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OCCUPATIONAL CHOICE AND THE INTERGENERATIONAL MOBILITY OF WELFARE

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ABSTRACT

Based on responses in the General Social Survey, we construct an index that captures non-monetary qualities of occupations, such as respect, learning, and work hazards, relevant to the well-being of workers. Using the Panel Study of Income Dynamics and National Longitudinal Survey of Youth data, we document that the children of richer US parents are more likely to select into occupations that rank higher in terms of this index. We rationalize this fact by introducing occupational choice with preferences over the intrinsic qualities of occupations into a standard theory of intergenerational mobility. Estimating the model allows us to infer the equivalent monetary compensation each worker receives from the intrinsic qualities of their chosen occupation. Earnings adjusted to reflect this additional compensation show substantially larger persistence of income from parents to children. Our model further predicts that the trends in the composition of labor demand in the US over the past three decades decreased intergenerational persistence, and also led to higher growth in the welfare of the average worker than that implied by observed earnings.

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A data appendix is available at http://www.nber.org/data-appendix/w29381

1 Introduction

Modern economies aspire to offer all individuals equal opportunities to build productive and fulfilling careers, regardless of the economic background they are born into. The most common measure of an economy's success in realizing this promise is how well parental income predicts the monetary compensation children receive from their work (Black and Devereux, 2011). Nevertheless, a long line of research in economics, sociology, and psychology has highlighted the link between well-being and many *non*-monetary qualities of one's job, including the degree of automony and control, the variety and complexity of tasks, the opportunities for skill development, and the presence of physical occupational hazard (e.g., Kohn and Schooler, 1973; Warr, 1990; Hamermesh, 1999; Green, 2006; Kalleberg, 2016). Focusing on career choice, for instance, individuals who choose occupations with higher non-monetary quality are remunerated in part through the higher value they receive from the intrinsic nature of their work throughout their lifetimes (Rosen, 1986).

How does this non-monetary component of compensation vary with family economic background? We document that in the US parental income is positively associated with the likelihood of choosing occupations that rank higher in terms of an index of *intrinsic* (non-monetary) quality of work.[1] In other words, parental income predicts the non-monetary compensation that children receive from their work. Thus, when we solely rely on monetary compensation as a proxy for labor market outcomes, we may overestimate the degree of intergenerational mobility. We provide a model to quantify the size of the compensation that workers receive from intrinsic qualities of their occupations, and to account for its contribution to the measurement of intergenerational mobility.

To construct our proxy for the intrinsic quality of occupations, we follow a long tradition of survey-based indices of job quality.[2] We rely on the Quality of Work-life Module of the General Social Survey (GSS), collected from a representative sample of the US population, and consider seven questions covering different qualities highlighted in the literature. These questions assess social (respect at the workplace), physical (heavy lifting, hand movement), and intellectual (continuous learning, opportunity to develop new abilities) aspects of work, as well as those concerning autonomy and control (variety of tasks, need to work

[1] Here, we adopt a terminology that distinguishes the intrinsic qualities of an occupation, i.e., the rewarding characteristics tied to the nature of the job, from the extrinsic ones, e.g, the monetary wage or non-wage rewards received in return for performing the job (e.g., Kalleberg, 1977; Mottaz, 1985; Kalleberg, 2016).

[2] For attempts to organize and classify such indices, see de Bustillo et al. (2011) and Holman (2013). In addition to academic work, international organizations such as the International Labor Organization (ILO, 2013) and the OCED (Cazes et al., 2015) have developed indicators that assess similar non-monetary aspects of job quality. Prior work in economics has also used measures of job satisfaction to accounts for these aspects (Hamermesh, 2009).

fast). We purge the responses for each question from the effect of wages and tenure, to make the measures orthogonal to monetary aspects, and combine them into a single index by using principal component analysis. Our measure of intrinsic quality for each occupation is the first principal component of the residualized values, which explains the majority of the variation in responses to all questions. We find that being a machine operator, a farmer, or a housekeeper carries relatively low intrinsic quality, while artists, librarians, or post-secondary teachers enjoy a relatively high intrinsic quality.

