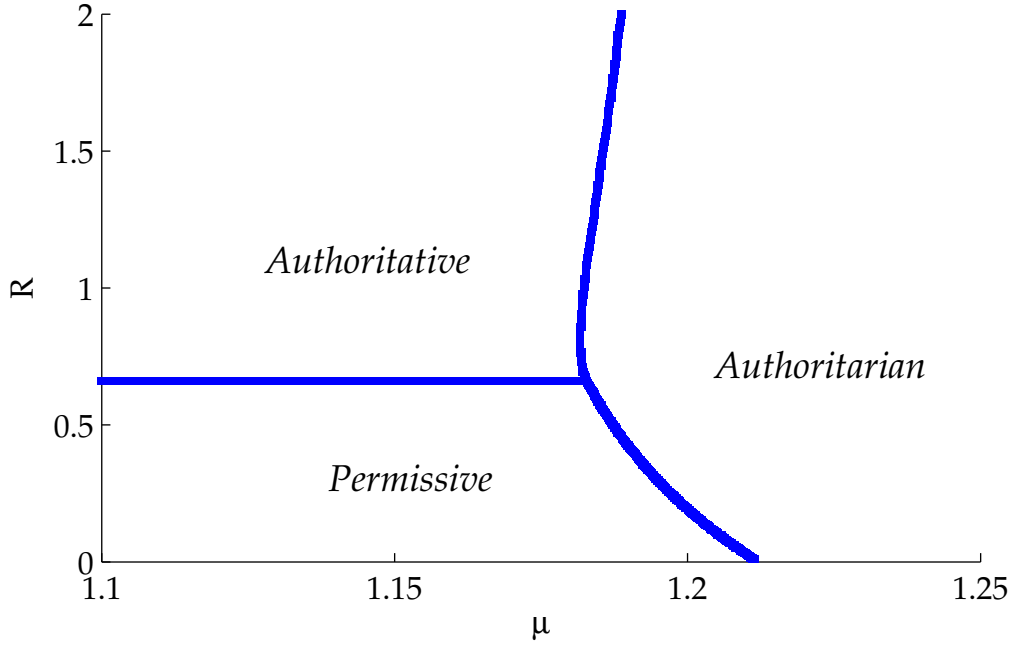
1. *If $R \leq \bar{R}$, then $a^* = \bar{a}$.*
2. *If $R > \bar{R}$, then $a^* < \bar{a}$ and a^* is strictly decreasing in R, with a lower bound equal to $\bar{a}^* = \lim_{R\to\infty} a^* = \lambda^{\frac{1-\sigma}{\lambda-\sigma}}$.*

Conversely, if $\lambda \leq \sigma \frac{\bar{a}}{\bar{a}-(1-\sigma)}$, then $a^* = \bar{a}$ independently of R.

Conditional on granting the child independence, the parent adopts a permissive style if the return to human capital is low ($R < \bar{R}$), and an authoritative style if the return to human capital is high ($R \geq \bar{R}$). In the high range, the extent to which the parent molds the child's preferences is increasing in R.[32]

[32]Note that $\lambda < 1$ impllies that $\lambda^{\frac{1-\sigma}{\lambda-\sigma}} > 1$, hence, $a^* > 1$. $a^* = 1$ is only attained by fully paternalistic parents.

Figure 4: Equilibrium parenting style as a function of incumbency premium μ and return to human capital R.



4.4 Equilibrium Parenting Style

We can now analyze the choice between authoritarian and non-authoritarian (i.e., either permissive or authoritative) parenting. This choice hinges on the return to incumbency μ. In particular, for a fixed R, there exists a unique threshold $\hat{\mu}(R)$ such that for $\mu \geq \hat{\mu}(R)$ parents choose to be authoritarian.

Figure 4 displays the optimal parenting style as a function of the return to human capital R and the incumbency premium μ, given parameters $\sigma = 0.5$, $\beta = 0.8$, $\lambda = 0.95$, $\bar{a} = 1.5$, and $y_H/y_L = 1.5$. The figure shows that the critical level $\hat{\mu}(R)$ above which parents are authoritarian is first decreasing and then increasing in R. The reason is that the threshold depends on the severity of the agency problem in choosing education effort. If $R = 0$, there is no disagreement, because parents and children agree that optimal effort is zero. Disagreement also vanishes as $R \to \infty$, since then both parents and children think that maximum effort should be devoted to education.[33] However, the agency problem bites for intermediate values of R. In this region, controlling the effort of the child becomes more attractive for the parent, and thus the threshold $\hat{\mu}(R)$ shifts downward (i.e., to the

[33] In this case, an authoritarian parenting style is chosen over permissive parenting only if the incumbency premium exceeds the value of flexibility. This threshold is defined in Proposition 5.

left in Figure 4).[34]

Consider the choice between authoritative and permissive parenting for $\mu < \hat{\mu}(R)$. As shown in Proposition 4, in this region there is a fixed threshold $\bar{R}$ such that for $R > \bar{R}$, parents are authoritative, and for $R \leq \bar{R}$ they are permissive. Proposition 4 implies that for sufficiently low λ, authoritative parenting is never optimal. That is, if we lower λ, the boundary between permissive and authoritative parenting in Figure 4 first shifts upward and then disappears entirely.

Our results for the optimal choice of parenting style are summarized in the following proposition.

Proposition 5. *There exists a function $\hat{\mu}(R)$ where $0 < \hat{\mu}(R) \leq \bar{\mu}$ such that:*

1) If $\lambda > \sigma \frac{\bar{a}}{\bar{a}-(1-\sigma)}$, then:

- *If $\mu > \hat{\mu}(R)$, parents choose an authoritarian style.*
- *If $\mu \leq \hat{\mu}(R)$ and $R > \bar{R}$, parents choose an authoritative style.*
- *If $\mu \leq \hat{\mu}(R)$ and $R \leq \bar{R}$, parents choose a permissive style.*

2) If $\lambda \leq \sigma \frac{\bar{a}}{\bar{a}-(1-\sigma)}$, then:

- *If $\mu > \hat{\mu}(R)$, parents choose an authoritarian style.*
- *If $\mu \leq \hat{\mu}(R)$, parents choose a permissive style.*

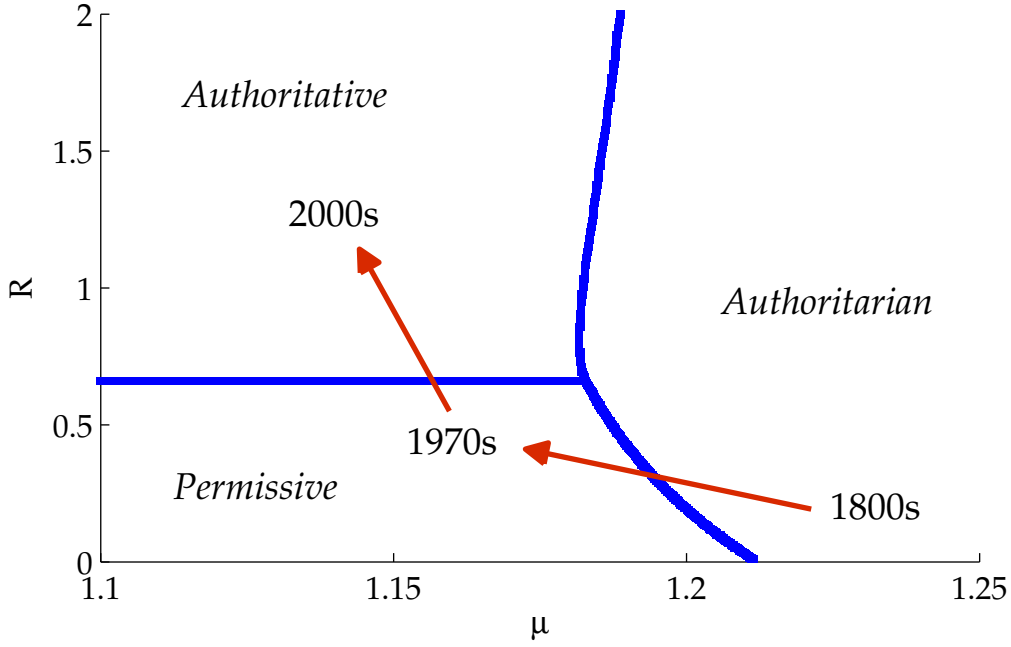
Here $\bar{R}$ is the threshold characterized in Proposition 4 and $\bar{\mu}$ is the threshold where the incumbency premium exactly offsets the value of flexibility, given by:

$$\bar{\mu} \equiv \left(\left(2y_H^{1-\sigma}\right) / \left(y_H^{1-\sigma} + y_L^{1-\sigma}\right)\right)^{\frac{1}{1-\sigma}}.$$

Moreover, $\mu(0) = \lim_{R\to\infty} \hat{\mu}(R) = \bar{\mu}$, and $\hat{\mu}(R) < \bar{\mu}$ for $0 < R < \infty$.

[34]Interestingly, the $\hat{\mu}(R)$ function is constant (i.e., the boundary between authoritarian and the other parenting styles in Figure 4 is vertical) when either $\lambda = 0$ or when $\lambda = 1$. The reason is that in these extreme cases the agency problem is entirely resolved, either because the parent completely agrees with the child ($\lambda = 0$) or because the child is indoctrinated to completely agree with the parent ($\lambda = 1$).