We then use micro data from the Panel Study of Income Dynamics (PSID) and the National Longitudinal Survey of Youth 1997 (NLSY) to study the relationship between the labor market outcomes of young adults and their economic background. We summarize the effect of growing up in a rich family on occupational choice in the form of an *occupational choice elasticity* that captures the change in the likelihood that an occupation is chosen as parental income rises. These elasticities show a large, positive, and robust correlation with our measure of intrinsic quality.[3] This correlation holds when controlling for the child's educational attainment, for proxies of potential earnings across all occupations, and for the parent's occupation.

We rationalize this fact using a simple theory of intergenerational occupational choice, in which preferences are separable in market consumption and the non-monetary quality of work. The monetary compensation that an individual attributes to a given level of intrinsic quality inversely depends on their marginal value of monetary resources, i.e., their marginal utility of consumption. Since the children of richer parents receive larger monetary transfers from their parents, they have higher levels of consumption and lower marginal utility of consumption. Thus, they demand higher levels of compensation for giving up occupations with a high intrinsic quality. The equilibrium level of compensating differentials thus sorts the children of rich parents into occupations with higher intrinsic qualities.

Our model generalizes the classical theory of intergenerational transmission of earnings and welfare (Becker and Tomes, 1979, 1986) and features overlapping generations of individuals who choose their occupation, and altruistically allocate their wealth between own market consumption and transfers to their children, either directly or in the form of human capital investments. Before choosing their occupation, young adults receive independent taste shocks for each occupation. We discipline the mean of these occupational taste shocks to be correlated with our proxies of intrinsic quality based on the GSS. In addition, the productivity of each young adult varies across occupations depending on their school-

[3]In popular discourse, this fact is often anecdotally invoked by the observation that many workers in creative occupations such as arts or design come from a rich background (e.g., Bui, 2014, March 18, 2017, Feb 9; Sussman, 2017, Feb 14).

ing attainment, an idiosyncratic and unobserved talent shock, and parental income. The latter dependence accounts for all the potential mechanisms through which richer parents may facilitate higher earnings for their children on the labor market, e.g., by endowing their children with tacit know-hows, social skills, or career networks. We close the model with a simple specification of demand for occupational services, which allows us to endogenize occupational wages.

We derive closed form expressions for the conditional distribution of earnings, occupational choice, and schooling of each child given the income of their parents. We rely on this conditional distribution to perform a maximum likelihood estimation of the model based on parent-child pairs in the PSID data. The estimated parameters provide us with the full structure of the potential earnings of each individual given schooling, parental income, and inferred talent, across 54 occupations in our data. We show that, despite its parsimony, the model matches the patterns of occupational choice and intergenerational mobility in the data.

The model allows us to compute the compensation each individual in the data demands for a certain level of downward change in the intrinsic occupational quality. For instance, the compensation corresponding to the interquartile range of intrinsic qualities across occupations is substantial (around 10% of average earnings) and is increasing in parental income, in line with the mechanism laid out above. Using the model, we can also compute proxies for the equilibrium compensating differentials corresponding to the variations in intrinsic occupational quality. We find that a standard deviation rise in intrinsic quality is associated with a fall of 10 to 17% in the wage rate across occupations.

We also derive measures of *compensated earnings* that include the additional compensation that each individual receives from the intrinsic quality of their own occupation. We construct two different such measures depending on whether or not we include the conditional expected value of the idiosyncratic taste shocks. When we include these additional sources of value in our measures of persistence of earnings, we find that they imply substantially lower levels of mobility in welfare (between 15 and 35%). In addition, we find a higher degree of intergenerational persistence when including idiosyncratic taste shocks. This implies that richer children not only benefit from choosing occupations with higher intrinsic quality, but they also benefit from being able to choose occupations that better reflect their idiosyncratic tastes.

Finally, we revisit through the lens of our model the mobility implications of the trends in the occupational composition of the US labor force over the past three decades (Acemoglu and Autor, 2011). We first document that over this period the composition of the labor force has shifted towards occupations with higher intrinsic quality. We interpret these trends in conjunction with the rise in average earnings as reflecting shifts in occupational labor demand. The model then predicts that parental income becomes a less important determinant of selection into high intrinsic quality occupations, leading to a rise in the intergenerational mobility of earnings and welfare. The model also suggests that a non-trivial component of the rise in average welfare over the period stems from the rise in the workers' monetary valuation of the higher average intrinsic quality of occupations, and that the growth in our measures of compensated earnings may be more equally distributed across workers than the observed gains in earnings.

Prior Work Our paper builds on the large literature on intergenerational mobility of earnings, income and wealth. Earlier empirical contributions to this literature are summarized by Solon (1999) and Black and Devereux (2011). More recently, Chetty et al. (2014) and Chetty et al. (2017) rely on administrative tax records to document patterns of intergenerational mobility in the United States. These patterns are borne in our main data source of intergenerational linkages, the PSID. On the theoretical side, our model builds on the seminal model of Becker and Tomes (1979, 1986) who pioneered a view of intergenerational mobility through the lens of transmission of human capital (Heckman and Mosso, 2014; Mogstad, 2017). While we maintain this parsimonious account of human capital transmission, we also introduce occupational choice with non-pecuniary intrinsic quality[4] in a framework that can be quantitatively disciplined by rich data on choices of children in a large set of occupations.[5]

Our results highlight the insight that the intergenerational mobility of income need not necessarily translate to intergenerational mobility of welfare if agents face tradeoffs between higher earnings and some non-market goods, which in our case are given by the non-pecuniary intrinsic quality of occupations. This insight relates our paper to recent work that emphasizes how income or market consumption provides an imperfect proxy for welfare in the presence of other non-market factors that enter in the utility function, such as leisure, home production, or mortality (Jones and Klenow, 2016; Aguiar et al., 2017; Boerma and Karabarbounis, 2021; Boppart and Ngai, 2021).

Our paper is also related to the literature on compensating differentials pioneered by Rosen (1986). Complementing the hedonic approach in this literature (Mas and Pallais, 2017), recent work by Hall and Mueller (2018), Sorkin (2018), and Taber and Vejlin (2020) presents evidence on the non-pecuniary value of jobs and shows that job specific compensat-

[4]For recent evidence on the central role of preferences for non-pecuniary aspects of occupations in the choice of college major and occupations, see Arcidiacono et al. (2020) and Patnaik et al. (2020).

[5]Lo Bello and Morchio (2019) also study the role of occupational choice on intergenerational mobility. However, they focus on how children may rely on parental network to enhance their chances in frictional search for jobs on the labor market.

ing differentials account for a large fraction of earnings variance within a firm.[6] Relative to this literature, we emphasize the role of occupation-specific compensating differentials, complementing the work of Kaplan and Schulhofer-Wohl (2018), who document how changes in the distribution of occupations over time affected non-pecuniary costs and benefits of working.

Lastly, our focus on socioeconomic background and occupational choice relates our paper to Bell et al. (2018), who show that children's chances of becoming inventors vary with their parents' socioeconomic class, and to Hsieh et al. (2019), who find that certain demographic groups face obstacles to accumulating human capital that impact the allocation of talent across occupations and, in turn, economic growth. Our hypothesis that growing up in a rich family makes it more likely for children to accept potentially lower earnings in occupations with a high intrinsic quality is most similar to Luo and Mongey (2019) who show that higher student debt induces college graduates to accept jobs with higher wages and lower job satisfaction. Luo and Mongey (2019) show this has implications for welfare in the context of student debt repayment policies.

2 Data and Facts

In this section we provide suggestive evidence that children from richer families are more likely to choose occupations with a higher intrinsic quality, a fact that holds even when controlling for potential earnings in all other occupations and the occupation of the parents.

2.1 Data

We use data from the Panel Study of Income Dynamics (PSID) and the General Social Survey (GSS) to conduct our empirical work. Appendix A discusses our variable construction and sample restrictions in detail. Here we briefly describe these data sources and highlight the key variables we use. In a robustness exercise we also use data from the National Longitudinal Survey of Youth 1997 (NLSY), which we also describe in Appendix A.

PSID. The PSID is a longitudinal survey of a representative sample of US individuals and families. The survey started in 1968, collecting information on a sample of approximately 5,000 households. We employ all surveys from 1968 to 2015. Our sample reflects the nationally representative core sample and sample extensions to better represent dynasties of recent immigrants. Over the years both the original families and their split-offs (children

[6] Other recent contributions to the estimation of compensating differentials include Lavetti and Schmutte (2015).

moving out of the parent household) have been surveyed. We match parents and children using the PSID Family Identification Mapping System and obtain a panel of parent-child pairs. Our analysis focuses on career choices, so we transform the panel into a cross-section of parent-child pairs with information on the occupation, education and lifetime earnings of parents and children, as well as the lifetime income and wealth of the parent.