Figure 5: Evolution of parenting styles over time, driven by shifts in incumbency premium μ and return to human capital R.



In summary, there are three regions of the parameter space corresponding to each of the parenting styles.[35] For a high incumbency premium, the authoritarian style is optimal. For a low incumbency premium and a low return to human capital, permissive parenting is adopted. Finally, for a low incumbency premium and a high return to human capital, parents choose to be authoritative.

Figure 5 summarizes our interpretation of the historical evolution of parenting styles discussed in the introduction. We view pre-industrial economies as characterized by a high incumbency premium μ and a low return to human capital R. Hence, initially an authoritarian parenting style is adopted. Subsequently, industrialization brought about an erosion of incumbency advantage, an increase in occupational specialization, and a rising demand for human capital. These trends are represented by a fall in μ and a modest rise in R, moving the economy towards a higher prevalence of permissive parenting. The most recent decades feature a further decline in the incumbency premium μ and a sharp rise in the return to human capital R, leading to the current situation where authoritative parenting is dominant.[36]

[35] The neglecting parenting style does not apply here because the cost of parenting is set to zero.

[36] Figure 5 is drawn for a particular value of the paternalism parameter ($\lambda = 0.95$). We view the popula-

4.5 Heterogeneity in the Cost of Parenting

So far, we have abstracted from parental effort costs. In this section, we extend the model by introducing heterogeneity in the cost of parenting. There are two types of dynasties, distinguished by skill. For high-skill parents, molding their children's preferences is costless, as in the previous section. In contrast, low-skill parents who engage in authoritative parenting face a cost given by:

$$e^A(a'|h,s) = \begin{cases} 0 & \text{if} \quad a' = \bar{a}, \\ e^A & \text{if} \quad a' < \bar{a}. \end{cases}$$

This assumption is in line with the discussion in Section 2.2, where we argue that education improves parents' ability to motivate their children and mold their preferences.

To start with, consider a society where the return to incumbency is low, and hence the relevant margin is between permissive and authoritative parenting (namely, all parents choose X^{FREE}). We can establish the following result.[37]

Proposition 6. *For given parameters, there exists thresholds for the degree of paternalism $\bar{\lambda}_H, \bar{\lambda}_L$ where $0 < \bar{\lambda}_H < \bar{\lambda}_L < 1$ such that: (i) no parents with $\lambda < \bar{\lambda}_H$ exert effort in molding their children's preferences; (ii) no low-skill parents with $\lambda \in [\bar{\lambda}_H, \bar{\lambda}_L]$ and all high-skill parents with $\lambda \in [\bar{\lambda}_H, \bar{\lambda}_L]$ exert effort in molding their children's preferences; (iii) all parents with $\lambda > \bar{\lambda}_L$ exert effort in molding their children's preferences.*

In this environment, we can consider again the effect of an increase in the return to education effort R. The incentive to exert child-rearing effort increases for all parents. Paternalistic parents with $\lambda \in \left(\bar{\lambda}_L, 1\right)$ will respond on the intensive margin by increasing their parental effort, and so will high-skill parents with $\lambda \in [\bar{\lambda}_H, \bar{\lambda}_L]$. In addition, there will be some response on the extensive margin for both types. The range of λ for which parents continue to be permissive and do not react to the change in R will be larger for low-skill parents. Although the average response hinges on the distribution of λ in the population, the fact that the range of inaction is larger for low-skill parents

tion as heterogeneous in λ, and to some extent the incumbency premium and the return to human capital investment may vary across families as well (see below). Thus, the evolution depicted in Figure 5 does not necessarily affect all families equally, but should be interpreted as broad trends that shift the distribution across the parenting styles in the population.

[37] The proof is an immediate extension of the proof of Proposition 5 and is omitted.

suggests that, as a group, high-skill parents will respond more strongly to an increase in R. The predictions of the theory are consistent with the evidence on parental time use by education discussed in Section 2.2.

Next, consider in the same setting the case in which μ is sufficiently large so that authoritarian parenting is also a relevant choice. For simplicity, assume that e^A is sufficiently large that low-skill parents are never authoritative. The following proposition characterizes the parenting choices in this setting.

Proposition 7. *There exist functions $\hat{\mu}_L(R)$ and $\hat{\mu}(R)$ where $0 < \hat{\mu}_L(R) \leq \hat{\mu}(R) \leq \bar{\mu}$ such that:*

1) If $\lambda > \sigma \frac{\bar{a}}{\bar{a}-(1-\sigma)}$, then:

- *If $\mu \geq \hat{\mu}(R)$, all parents choose an authoritarian style.*
- *If $\mu \in [\hat{\mu}_L(R), \hat{\mu}(R)]$ and $R > \bar{R}$, high-skill parents choose an authoritative style and low-skill parents choose an authoritarian style.*
- *If $\mu \leq \hat{\mu}_L(R)$ and $R > \bar{R}$, high-skill parents choose an authoritative style and low-skill parents choose a permissive style.*
- *If $\mu \leq \hat{\mu}(R)$ and $R \leq \bar{R}$, then $\hat{\mu}_L(R) = \hat{\mu}(R)$ and all parents choose a permissive style.*

2) If $\lambda \leq \sigma \frac{\bar{a}}{\bar{a}-(1-\sigma)}$, then $\hat{\mu}_L(R) = \hat{\mu}(R)$, and:

- *If $\mu \geq \hat{\mu}(R)$, parents choose an authoritarian style.*
- *If $\mu < \hat{\mu}(R)$, parents choose a permissive style.*

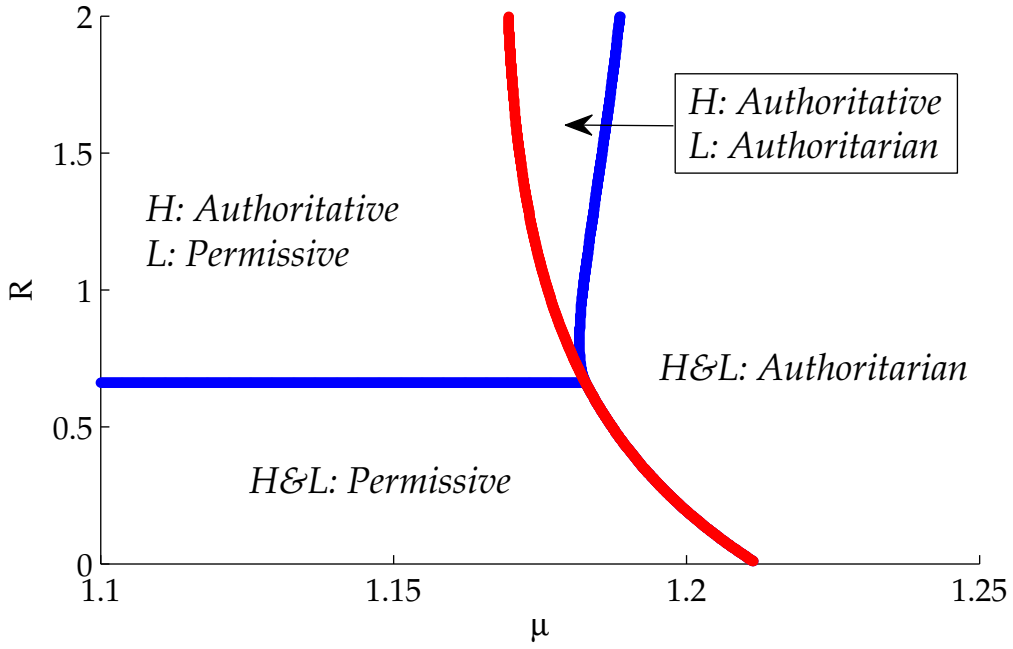
Here $\bar{R}$ and $\bar{\mu}$ are the same as in Proposition 5.

Likewise, $\mu(0) = \lim_{R\to\infty} \hat{\mu}_L(R) = \lim_{R\to\infty} \hat{\mu}(R) = \bar{\mu}$, and $\hat{\mu}_L(R) < \bar{\mu}$ for $0 < R < \infty$.

Figure 6 provides a numerical illustration of the result.[38] An interesting implication of the analysis is that from an initial condition in which all parents are authoritarian, a decline in the incumbency premium μ can induce diverging behavior between low and high skill parents: the low skilled remain authoritarian, while the high skilled turn

[38]The parameter values are $\sigma = 0.5$, $\beta = 0.8$, $\lambda = 0.95$, $\bar{a} = 1.5$, and $y_H/y_L = 1.5$.

Figure 6: Equilibrium parenting style as a function of incumbency premium μ and return to human capital R with two types of parents.



authoritative. Such a divergence is consistent with the observation that in the United States, the decline in the approval of corporal punishment in recent decades has been much more pronounced among the educated (see Figure 3). Alternatively, if we start from a situation where all parents are permissive, an increase in R turns low-skill parents authoritarian, and high-skill parents authoritative. Overall, this pattern lines up with the observations that over the last decades parenting style has become more intensive and that the behavior of different socio-economic groups has diverged.

The parenting cost considered in this section implies that it is costly (for some parents) to mold children's preferences away from the natural inclination. Another dimension of parenting cost is the possibility that the parent can spend effort to expand the child's choice set in a way that makes the child better off, for example by opening up additional educational opportunities. Such an extension would allow for all four parenting styles, where neglecting parents would be the ones who minimize parenting effort rather than making investments to benefit the children.

5 Risk Aversion and Protective Parents

The theory can be applied to another important dimension of preferences, namely, the attitude towards risk. Risk aversion is known to increase with age (Morin and Suarez 1983, Pålsson 1996), leading to a natural conflict between parents and children regarding risky behavior. Risk aversion is also known to matter for important aspects of human behavior. For instance, Barsky et al. (1997) document that risk tolerance is associated with hazardous behaviors that tend to lower economic success, such as smoking and drinking, but also with a more aggressive investing style that yields higher average returns, such as holding stocks rather than bonds. Risk tolerance is also an important driver of entrepreneurship as shown, among others, by van Praag and Cramer (2001), Cramer et al. (2002), and Kan and Tsai (2006). Dohmen et al. (2012) document that trust and risk attitudes are strongly correlated between parents and children in the German Socio-Economic Panel. Using the same data set, Zumbuehl, Dohmen, and Pfann (2013) find that parents who invest more in child-rearing efforts are more similar to their children in terms of attitudes towards risk. All these studies concur on the importance of the transmission of attitudes towards risk within families.

In line with the analysis in the previous sections, we focus on the relationship between income inequality and preference transmission. In Section 4, we emphasize the dimension of preferences that regulates the intertemporal tradeoff in consumption, a key determinant of human capital investments. However, success in education and the labor market also hinges on young people avoiding various forms of hazardous behavior that tempt many adolescents: consumption of street drugs, unprotected sex, delinquency. Parents typically disapprove of such activities, not least because they can harm their children's future prospects. For instance, adolescent risk taking is often associated with poor grades and school dropout. How consequential these choices are ultimately hinges on the extent of inequality. In countries where unemployment is low, the income distribution is equal, and where there exist social safety nets and second opportunities, the risk associated with making poor choices during adolescence is limited. In contrast, early mistakes tend to be more detrimental in societies where adult success hinges on being admitted to good schools, and where the return to education is high. While parents may try to counteract risk-taking behavior by making their children more forward-looking, another natural intervention is to increase the children's wariness of risk. Monitoring children to ensure they stay away from dangerous activities is another option.

5.1 Environment

To focus sharply on the risk dimension, we both extend and specialize the model of Section 4. In particular, we focus on juvenile risk, while abstracting from other dimensions of physical and human capital investment. As in the previous section, the income realization can be either high, y_H (success), or low, y_L (failure). To focus on risk preferences separately from time preferences, we consider lotteries that affect success in the first period only, whereas income in the adult period is exogenous. Allowing persistent effects would combine the effects analyzed in the previous section with the risk dimension that is the focus here. To simplify the analysis we also abstract from savings, and we continue to set the cost of parental investments to zero.

Preferences are parameterized by a von Neumann-Morgenstern expected utility function inducing a constant relative risk aversion (CRRA). The child's felicity is given by:

$$U^y(c|a) = E\left[\frac{c^{1-a}-1}{1-a}\right],$$

with the usual convention that $U^y(c|1) = \log(c)$. The child's risk aversion is endogenous and is given by $a = a' \in [0, \infty)$. Here $\bar{a} = 0$, so that a higher a' implies a higher risk aversion, and at the bliss point preference $\bar{a}$ adolescents are risk neutral. Parents are risk averse, i.e., $a = \sigma > 0$.[39] Their higher innate risk aversion lead them to disagree with their children about the choice of lotteries. A useful property of CRRA utility is that, for any given c, $U^y(c|a)$ is decreasing in a. This captures conveniently the notion that risk aversion makes people fearful and less disposed to enjoy life. Therefore, altruistic parents will suffer a cost in making their children risk averse. If parents opt, nevertheless, to turn them risk averse, it is because of their paternalistic drive to distort their choice of lotteries (as shown in Proposition 2).

The parent's value function can be written as:

$$v^o = \max_{a', X \in \mathcal{X}} \left\{u^o(c^o) + \delta w(X, a')\right\},$$

[39] Note that, contrary to the case of patience, parental preferences here affect incentives for preference transmission. More risk averse parents will worry more about the risk-taking of their children, and are therefore more likely to mold their children as risk averse. If we assume that the preferences of the young persist, the theory can feature path dependence (see Doepke and Zilibotti 2013). Here, we abstract from this source of persistence by assuming, for simplicity, that the risk aversion of the old is exogenous.

where

$$w\left(X,a'\right)=E_{s'}\left[\left(1-\lambda\right)U^{y}\left(C^{y}(x,s')|a'\right)+\lambda U^{o}\left(C^{y}(x,s')\right)+\beta v^{o}\right].$$

The exogenous consumption of parents c^o will be ignored below since it does not affect any parenting choice.

We assume that adolescents can choose between two lotteries: $x \in X^{FREE} = \{x_J, x_N\}$. The lottery x_N (no juvenile risk) yields a safe income y_H. The lottery x_J (juvenile risk) yields an additional utility that is assumed to be multiplicative in the consumption level. However, it is risky: youngsters engaging in juvenile risk are successful (y_H) with probability $p_J \in (0,1)$, and unsuccessful (y_L) with probability $1-p_J$.

5.2 Authoritative versus Permissive Parenting

We now consider the case where parents cannot monitor the choice of lotteries, but can influence risk aversion through an authoritative parenting style. The child's value function is given by:

$$v^{y}(a')=\max_{x\in\{x_J,x_N\}}\left\{E_{s'}\left[U^{y}\left(C^{y}(x,s')|a'\right)+\beta v^{o}\right]\right\},$$

where

$$E_{s'}\left[U^{y}\left(C^{y}\left(x_J,s'\right)|a'\right)\right]=p_J\frac{\left(\psi\, y_H\right)^{1-a'}-1}{1-a'}+\left(1-p_J\right)\frac{\left(\psi\, y_L\right)^{1-a'}-1}{1-a'},$$
$$E_{s'}\left[U^{y}\left(C^{y}\left(x_N,s'\right)|a'\right)\right]=\frac{y_H^{1-a'}-1}{1-a'}.$$

Here, $\psi > 1$ captures the thrill associated with taking the risky juvenile lottery.

The optimal choice of x hinges on the endogenous risk aversion parameter a'. We assume parameters to be such that children rank the three possible outcomes as follows: first, success and juvenile activities; next, success and no juvenile activities (safe option); last, failure and juvenile activities. Choosing x_J yields a lottery between the most and the least desired outcome. The standard properties of von Neumann-Morgenstern utility imply that, for any risk aversion, there exists a value $p_J = P_J\left(a'\right)$ for the probability of success that makes the decision maker indifferent between the juvenile and the safe

lottery. The indifference condition between the two lotteries can be written as:

$$P_J(a') = 1 - \frac{\psi - \psi^{a'}}{\psi}\left(1 - \left(\frac{y_L}{y_H}\right)^{1-a'}\right)^{-1}. \tag{13}$$

We can establish the following intuitive property:

Lemma 3. *$P_J(a')$ is an increasing function of risk aversion a'. Hence, there exists a range of probabilities p_J such that a more risk averse child chooses x_J over x_N, whereas a less risk averse child chooses x_N over x_J.*

Since P_J is monotonic, it admits an inverse function, $P_J^{-1}(p_j) \equiv A(p_J, y_H/y_L)$, where A is increasing in p_J and decreasing in y_H/y_L. The function $A(p_J, y_H/y_L)$ gives the degree of risk aversion a' that makes the child indifferent between the two lotteries, and hence the minimum level of risk aversion the parent has to endow the child with to induce the child to take the safe choice. To focus on the interesting case, we restrict attention to parameter values p_J, y_H, and y_L that fulfill the inequality:

$$0 < \hat{a} \equiv A(p_J, y_H/y_L) < \sigma.$$

This guarantees that parents prefer the safe lottery, while risk-neutral children would take the juvenile lottery.

Now consider the parent's choice between an authoritative and a permissive parenting style. An authoritative parent sets $a' = \hat{a}$, while a permissive parent sets $a' = 0$.[40] A parent chooses to be permissive if $w\left(X^{FREE}, 0\right) \geq w\left(X^{FREE}, \hat{a}\right)$, and to be authoritative if $w\left(X^{FREE}, 0\right) < w\left(X^{FREE}, \hat{a}\right)$, where:[41]

$$\begin{aligned} w\left(X^{FREE}, 0\right) &= (1-\lambda)\left(p_J \psi y_H + (1-p_J)\psi y_L\right) \\ &\quad + \frac{\lambda}{1-\sigma}\left(p_J(\psi y_H)^{1-\sigma} + (1-p_J)(\psi y_L)^{1-\sigma} - 1\right) + \beta v^o, \\ w\left(X^{FREE}, \hat{a}\right) &= \frac{1-\lambda}{1-\hat{a}}\left((y_H)^{1-\hat{a}} - 1\right) + \frac{\lambda}{1-\sigma}\left((y_H)^{1-\sigma} - 1\right) + \beta v^o. \end{aligned}$$

[40] To see why, recall that, with CRRA utility, a higher risk aversion reduces cardinal utility for any given choice. Thus, it would be sub-optimal to choose $a' > \hat{a}$. Likewise, no parent would choose $a' \in (0, \hat{a})$, as in this range the child would take the juvenile risk, in which case setting $a' = 0$ is always better.