In the cross-section, we define the occupation (i.e. the career) as the the most frequently held occupation between age 22 and 55 and consider an occupation classification with 54 occupations, listed in Table 5 in Appendix A. Education is defined as the highest level of education attained, for both parents and children. Labor earnings in the cross-section are defined as the average earnings in the most frequently held occupation between age 22 and 55, net of age and time effects that are allowed to vary by occupation. Parental income and wealth in the cross-section are also defined as the average over parental family income and wealth between age 22 and 55, net of age and time effects. Lastly, we define parental endowment, a variable we use in the theoretical model, to be the sum between parental income and parental inherited wealth. We use the PSID to study patterns of intergenerational mobility of earnings, as well as occupational choice as a function of parental income. Appendix A.2 shows that standard measures of intergenerational mobility estimated using these data are consistent with those reported in Chetty et al. (2014) based on administrative data, suggesting that the PSID is representative of the US population in terms of intergenerational mobility and is thus suited for the analysis in this paper.

GSS. The GSS is a survey that assesses attitudes, behaviors, and attributes of a representative sample of US residents. The survey began in 1972, collecting information on a sample between 1,500 and 4,000 respondents. We use the Quality of Working Life module, administered in 2002, 2006, 2010 and 2014. This survey module is asked of all GSS respondents who are working in a given year and includes questions on hours worked, workload, worker autonomy, layoffs and job security, job satisfaction/stress, and worker well-being. We use a subset of these questions and principal component analysis (PCA) to create a measure of the intrinsic quality of occupations.

2.2 The Intrinsic Quality of Occupations

We first describe our measure of the intrinsic quality of occupations, which aims to capture the bundle of factors linked to worker well-being in the extensive literature on job quality in sociology and psychology (e.g., Kohn and Schooler, 1973; Warr, 1990; Hamermesh, 1999; Green, 2006; Kalleberg, 2016). Our approach is to rely on a representative survey of US workers, the Quality of Worklife module of the GSS, and select questions that cover different dimensions highlighted in this literature. From the list of questions asked in the Quality of Worklife module of the GSS, we select 7 job characteristics, listed in the first column of Table 1. The questions assess social (respect at the workplace), physical (heavy lifting, hand movement), and intellectual (continuous learning, opportunity to develop new abilities) aspects of work, as well as those concerning autonomy and control (variety of tasks, need to work fast). In practice, we measure the intrinsic quality of an occupation as the first principal component of the variations in the standardized responses to these questions[7], which as we will see are highly correlated with one another and with a general measure of job satisfaction.

Some of the characteristics we focus on are likely to also be correlated with extrinsic aspects of the job and the occupation, e.g., wages, earnings, and the tenure at the job. For example, tenured workers are arguably more likely to be treated with respect. Therefore, we first purge respondents' assessment of the quality of their worklife along these dimensions from confounding factors. Specifically, for each occupation characteristic ν^x listed in the first column of Table 1[8], where $x = 1, \ldots, 7$, we estimate

$$\nu_{it}^x = \boldsymbol{\alpha}^x \boldsymbol{X}_{it} + \delta_j^x + \epsilon_{it}^x, \tag{1}$$

where i denotes the respondent and t denotes the wave of the survey module (2002, 2006, 2010 or 2014). Here, $\boldsymbol{X}_{it}$ is a vector of controls that includes the logarithm of real income, hours worked, and a dummy variable indicating whether the respondent has been at the current job for less than one year, one year, 2-5 years, 6-10 years, 11-20 years or more than 20 years, and $\boldsymbol{\alpha}^x$ is the corresponding vector of coefficients.[9] The coefficients δ_j^x are occupation specific fixed effects and ϵ_{it}^x are the residuals.

Our measure of the intrinsic quality of an occupation j, which we denote by ν_j, is an overall worklife quality index represented by the first principal component of all occupation characteristics δ_j^x listed in the first column of Table 1. The second column of Table 1 reports loadings on each occupation amenity. The occupation quality index loads positively on all characteristics, even though the loadings are not influenced by any prior information about which characteristic is thought to be desirable or undesirable. The first component alone explains 51% of the total variance in the 7 job characteristics. This suggests that a simple one-

[7]Such a technique has been used, for example, in the spatial economics literature to measure the variations in amenities across cities (Diamond, 2016) or in the trade literature to reduce the dimensionality of tasks associated to occupations (Traiberman, 2019).

[8]Appendix A discusses the exact wording of the GSS questions, as well as our treatment of the data.

[9]In practice, the effect of these controls is minimal as the correlation coefficient between the intrinsic quality of occupations that we estimate below and its counterpart without these controls is 0.975 (SE=0.031). Also note that the Quality of Worklife Module does not collect information on earnings, so we use the total income of the respondent (earnings + other income) to proxy for work pay.

Table 1: Principal Component Analysis for Occupation Characteristics

Occupation characteristic ν^x	Loading	Unexplained variance
Social		
Treated with respect	0.38	0.49
Physical		
Little hand movement	0.41	0.40
Little heavy lifting	0.36	0.52
Intellectual		
Keep learning new things	0.47	0.21
Opportunity to develop abilities	0.41	0.40
Autonomy and control		
Do numerous different things	0.40	0.43
Do not need to work fast	0.11	0.95

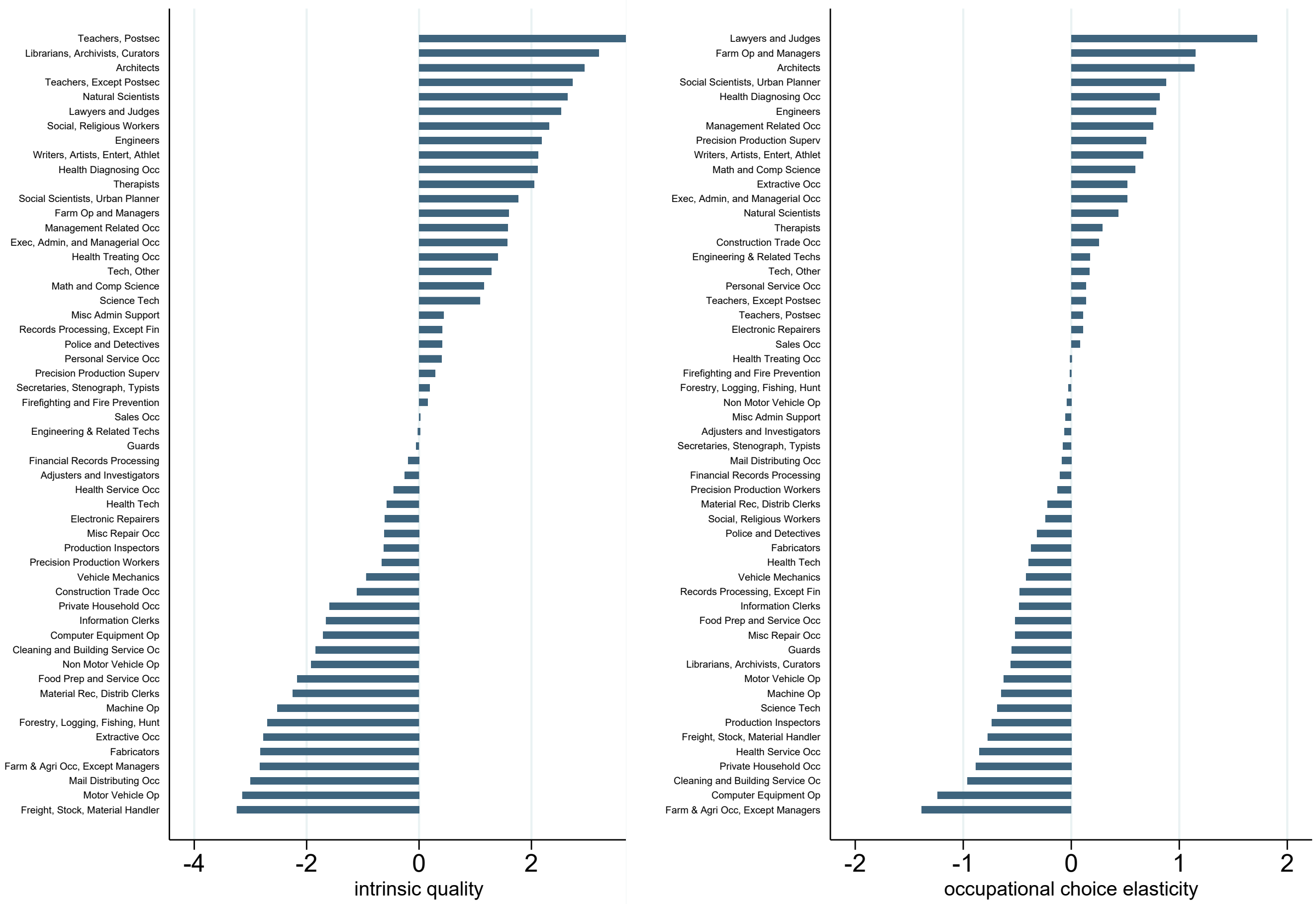
dimensional index is able to capture the bundle of job qualities likely to matter for worker well-being. The last column of Table 1 reports the variance that remains unexplained in each characteristic and suggests that our measure of the intrinsic quality of an occupation is able to explain the majority of the variation in nearly all dimensions of the quality of worklife that we consider.