[41] Note that we assume that the thrill ψ enters the utility of both altruistic and paternalistic parents, being essentially part of consumption. This modeling strategy emphasizes that risk is the only source of disagreement. One could alternatively assume that ψ only enters the altruistic component of w. In this case, parents and children would also disagree on the evaluation of the thrill embedded in juvenile activities. This source of additional disagreement would strengthen our results.

The choice of parenting style hinges on λ: higher paternalism induces a more intrusive parenting style. The following proposition formally states this result (the proof is straightforward and is omitted).

Proposition 8. *There exists $\lambda_J(p_J, y_H/y_L)$ such that all parents with $\lambda \geq \lambda_J(p_J, y_H/y_L)$ are authoritative while all parents with $\lambda \leq \lambda_J(p_J, y_H/y_L)$ are permissive. λ_J is increasing in p_J and decreasing in y_H/y_L.*

Hence, as income inequality parameterized by y_H/y_L increases, the range of λ inducing a permissive parenting style shrinks.[42]

5.3 Helicopter Parents

So far, we have considered the margin between permissive and authoritative parenting. We now extend the analysis to authoritarian parenting by allowing parents to combine authoritative and authoritarian strategies.[43] To this aim, suppose that there exists a second risky lottery (henceforth, the *small lottery*) denoted by $\tilde{x}_J$ that entails less risk but also delivers less fun than the juvenile lottery. This lottery is assumed to be a mean-preserving compression of the juvenile lottery, i.e., it delivers the same expected income with a lower variance. More formally, we denote by $\tilde{y}_H < y_H$ and $\tilde{y}_L > y_L$ the realizations of the small lottery, where we have:

$$\frac{y_H - \tilde{y}_H}{\tilde{y}_L - y_L} = \frac{1 - p_J}{p_J}.$$

Here p_J is the probability of success of both the juvenile and the small lottery (assumed, for simplicity, to be the same). The small lottery delivers an extra utility $\tilde{\psi} < \psi$ such that $\psi y_H > \tilde{\psi}\tilde{y}_H > y_H > \tilde{\psi}\tilde{y}_L > \psi y_L$. We also assume that

$$\psi\left(p_J y_H + (1 - p_J) y_L\right) > \tilde{\psi}\left(p_J \tilde{y}_H + (1 - p_J)\tilde{y}_L\right) > y_H,$$

[42] It is interesting to observe that, ceteris paribus, more inequality turns children themselves to be less prone to risk taking. Formally, $A(p_J, y_H/y_L)$ is decreasing in y_H/y_L, implying that parents' interventions can succeed even if less intensive. Arguably, this is in line with the casual observation that in today's more unequal societies the young generation tends to be more conservative and oriented towards individual success (although part of this observation can relate to parents' interventions).

[43] In an earlier version of this paper, we also study outcomes when parents can restrict children to a single choice, similar to the model of Section 4. Since such a setting leads to similar insights as already derived for the case of patience, here we explore a different set of assumptions that deliver novel implications.

That is, a risk neutral child prefers the juvenile over the small lottery, and the small lottery over the safe lottery.

The new authoritarian element is that parents can prevent children from taking the small lottery by monitoring them at no cost. In contrast, parents cannot monitor the juvenile lottery. Hence, parents can choose between the choice sets $X^{FREE} = \{x_J, \tilde{x}_J, x_N\}$ and $X^{HELICOPTER} = \{x_J, x_N\}$. With this in mind, parenting boils down to choosing between three strategies:

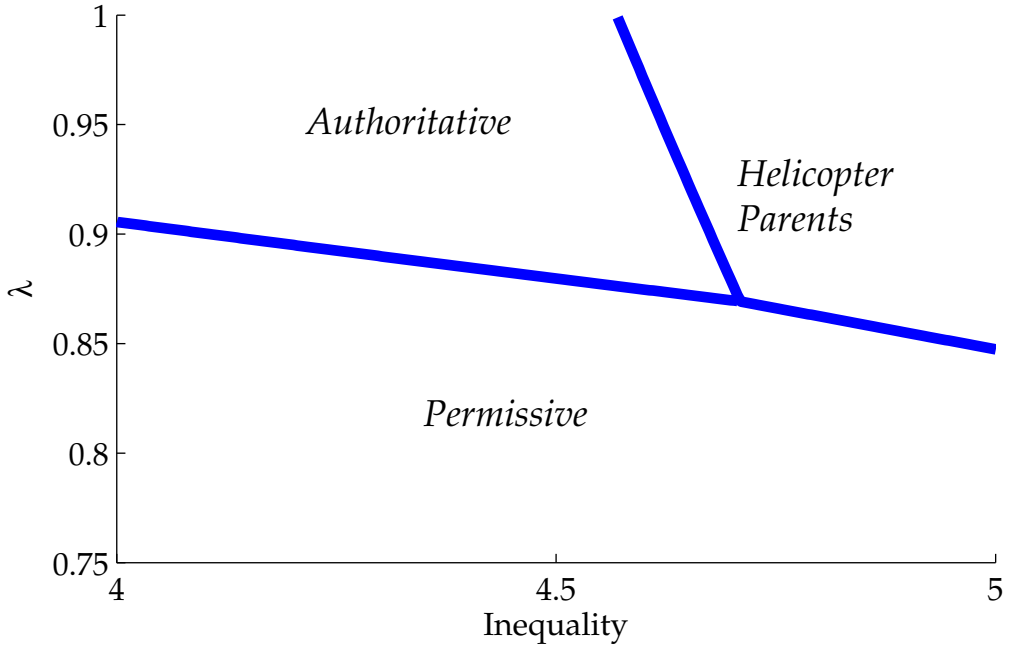
1. Allow children to take the juvenile lottery (permissive parenting style).
2. Induce children to decline the juvenile lottery but let children take the small lottery (authoritative parenting style).
3. Take no chance (helicopter parenting): Mold the children's preferences so that they decline the juvenile lottery, and monitor that they reject even the small lottery (combination of authoritative and authoritarian parenting).

Note that, in order to avoid the small risk, parents could in principle choose X^{FREE} and increase the child's risk aversion so much that she declines both lotteries. However, under our assumptions this option is always dominated by setting $a' = \hat{a}$ and restricting the choice set to $X^{HELICOPTER}$, as this yields a larger utility while inducing the same choice of lotteries. Similarly, a parent could in principle be only authoritarian, but this is also a dominated strategy because then the child would choose the juvenile lottery, which is the parent's least preferred option.

Figure 7 displays the optimal parenting style as function of paternalism λ and inequality (parameterized as proportional shift in the variances of both risky lotteries).[44] The figure shows that the range of λ for which parents are permissive is decreasing in inequality (or risk). For very low levels of risk, all parents are permissive. For a moderate degree of risk, there is a threshold for λ such that parents with a degree of paternalism above the threshold are authoritative, i.e., they endow their children with sufficient risk aversion to avoid the juvenile lottery, but they still allow their children to take the small lottery. Next, there is a region of high risk where low-λ parents continue to be permissive, intermediate-λ parents are authoritative, and high-λ parents are helicopter

[44]The parameter values are $\sigma = 2$, $\psi_J = 1.5$, $\tilde{\psi}_J = 1.33$, $p_J = 0.75$, and $E(x_J) = 1.75$. In Figure 7, inequality on the horizontal axis refers to the ratio y_H/y_L for the juvenile lottery. The relative riskiness of the small and juvenile lotteries is held constant as inequality varies, namely, $\tilde{y}_H/\tilde{y}_L = 0.4 y_H/y_L$.

Figure 7: Equilibrium parenting style as a function of paternalism (λ) and inequality (y_H/y_L).



parents, i.e., they forbid even small lotteries. For even larger levels of risk, parents are either permissive or helicopter parents. The range of helicopter parents increases with inequality.

In summary, the theory leads to predictions that are consistent with the recent trend in helicopter parenting, comprising both an increase in moral suasion aimed to deter children from taking gambles, and direct monitoring to avoid even small risks. This form of overprotection comprises both authoritative and authoritarian components.[45]

5.4 Discussion and Extensions

In this section, we discuss further extensions of the application of our model of parenting to risk preferences, omitting formal details. Suppose, first, that parents differ in their risk aversion, i.e., σ is drawn from a distribution with support $[\sigma^-, \sigma^+]$. Then, conditional on λ there exists a threshold risk aversion, $\hat{\sigma}_\lambda = \sigma_\lambda \left(p_J, \frac{y_H}{y_L}\right)$, such that all parents with

[45] In our example, the only cost of being a helicopter parent is a utility loss for the child. However, it is easy to extend the model and show that when children are turned more risk averse, they may also reject risky lotteries with an upper tail, like entrepreneurial activities, see Doepke and Zilibotti (2013).

$\sigma > \hat{\sigma}_\lambda$ turn their children risk averse, while those with $\sigma \leq \hat{\sigma}_\lambda$ are permissive. Hence, the model gives rise to intergenerational correlation in risk preferences, as documented by Dohmen et al. (2012). Moreover, an increase in inequality reduces $\hat{\sigma}_\lambda$, i.e., it increases the proportion of authoritative parents in society, and pushes the distribution of risk aversion in the population upwards.

Consider, next, the effect of heterogeneity in skills and opportunities. As in Section 4.5 there are two types of families, high skill and low skill. Assume further that the children of low-skill families have access to fewer opportunities, due to intergenerational correlation in ability and barriers to social mobility. In particular, consider a setting where even if they reject the juvenile risk, the children of low-skill parents have no access to the safe lottery available to the children of high-skill families (x_S). Instead, they have access to a less attractive lottery (x_L) that yields success with a probability $p_L \in (0, p_J)$. Then, low-skill parents are discouraged from adopting an authoritative parenting style, and a larger proportion of them will be permissive. Moreover, under some additional parametric assumptions, fewer of them will respond to an increase in inequality. As a result, increasing inequality may lead to a divergence in the behavior of low- versus high-skill parents. This prediction is in line with Putnam (2015), who argues that today's American children are exposed to a much more unequal upbringing than a half century ago.

The model can also be extended to incorporate endogenous intergenerational persistence in earnings. Suppose that all people are ex-ante identical. However, the cost of being authoritative is a decreasing function of the realization of juvenile lotteries. For instance, juvenile activities may spoil school performance, and a low educational attainment may have negative effects on a parent's ability to mold her children's preferences. In this case, an increase in y_H/y_L has two effects: it induces more parents to be authoritative, and increases the handicap of children from a disadvantaged background. If some risks are unavoidable (i.e., even children playing it safe have a small probability of failure), the model predicts both upward and downward social mobility, with a non-degenerate long-run distribution. Moreover, an exogenous increase in inequality may exacerbate inequality in opportunities.[46]

[46]For instance, suppose that inequality is initially low, and that all parents are permissive. Then, the proportions of successful and unsuccessful people are given by p_J and $1-p_J$, respectively, with outcomes being independent of the socio-economic background. Then, suppose that inequality increases, leading (only) successful parents to be authoritative. Then, the proportion of successful people in the long run increases to $p_J/(1+p_J-p_S)$, where p_S is the probability of success conditional on making the safe choice.

6 Social Preferences

Our theory can also be applied to the transmission of social preferences. Pro-social preferences such as trust, other-regarding preferences, and interpersonal skills are correlated with better economic outcomes at the individual and social levels, see, e.g., Camerer and Fehr (2006). Upbringing and socialization are important determinants of such preferences (Fehr and Hoff 2011, Heckman, Pinto, and Savelyev 2013). Social behavior is often a source of disagreement between parents and children, with parents typically discouraging the natural tendencies of their children to behave in an aggressive or anti-social manner. The incentive for altruistic parents to teach social behavior varies with the extent to which such behavior is rewarded in society. For instance, in societies where aggression and abuse are the norm, teaching children other-regarding preferences may be dangerous. The opposite is true in societies where aggressive and opportunistic behaviors are penalized by social norms or law enforcement.

While the formation of social preferences has been analyzed in the cultural transmission literature (see, e.g., Hauk and Saez-Marti 2002), our theory links these explicitly to parenting styles. Authoritative parents aim to instill social preferences into their children, whereas permissive and authoritarian parents do not interfere with children's natural inclinations (although authoritarian parents might sanction anti-social behavior). The theory has two main implications. First, there may be path dependence in the accumulation of social preferences. Pro-social parents may attach more value to the social skills of their children, and they may also be more effective at transmitting such skills. This leads to persistence of social preferences within dynasties (see, e.g., Almås, Tungodden, and Cappelen 2016). In addition, externalities can induce self-reinforcing mechanisms and multiple equilibria: in a society where authoritative parenting is pervasive, social norms that sanction deviating behavior may emerge. Second, the formation of social preferences may interact with other dimensions of parenting. For example, if parents adopt an authoritarian parenting style with respect to time preference (as in the application above), this may spill over to the transmission of social preferences. More specifically, children in authoritarian families may interact less with others and be subjected to coercive methods, both of which may work against the formation of pro-social skills and feed parochialism. Consistent with these predictions, Alesina and Giuliano (2013) document that strong family ties are negatively correlated with generalized trust, while

In addition, the probability of success is larger for the children of high-skill parents than for those of low-skill parents, while it used to be the same in the more equal society.

Alesina and Giuliano (2011) find that they are conducive to lower political participation.

7 Related Literature

The concept of parenting style originates from developmental psychology. In her seminal contributions, Baumrind (1967, 1971, 1978) proposes the threefold classification of parenting styles into authoritarian, permissive, and authoritative that is still dominant today. Since then, many studies in psychology have attempted to identify causal effects of parenting style on children's preferences, personalities, and outcomes (see, e.g., Aunola, Stattin, and Nurmi 2000, Chan and Koo 2011, Darling and Steinberg 1993, Dornbush et al. 1987, Spera 2005, and Steinberg et al. 1991).

There exists a limited economic literature on parenting, influenced by the seminal contributions of Becker and Tomes (1979) and Mulligan (1997). Weinberg (2001) focuses on parents' influence on their children's behavior through pecuniary incentives. He argues that, due to the scarcity of means, low-income parents have limited access to such incentives, and therefore resort to authoritarian methods such as corporal punishment. Such authoritarian methods, in turn, are at the root of the lower success of their children, and perpetuate the initial inequality. Our theory focuses on a broader set of parenting choices, and ignores, for simplicity, pecuniary costs of parenting.[47] Lizzeri and Siniscalchi (2008) assume that altruistic parents are better informed than their children about the consequences of certain actions. Parents can then intervene to protect children from the consequences of ill-informed choices. However, this comes at the cost of reducing children's ability to learn from experience. The paper focuses on a different dimension (information accumulation) of parenting practices, and is therefore complementary to ours.[48] Bhatt and Ogaki (2012) construct a model of tough love in which parents evaluate the child's lifetime utility with a constant high discount factor, whereas the child's patience is assumed to be inversely related to consumption. In this environment, parental transfers are distorted strategically to affect the child's discount factor. Different from our paper, these authors postulate a direct relationship between preferences and consumption. Cosconati (2009) estimates a two-period model of parenting style in

[47] Pecuniary incentives are also considered in Hao, Hotz, and Jin (2008), who focus on birth order effects. Specifically, parents may want to punish older children more severely for unwanted behavior, in order to built up a reputation for toughness vis-à-vis the younger children.

[48] Other information-based theories include Adriani and Sonderegger (2009, 2014).

which children differ in their predisposition to human capital accumulation, and argues that this affects the optimal choice of parenting style. None of these papers develops a theory that encompasses all three main parenting styles emphasized in the psychology literature, or uses the theory to explain variation in parenting styles over time and across countries.[49]

Our paper is related more generally to the large literature on cultural transmission and norms, including Bisin and Verdier (2001), Bisin and Verdier (2010), Hauk and Saez-Marti (2002), Saez-Marti and Zenou (2012), and Tabellini (2008 and 2010). A common assumption in this literature is imperfect empathy. Imperfectly empathic parents desire, by assumption, that their children adopt the parents' cultural traits (such as religion). Parents' effort in shaping their children's values determines the probability of successful transmission. When transmission fails, children copy the trait of a random member of the population. Different from this approach, our model is framed in a dynastic model where parents have both altruistic and paternalistic motives. In our model, even fully paternalistic parents have no exogenous drive to reproduce their own traits. Rather, preferences may be persistent across cohorts within dynasties as an equilibrium outcome.[50] Interactions between parental transmission of preferences and occupational choice are also central to the analyses of Doepke and Zilibotti (2005, 2008) and Corneo and Jeanne (2010), but in these papers parents are entirely altruistic, and alternative parenting styles are not considered.

Another closely related theory is Becker, Murphy, and Spenkuch (2014), who show that it may be optimal for parents to invest resources in manipulating their children's preferences in order to "buy" their support in old age. Such an investment can be Pareto improving, since parents invest more in the human capital of their children when they expect more support from them in old age. Becker, Murphy, and Spenkuch (2014) share with our study the notion that parents can mold their children's preferences. However, they abstract from paternalistic motives in parents' choice, and they do not consider alternative parenting styles. In turn, we ignore the consequences of parents investing in their children's preferences on old-age insurance, which is the focal point of their study. Thus, the two papers are complementary. Conversely, Lundberg, Romich, and Tsang (2009) and Romich, Lundberg, and Tsang (2009) focus on the non-cooperative in-

[49] Other recent studies in family economics involving altruism and the choice of parenting style include Cobb-Clark, Salamanca, and Zhu (2016) and Zhang and Ikeda (2016).

[50] A more thorough review of the similarities and differences between the two approaches can be found in Saez-Marti and Zilibotti (2008).

teraction between paternalistic parents and myopic children. These papers focus on the parental choice between letting children decide autonomously, sharing decision making with them, or imposing decisions on them; and, on how this choice influences children's decision-making as they turn adolescent. Their empirical analysis is guided by a model where parents decide how much time to invest in controlling their children, while the children decide how much resistance to stage against parental control, at the cost of reducing family harmony and their resources. These dimensions, from which we abstract, are also complementary to our analysis.

In our model, authoritative parenting distorts the child's preferences away from those that would maximize their welfare in a utilitarian sense. Such intervention can therefore be interpreted as instilling a form of "guilt" that induces the child to behave responsibly, and in particular to avoid choices that parents view as inappropriate. For instance, the responsible child is induced to study diligently for an exam instead of playing with friends. This feature links our work to the recent paper by Fernández-Villaverde, Greenwood, and Guner (2014), where altruistic parents choose how strongly to stigmatize sex, trading off the marginal gains from instilling a taboo against its costs. The focus of their paper is how an episode of technical change, i.e., the introduction of modern contraception, has changed over time the benefits, and thus the incidence, of the taboo. However, they do not discuss alternative parenting styles.