Figure 1a displays the measured intrinsic quality of occupations. The figure reveals substantial heterogeneity in the intrinsic quality of occupations. Occupations with low intrinsic quality are material handlers, motor vehicle operators, non-managerial firm occupations, cleaning occupations. At the other end of the spectrum, occupations with high intrinsic quality are post-secondary teachers, librarians, architects, lawyers and judges, writers, artists. While the cardinal information in the estimated intrinsic quality may not be readily interpretable, the relative ranking of occupations is meaningful, and is what we exploit in the analysis.

We explore how our measure of the intrinsic quality of occupations correlates with a general measure of job satisfaction by applying the same treatment described above in Equation (1) to the following question asked in the Quality of Worklife module of the GSS: *"All in all, how satisfied would you say you are with your job?"*. Figure 2a shows that our measure of the intrinsic quality of occupations correlates positively with job satisfaction: the correlation coefficient is 0.524 (SE=0.118). However, this general measure of job satisfaction reflects a subjective proxy that is inclusive of both extrinsic (monetary) and intrinsic (non-monetary)

Figure 1: Intrinsic Quality and Occupational Choice Elasticities

(a) Intrinsic Quality of Occupations (b) Occupational Choice Elasticities



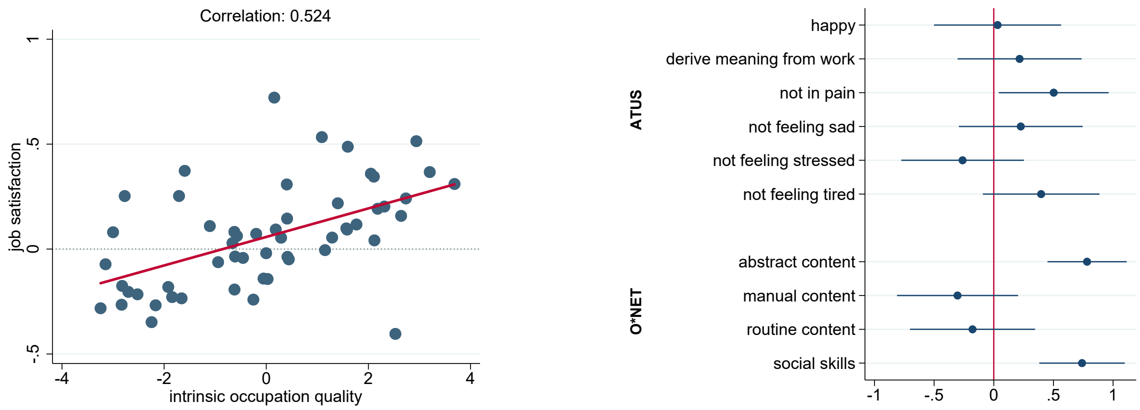
Notes: Bars are indices of intrinsic quality of occupations represented by the first principal component of the occupation characteristics we consider in Panel (a) and estimated occupations choice elasticities for each occupation in Panel (b).

aspects of jobs and occupations. For this reason, we proceed in the remainder of the analysis with the PCA-based measure of occupation quality as our preferred one, but note that the empirical fact we document is robust to using the more general index of job satisfaction instead.