Our paper also has links to the recent literature on time-inconsistent decision making and temptation. In the application to patience in Section 4, dynasties display quasi-hyperbolic discounting, as in Laibson (1997). The possibility of restricting choice sets to deal with this time-inconsistency is related to Gul and Pesendorfer (2003), who propose an axiomatic decision theory of a rational agent who is subject to a temptation problem. Specifically, the choice set includes elements that would appeal to her, but whose choice she anticipates she would regret. The agent chooses optimally whether to succumb to temptation or to resist, knowing that even resisting induces a utility loss (e.g., not ordering an appetizing dessert at a restaurant). In this environment, the decision maker may wish to restrict the choice set ex ante. In our model, similarly, a parent may find it optimal to restrict the choice set of the next member of the dynasty. The trade-off between restricting choice and letting children follow their inclinations is related to the trade-off between commitment and flexibility in Amador, Werning, and Angeletos (2006), who build on Gul and Pesendorfer (2003) but add an information friction that implies a downside to overly restricted choice sets.

Our application to patience is also related to the recent empirical literature emphasizing the importance of patience for savings and human capital investment (see, e.g., Mischel, Shoda, and Rodriguez 1992, Heckman, Stixrud, and Urzua 2006, Reyes-Garcia et al. 2007, Sutter et al. 2013, and Chen, de la Rupelle, and Zilibotti 2016). Similarly, the application to endogenous risk aversion relates to the literature on the determinants of entrepreneurship, namely individual risk tolerance (see Doepke and Zilibotti 2013). More generally, our paper relates to the growing literature on the formation and accumulation of cognitive and non-cognitive skills, examples of which are patience, self-discipline, and social skills, see, e.g., Cunha and Heckman (2008), Cunha, Heckman, and Schennach (2010), Segal (2013), and Cunha (2015). While these studies focus mainly on the production function for such skills, our framework provides a rationale for how differences in socio-economic conditions can affect parental investments in children. Elucidating such determinants is useful from a policy perspective. Heckman and Mosso (2014) show, for example, that the success of intervention programs targeting poor families with small children hinges on whether a program stimulates parental investments and improves parent-child interactions (see also Cunha and Heckman 2009 and Heckman, Pinto, and Savelyev 2013). These findings underscore the importance of understanding how parenting styles are chosen, and how policy interventions can affect those choices.

Recent empirical research in development economics by Attanasio (2015), Attanasio et al. (2015a), and Attanasio et al. (2015b) argues that parental investment in child rearing hinges not only on parents' objectives and resource constraints, but also on their possibly incorrect beliefs about the nature of the production function for human capital. Based on a field experiment conducted in Malawi, Dizon-Ross (2016) concludes that less educated parents have less accurate beliefs than more-educated parents, and respond more to information. This research is complementary to ours. It postulates, as we do, that parenting practices are crucial in shaping child development, but deviates from the assumption (that we maintain here) that parents have correct expectations. Moreover, this research does not focus specifically on the choice of parenting style as a strategy to affect children's choices and beliefs.

8 Conclusions

The recent economic literature has turned increasingly to preference heterogeneity in its attempts to solve micro- and macroeconomic puzzles. The persistence of economic un-

derdevelopment, for instance, has been linked to the prevalence of cultural traits that are not conducive to entrepreneurship and innovation (Gorodnichenko and Roland 2010, 2011). In turn, the developmental psychology literature has long argued that parenting styles can affect individual values, preferences, and beliefs. There is, however, little understanding of the determinants of parenting styles. In this paper, we provide a formal economic theory of child rearing that rationalizes the emergence of different parenting styles as equilibrium outcomes. A cornerstone of our theory is the notion of paternalism: parents do not always accept their children's preferences and inclinations, and typically regard influencing or constraining their children's behavior as part of their parental duties. Our theory predicts that different parenting styles are the rational outcomes of the interaction between parental paternalism and the economic environment.

We apply our model to the intergenerational transmission of patience and of risk aversion. The theory yields predictions for how the economic characteristics of a country determine the prevalence of different parenting styles. In particular, the theory is consistent with historical evidence that authoritarian parenting declines as economic development advances. Moreover, the theory is consistent with evidence that in the industrialized world, parents in low-inequality countries are more permissive and emphasize values such as independence and imagination, whereas in high-inequality countries parents place more stock in hard work, a value typically associated with an authoritative parenting style.

The theory can be extended in several directions. For instance, one could let paternalism result from an evolutionary process.[51] Our analysis suggests that there is no golden rule about the fitness of paternalistic preferences. In our application to patience, paternalism has high fitness, as it induces human capital accumulation, contributing to the economic success of paternalistic dynasties. In the application to risk preferences, parental paternalism reduces risk-taking and protects children from juvenile risk, but may also stifle entrepreneurship. Therefore, the success of paternalistic families depends on the preference trait, the economic environment, and the stage of economic development.

One could also consider self-reinforcing mechanisms operating through general equilibrium effects. In earlier work, we study the interaction among preference formation, innovation, and growth in a model where patience and risk tolerance are endogenous (see Doepke and Zilibotti 2013), and where the distribution of preferences has a gen-

[51] Studies of evolutionary forces shaping preference transmission and the growth process include Galor and Moav (2002), Galor and Michalopoulos (2012), and Galor and Özak (2016).

eral equilibrium effect via an endogenous choice between entrepreneurship and other occupations. However, in that paper, we abstract from paternalism and an endogenous choice of parenting style. One could go even farther and study how parenting style feeds back into the determination of policies, institutions, and social norms.[52] Such extensions are left to future research.

A Mathematical Appendix

A.1 Proofs for Lemmas and Propositions

Proof of Proposition 1: Suppose, to derive a contradiction, that $a^* \neq \bar{a}$, i.e., the parent is authoritative. Then optimality of the choice of a^* implies that the following inequality should hold:

$$
\begin{aligned}
&- e\left(X^*, a^* | h, s\right) + \delta E_{s'} \Big[U^y \left(C^y(x\left(X^*, a^*\right), s') | a^* \right) \\
&+ \beta \left(U^o \left(C^o(H(x\left(X^*, a^*\right), s'), s') | a^* \right) - e(X'', a'' | H(x\left(X^*, a^*\right), s'), s') + \delta w(X'', a'' | a^*) \right) \Big] \\
&\geq - e\left(X^*, \bar{a} | h, s\right) + \delta E_{s'} \Big[U^y \left(C^y(x\left(X^*, a^*\right), s') | \bar{a} \right) \\
&+ \beta \left(U^o \left(C^o(H(x\left(X^*, a^*\right), s'), s') | \bar{a} \right) - e(X'', a'' | H(x\left(X^*, a^*\right), s'), s') + \delta w(X'', a'' | \bar{a}) \right) \Big],
\end{aligned}
$$

where X'' and a'' denote the optimal choices in the next period, given that $a' = a^*$ and $X' = X^*$ are chosen today. Now notice that with $\lambda = 0$ we have $w(X'', a'' | \bar{a}) = w(X'', a'' | a^*)$, that is, the parent's preference parameter does not directly enter the utility derived from children. Canceling equal terms, we therefore have:

$$
\begin{aligned}
&- e\left(X^*, a^* | h, s\right) + \delta E_{s'} \Big[U^y \left(C^y(x\left(X^*, a^*\right), s') | a^* \right) + \beta U^o \left(C^o(H(x\left(X^*, a^*\right), s'), s') | a^* \right) \Big] \\
&\geq - e\left(X^*, \bar{a} | h, s\right) + \delta E_{s'} \Big[U^y \left(C^y(x\left(X^*, a^*\right), s') | \bar{a} \right) + \beta U^o \left(C^o(H(x\left(X^*, a^*\right), s'), s') | \bar{a} \right) \Big].
\end{aligned}
$$

This inequality contradicts Assumption 2 which implies $\bar{a}$ is the unique preference parameter that maximizes the expression on the right-hand side. We therefore have ob-

[52] For related recent work on optimal taxation see Pavoni and Yazici (2016).

tained a contradiction, and must conclude that $a^* = \bar{a}$, so that parents cannot behave authoritatively. A similar argument establishes that purely altruistic parents do not behave in an authoritarian fashion. □

Proof of Proposition 2: Note that

$$v^o(a,h,s) = U^o\left(c^o|a\right) - e\left(X^*,a^*|h,s\right) + \delta v^y(X^*,a^*) \\ + \delta\left(1-\lambda\right)E_{s'}\left[U^o\left(C^y(x\left(X^*,a^*\right),s')|a\right) - U^y\left(C^y(x\left(X^*,a^*\right),s')|a^*\right)\right]. \quad (14)$$

Consider the first part of the proposition. Note that, since (X^*,a^*) is the optimal choice, then:

$$-e\left(X^*,a^*|h,s\right) + \delta v^y(X^*,a^*) \\ + \delta\left(1-\lambda\right)E_{s'}\left[U^o\left(C^y(x\left(X^*,a^*\right),s')|a\right) - U^y\left(C^y(x\left(X^*,a^*\right),s')|a^*\right)\right] \\ \geq -e(\tilde{X},a^*|h,s) + \delta v^y(\tilde{X},a^*) \\ + \delta\left(1-\lambda\right)E_{s'}\left[U^o\left(C^y(x(\tilde{X},a^*),s')|a\right) - U^y\left(C^y(x(\tilde{X},a^*),s')|a^*\right)\right].$$

Suppose, to derive a contradiction, that $C^y(x(X^*,a^*),s') = C^y(x(\tilde{X},a^*),s')$. Then, the expression above can be rewritten as:

$$e(\tilde{X},a^*|h,s) - e(X^*,a^*|h,s) + \delta\left(v^y(X^*,a^*) - v^y(\tilde{X},a^*)\right) \geq 0.$$

However, this is impossible since (i) $e(X^*,a^*|h,s) > e(\tilde{X},a'|h,s)$ by assumption, and (ii) $v^y(X^*,a^*) \leq v^y(\tilde{X},a^*)$ since we assume that $X^* \subset \tilde{X}$. A contradiction.

Consider the second part of the proposition. Note that, since a^* is the optimal choice, we have

$$-e\left(X^*,a^*|h,s\right) + \delta E_{s'}\big[\left(1-\lambda\right)U^y\left(C^y(x\left(X^*,a^*\right)|a^*\right) \\ + \lambda U^o\left(C^y(x\left(X^*,a^*\right)|a\right) + \beta v^o\left(a^*,H(x(X^*,a^*),s'),s'\right)\big] \\ \geq -e\left(X^*,\bar{a}|h,s\right) + \delta E_{s'}\big[\left(1-\lambda\right)U^y\left(C^y(x\left(X^*,\bar{a}\right)|\bar{a}\right) \\ + \lambda U^o\left(C^y(x\left(X^*,\bar{a}\right)|a\right) + \beta v^o\left(\bar{a},H(x(X^*,\bar{a}),s'),s'\right)\big].$$

Now, to derive a contradiction, let $C^y(x\left(X^*,a^*\right) = C^y(x\left(X^*,\bar{a}\right)$ and $x(X^*,a^*),s') = x(X^*,\bar{a}),s')$. The expression can then be rewritten as:

$$e\left(X^*,\bar{a}|h,s\right)-e\left(X^*,a^*|h,s\right)+\delta(1-\lambda)E_{s'}\left[U^y\left(C^y(x\left(X^*,a^*\right)|a^*\right)-U^y\left(C^y(x\left(X^*,\bar{a}\right)|\bar{a}\right)\right]$$
$$+\lambda\beta E_{s'}\left[v^o\left(a^*,H(x(X^*,a^*),s'),s'\right)-v^o\left(\bar{a},H(x(X^*,\bar{a}),s'),s'\right)\right]\geq 0.$$

However, given the condition stated in the proposition the first term is non-positive, and $\bar{a}$ is (by Assumption 2) the unique maximizer of U^y and U^o (which enters in v^o), so that the remaining expression is negative, giving a contradiction. □

Proof of Proposition 3: If $U^y\left(c|a^*\right)=U^o\left(c|a\right)$, then equation (14) above simplifies to

$$v^o(a,h,s)=U^o\left(c^o|a\right)-e\left(X^*,a^*|h,s\right)+\delta v^y(X^*,a^*).$$

Suppose, to derive a contradiction, that the parent is authoritarian, i.e., there exists an $\tilde{X}\in\mathcal{X}$ such that $v^y(X^*,a^*)<v^y(\tilde{X},a^*)$ and $e\left(X^*,a^*|h,s\right)\geq e(\tilde{X},a^*|h,s)$. The optimality of X^*, a^* implies:

$$-e\left(X^*,a^*|h,s\right)+\delta v^y\left(X^*,a^*\right)\geq -e(\tilde{X},a^*|h,s)+\delta v^y(\tilde{X},a^*).$$

Since $v^y(X^*,a^*)<v^y(\tilde{X},a^*)$, we get that:

$$e\left(X^*,a^*|h,s\right)<e(\tilde{X},a^*|h,s).$$

However, this contradicts the condition $e\left(X^*,a^*|h,s\right)\geq e(\tilde{X},a^*|h,s)$. □

Proof of Lemma 1: First, note that

$$c^y(x^e\left(a'\right))=\frac{y_H^{1-\sigma}\left(1-x^e\left(a'\right)\right)^{1-\sigma}}{1-\sigma}.$$

Next, differentiating $x^e\left(a'\right)$ yields:

$$\frac{dx^e\left(a'\right)}{da'}=-\frac{1+R}{\sigma\beta R\left(1+R\left(\frac{a'}{R\beta}\right)^{\frac{1}{\sigma}}\right)^2}\left(\frac{a'}{R\beta}\right)^{\frac{1-\sigma}{\sigma}}.$$

Thus, differentiating $c^y(x^e\left(a'\right))$ with respect to a' yields:

$$c^y_{a'}(x^e\left(a'\right)) \;=\; -y_H^{1-\sigma}\left(1-x^e\left(a'\right)\right)^{-\sigma}\frac{dx^e\left(a'\right)}{da'}$$

$$= \frac{y_H^{1-\sigma}(1+R)^{1-\sigma}}{\sigma\beta R\left(1+R\left(\frac{a'}{R\beta}\right)^{\frac{1}{\sigma}}\right)^{2-\sigma}}\left(\frac{a'}{R\beta}\right)^{\frac{1-2\sigma}{\sigma}},$$

where the last equality follows from replacing $x^e(a')$ by its expression in (10). Substituting $x^e(a')$, $c^y(x^e(a'))$, and $c^y_{a'}(x^e(a')$ into (11) and rearranging terms yields (12).

Notice that the lemma only states a necessary condition for an optimum. For a given interior solution satisfying (11) to be a local maximum, one must also check that the second-order condition holds. In particular, let:

$$Q(a', R) = \lambda(a'-1)\left(\frac{1}{\sigma}\frac{1}{a'}\frac{1}{1+\left(\frac{a'}{\beta R^{1-\sigma}}\right)^{\frac{1}{\sigma}}}\right).$$

Then, the second-order conditions require that $\frac{\partial Q(a',R)}{\partial a'} < 0$ for the value of a' that satisfies (11) with equality. As long as $a' > 1$ the marginal benefit is everywhere decreasing in a', and the local optimum is unique. In particular, the condition $\partial Q(a', R)/\partial a' < 0$ must be true at the global optimum. □

Proof of Lemma 2: The right-hand side of (12) is negative for $\lambda = 0$, implying that $a' = \bar{a}$ for $\lambda = 0$ and, by continuity, also for a range of λ sufficiently close to zero. At $\lambda = 1$, The second term in (12) is zero, and the condition can be satisfied only by setting $a' = 1$, so that the first term is zero as well. □

Proof of Proposition 4: First note that if $\lambda \leq \sigma\frac{\bar{a}}{\bar{a}-(1-\sigma)}$, the right-hand side of (12) is negative for any a' and R. Hence, the inequality is strict and we must have $a' = \bar{a}$. For the case $\lambda > \sigma\frac{\bar{a}}{\bar{a}-(1-\sigma)}$, the threshold $\bar{R}$ results from setting $a' = \bar{a}$ and then equating the right-hand side of (12) to zero. Hence, if $R = \bar{R}$ condition (12) holds as an equality at $a' = \bar{a}$, so that $a' = \bar{a}$ is optimal. For $R < \bar{R}$, at $a' = \bar{a}$ the right-hand side of (12) is negative, so that we are at the corner solution and $a' = \bar{a}$ is optimal as well. For $R > \bar{R}$, notice that the right-hand side of (12) is strictly decreasing in R, which implies that the optimal a is strictly decreasing in R also in this range. Finally, when R goes to infinity, the right-hand side of (12) converges to $\lambda(a'-1)/\sigma a' - (1-\lambda)/(1-\sigma)$. Setting this expression equal to zero implies that $\bar{a}^* = \lim_{R\to\infty} a^* = \lambda(1-\sigma)/(\lambda-\sigma)$. □

Proof of Proposition 5: The results for the choice between authoritative and permissive parenting in the region $\mu \leq \hat{\mu}(R)$ follow from Proposition 4. Here we need to establish that there exists a function $\hat{\mu}(R)$ that satisfies $0 < \hat{\mu}(R) \leq \bar{\mu}$ and such that authoritarian

parenting is optimal for $\mu \geq \hat{\mu}(R)$. Consider the case $\mu = \bar{\mu}$. We have:

$$\begin{aligned}
\tilde{w}\left(X^{HOME}, \bar{a}\right) &= \frac{y_H^{1-\sigma}}{1-\sigma}\left((\lambda + (1-\lambda)\bar{a})\frac{(1-\bar{x}^e)^{1-\sigma}}{1-\sigma} + \beta\frac{(1+R\bar{x}^e)^{1-\sigma}}{1-\sigma}\right), \\
\tilde{w}\left(X^{FREE}, a^*\right) &= \frac{y_H^{1-\sigma}}{1-\sigma} \\
&\quad \left((\lambda + (1-\lambda)a^*)\frac{(1-x^e(a^*))^{1-\sigma}}{1-\sigma} + \beta\frac{(1+Rx^e(a^*))^{1-\sigma}}{1-\sigma}\right).
\end{aligned}$$