Finally, we show how our measure of the intrinsic quality of occupations correlates with other characteristics of occupations. We consider several such characteristics. First, we use six dimensions of feelings about work collected in the American Time Use Survey in 2010, 2012 and 2013. Respondents in the survey were asked how meaningful their find their work, how happy, sad, and tired they are while working and how much stress and pain they experience. Following Kaplan and Schulhofer-Wohl (2018) and our treatment of the GSS

Figure 2: Intrinsic Quality of Occupations and Other Occupation Characteristics

(a) Job Satisfaction (b) Other Characteristics of Occupations



Notes: Panel (a) shows the relationship between the intrinsic quality of occupations (horizontal axis) and a general index of job satisfaction (vertical axis). Panel (b) plots correlation coefficients between the intrinsic quality of occupations and other characteristics of occupations.

variables, we project the responses on a vector of covariates that includes the logarithm of weekly earnings and hours, a quadratic age polynomial, dummies for education (high-school or less, some college, college degree or more), race (Black, white, other) and gender, as well as on occupation fixed effects. We then correlate the occupation fixed effects with the intrinsic quality of occupations. Second, we consider the measures of abstract, routine and manual task content of occupations by Autor and Dorn (2013), based on the Dictionary of Occupational Titles, and the measure of social skill intensity of occupations by Deming (2017), based on O*NET.

Figure 2b summarizes these correlation coefficients and shows that occupations with a higher intrinsic quality are also occupations in which workers find the work meaningful, are not in pain and do not feel sad or tired when working, but feel stressed. These occupations also tend to have a higher content of abstract tasks, a lower content of manual and routine tasks, and require more social skills.

2.3 What Occupations are Rich Children More Likely to Choose?

In this section we document our key observation on a robust relationships between occupational choice, parental income, and the intrinsic quality of occupations.

2.3.1 Occupational Choice and Parental Income

We begin by examining how growing up in a rich family influences the career choice of children. To that end, we estimate a multinomial logit model that allows the probability that a child i chooses occupation $o_i = j$, for $j \in \{2, \ldots, 54\}$ to depend on the logarithm of parental income and the educational attainment of child i, expressed in years of schooling. Letting $\mathbb{P}(o_i = j)$ denote the unconditional probability that a child i chooses occupation $o_i = j$ and $\bar{y}$ denote lifetime parental income, we then define the elasticity of occupational choice with respect to parental income to be

$$\frac{\partial \ln \mathbb{P}(o_i = j)}{\partial \ln \bar{y}} = \beta_j^{\bar{y}} - \sum_{j'=1}^{54} \mathbb{P}(o_i = j')\, \beta_{j'}^{\bar{y}},$$

where $\beta_j^{\bar{y}}$ is the occupation j specific coefficient on log parental income in the multinomial logit model.

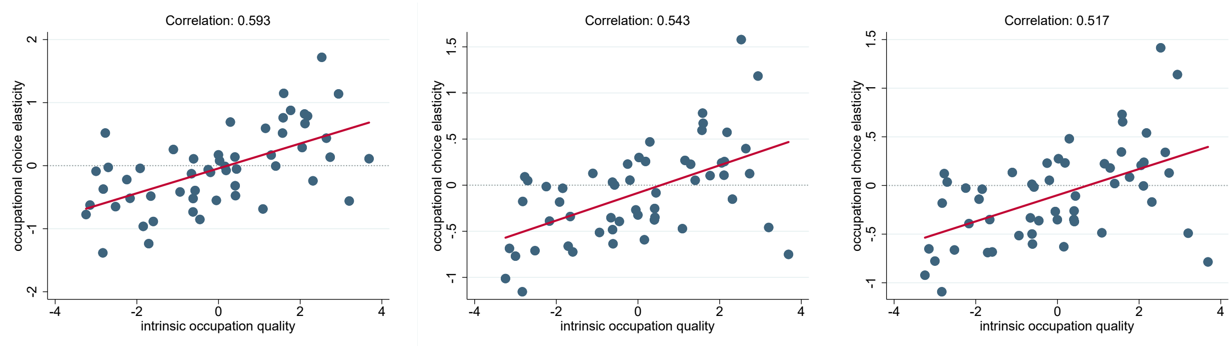
Figure 1b displays the estimated occupational choice elasticities for the 54 occupations we consider. The figure reveals substantial heterogeneity in elasticities, ranging from -1.38 for non-managerial farm occupations to 1.72 for lawyers and judges. A positive elasticity reflects that growing up in a rich family makes the child more likely to choose a given occupation. Our estimates indicate that children with rich parents are more likely to become lawyers and judges, architects, social scientists, writers, and artists. Conversely, growing up in a rich family makes children less likely to become farm workers, janitors, housekeepers, or material handlers.