Since under an authoritarian style the choices of a' and $\bar{x}$ are optimal from the parent's perspective, we have:

$$\tilde{w}\left(X^{HOME}, \bar{a}\right) \geq \tilde{w}\left(X^{FREE}, a^*\right).$$

Now consider the case $\lambda = 0$. Then, the argument in the text implies that $a^* = \bar{a}$ and $x^e(\bar{a}) = \bar{x}^e$. Hence, we have:

$$\tilde{w}\left(X^{HOME}, \bar{a}\right) = \frac{y_H^{1-\sigma}}{1-\sigma}\left(\bar{a}\frac{(1-\bar{x}^e)^{1-\sigma}}{1-\sigma} + \beta\frac{(1+R\bar{x}^e)^{1-\sigma}}{1-\sigma}\right) = \tilde{w}\left(X^{FREE}, \bar{a}\right).$$

Thus, the parent is indifferent between being authoritarian and granting freedom to the child, so that $\hat{\mu}(R) = \bar{\mu}$ for all R when $\lambda = 0$. Similarly, consider the case $\lambda = 1$. Then, the argument in the text implies that $a^* = 1$ and $e(1) = \bar{x}^e$, so that we have:

$$\tilde{w}\left(X^{HOME}, 1\right) = \frac{y_H^{1-\sigma}}{1-\sigma}\left(\frac{(1-\bar{x}^e)^{1-\sigma}}{1-\sigma} + \beta\frac{(1+R\bar{x}^e)^{1-\sigma}}{1-\sigma}\right) = \tilde{w}\left(X^{FREE}, 1\right).$$

Thus, for $\lambda = 1$ we have $\hat{\mu}(R) = \bar{\mu}$ for all R as well. Finally, consider interior levels of paternalism, $\lambda \in (0,1)$. Then, $x^e(a^*) = \bar{x}^e$, implying that $\tilde{w}\left(X^{HOME}, \bar{a}\right) > \tilde{w}\left(X^{FREE}, a^*\right)$, since $\bar{x}^e$ is chosen optimally, whereas $x^e(a^*)$ is distorted from the parent's perspective. In particular, if the parent is permissive, as long as $R > 0$ we have:

$$\begin{aligned}
\tilde{w}\left(X^{HOME}, \bar{a}\right) &= \frac{y_H^{1-\sigma}}{1-\sigma}\left((\lambda + (1-\lambda)\bar{a})\frac{(1-\bar{x}^e)^{1-\sigma}}{1-\sigma} + \beta\frac{(1+R\bar{x}^e)^{1-\sigma}}{1-\sigma}\right) \\
&> \frac{y_H^{1-\sigma}}{1-\sigma}\left((\lambda + (1-\lambda)\bar{a})\frac{(1-x^e(\bar{a}))^{1-\sigma}}{1-\sigma} + \beta\frac{(1+Rx^e(\bar{a}))^{1-\sigma}}{1-\sigma}\right) \\
&= \tilde{w}\left(X^{FREE}, \bar{a}\right),
\end{aligned}$$

since $x^e(\bar{a}) < \bar{x}^e$, and $\bar{x}^e$ is by definition optimal. A similar argument applies if the parent is authoritative (in this case the cost for the parent has two components: the lower effort of the child and her lower felicity for the child). To summarize, when $\lambda \in (0,1)$, the parents prefer to be authoritarian at $\mu = \bar{\mu}$, so that we must have $\hat{\mu}(R) < \bar{\mu}$. In the case $R = 0$, we have $a^* = \bar{a}$ and $x^e(\bar{a}) = \bar{x}^e = 0$, thus $\tilde{w}\left(X^{HOME}, \bar{a}\right) = \tilde{w}\left(X^{FREE}, \bar{a}\right)$. For the case $\lambda \in (0,1)$ and $R > 0$, the existence of a $\hat{\mu}(R) \in (0, \bar{\mu})$ that yields indifference between authoritarian parenting and granting freedom to the child follows because the utility of granting freedom is positive and independent of μ, whereas the utility of being authoritarian is strictly increasing in μ and converges to zero as μ approaches zero. Moreover, for $\mu > \hat{\mu}$, the proof implies *a fortiori* that authoritarian parenting is strictly optimal for all $\lambda \in [0,1]$. □

Proof of Proposition 7: For high-skill parents, the argument of Proposition 5 applies (note, in particular, that $\hat{\mu}(R)$ is the same). For low-skill parents, the only margin is permissive vs. authoritarian. If either $\mu \leq \hat{\mu}(R)$ and $R \leq \bar{R}$, or $\lambda \leq \sigma\bar{a}/(\bar{a} - (1-\sigma))$ (or both), then $\hat{\mu}(R) = \hat{\mu}_L(R)$ since authoritative parenting is an irrelevant alternative even for high-skill parents. Thus, along the relevant margin high- and low-skill parents face the same problem. Next, we establish that, in the range where $\lambda > \sigma\bar{a}/(\bar{a} - (1-\sigma))$ and $R > \bar{R}$, there exists a $\hat{\mu}_L(R)$ function such that $0 < \hat{\mu}_L(R) \leq \hat{\mu}(R)$, and such that low-skill parents prefer authoritarian parenting for $\mu \geq \hat{\mu}_L(R)$ and permissive parenting otherwise. Suppose, first that $\mu = \hat{\mu}(R)$. Then, by the definition of $\hat{\mu}(R)$, parents are indifferent between an authoritative and an authoritarian parenting style. Moreover, since $R > \bar{R}$, parents strictly prefer to be authoritative than permissive. Thus, at $\mu = \hat{\mu}(R)$, parents (including low-skill ones) strictly prefer being authoritarian than permissive. Hence, low-skill parents choose to be authoritarian in this range. Second, if $\mu = 0$, parents strictly prefer being permissive than authoritarian. Hence, low-skill parents choose to be authoritarian for a range of low μ. Continuity establishes, then, that there there exists $\hat{\mu}_L(R) \in [0, \hat{\mu}(R)]$ such that low-skill parents prefer authoritarian parenting for $\mu \geq \hat{\mu}_L(R)$ and permissive parenting otherwise. □

Proof of Lemma 3: We note first that, for all $z > 0$, the function

$$F(z) = \frac{\ln z}{z^{\xi} - 1} \tag{15}$$

has the following properties: $F(z) > 0$ if $\xi > 0$, $F(z) < 0$ if $\xi < 0$, $F'(z) < 0$ for all $\xi \neq 0$.

To see why $F'(z) < 0$, note that

$$F'(z) = \frac{z^{\xi}\left(1 - \ln z^{\xi}\right) - 1}{z\left(z^{\xi} - 1\right)^2}, \tag{16}$$

where $z^{\xi}\left(1 - \ln z^{\xi}\right) < 1$ for all $z < 1$ and $z^{\xi}\left(1 - \ln z^{\xi}\right) = 1$ for $z = 1$. The denominator is positive for all $z \neq 1$. The numerator is always negative for $z \neq 1$ and equal to zero at $z = 1$. Since as $z \to 1$ both the numerator and the denominator tend to zero, we apply the L'Hôpital Theorem and obtain:

$$\lim_{x \to 1} \frac{z^{\xi}\left(1 - \ln z^{\xi}\right) - 1}{z\left(z^{\xi} - 1\right)^2} = -\frac{1}{2}.$$

This establishes that $F'(z) < 0$ for all $z > 0$.

Next, observe that:

$$P_J' = \frac{1 - \psi^{a-1}}{1 - \left(\frac{y_L}{y_H}\right)^{1-a}} \left(\frac{\ln \frac{y_H}{y_L}}{1 - \left(\frac{y_H}{y_L}\right)^{1-a}} - \frac{\ln \psi}{1 - \psi^{1-a}} \right).$$

We therefore need to prove that

$$\frac{\ln \frac{y_H}{y_L}}{\left(\frac{y_H}{y_L}\right)^{1-a} - 1} < \frac{\ln \psi}{\psi^{1-a} - 1},$$

where both $\frac{\ln \frac{y_H}{y_L}}{\left(\frac{y_H}{y_L}\right)^{1-a}-1}$ and $\frac{\ln \psi}{\psi^{1-a}-1}$ are of the form F as in (15).

We break down the analysis into two cases. First, suppose that $a < 1$. Then, both terms are negative. Turn the two terms positive by pre-multiplying by minus one:

$$\frac{\ln \psi}{\psi^{1-a} - 1} > \frac{\ln\left(\frac{y_H}{y_L}\right)}{\left(\frac{y_H}{y_L}\right)^{1-\alpha} - 1},$$

where, recall, $\psi < \frac{y_H}{y_L}$. The inequality follows then from the properties of the function F in (15), and specifically $F' < 0$.

Next, suppose $a > 1$. Then, both terms are positive. In this case, we must show that

$$\begin{aligned} \frac{\ln \frac{y_H}{y_L}}{1 - \left(\frac{y_H}{y_L}\right)^{1-a}} &> \frac{\ln \psi}{1 - \psi^{1-a}} \Leftrightarrow \\ \frac{\ln \frac{y_H}{y_L}}{\left(\frac{y_H}{y_L}\right)^{1-a} - 1} &< \frac{\ln \psi}{\psi^{1-a} - 1}. \end{aligned}$$

The last inequality follows again from the properties of the function F in (15). □

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