2.3.2 Occupational Choice Elasticities and The Intrinsic Quality of Occupations

We now turn to the joint analysis of occupational choice elasticities and the intrinsic quality of occupations. Figure 3a depicts the correlation between occupational choice elasticities and the intrinsic quality of occupations. We find a large and positive correlation between these two variables, equal to 0.593 (SE=0.111). This suggests that, on average, those occupations more likely to be chosen by children born into rich families also yield higher non-pecuniary qualities and highlights a channel through which the inequality of opportunity stemming from different economic backgrounds can have consequences on welfare above and beyond those implied by earnings. This channel is quantitatively substantial as variation in intrinsic occupation quality explains 35% of the variation in occupational choice elasticities.

Figure 3: Occupational Choice Elasticities and the Intrinsic Quality of Occupations

(a) Benchmark (b) With Potential Earnings (c) (b) + Parent Occupation



Notes: Panel (a) shows the relationship between occupational choice elasticities (vertical axis) and the intrinsic quality of occupations (horizontal axis). Panel (b) shows the relationship between occupational choice elasticities estimated controlling for potential earnings and the intrinsic quality of occupations. Panel (c) shows the relationship between occupational choice elasticities estimated controlling for potential earnings and the occupation of the parent and the intrinsic quality of occupations.

2.4 Robustness

We next show that the relationship between occupational choice, parental income and the intrinsic quality of occupations is robust to a wide range of of considerations.

2.4.1 What Occupations Are Poor or Rich Children Better At?

A concern with the occupational choice elasticities estimated above is that parental income might influence the occupational choice of children through its effect on potential earnings across different occupations. For example, children from a richer background might have access to a better quality education, a more extensive professional network (Kramarz and Skans, 2014), or have the chance to develop better social skills (Deming, 2017), all of which can differentially affect their potential earnings across occupations. If the children of richer parents are more productive and earn higher earnings exactly in those occupations that feature higher estimates of intrinsic quality, we cannot readily interpret higher likelihood of choosing those occupations as being driven by the non-monetary attributes.

To explore this, we first estimate a flexible earnings equation that allows the earnings of the child to depend on occupation, their parent's lifetime income, as well as covariates (years of schooling, age, gender and race) whose effect on earnings is allowed to vary by occupation.[10] Second, we use this earnings equation to predict potential earnings that children

[10]See Appendix A.5 for a formal discussion of the specification we estimate. We also experimented with an even more flexible earnings function that allows for second order terms of the continuous covariates, as well

in our sample would earn in each occupation. Third, we re-estimate the occupational choice elasticities controlling for (counterfactual) potential earnings for each individual across all occupations.[11]

Figure 3b shows that the relationship between occupational choice elasticities and the intrinsic quality of occupations is qualitatively and quantitatively robust to netting out the effect of parental income on potential earnings in the estimation of occupational choice elasticities. In particular, the correlation coefficient is 0.54, very similar to the 0.59 in the benchmark. More importantly, the effect on the predictive power of the intrinsic quality of occupations is small: the intrinsic quality of occupations explains 30% of the variation in occupational choice elasticities, compared to 35% in the benchmark.

2.4.2 Intergenerational Transmission of Preferences for Occupations

In light of the well documented intergenerational persistence of occupational choice (see, for example, Long and Ferrie 2013; Lo Bello and Morchio 2019), it is conceivable that the sorting of children into occupations reflects, in part, the transmission of taste for the occupation of one's own parents (Doepke and Zilibotti, 2008, 2017). To assess to what extent that is the case, we re-estimate occupational choice elasticities controlling not only for the potential earnings of children across all occupations, as above, but also for a dummy variable that is equal to one if the parent works in that given occupation. Figure 3c shows the correlation between occupational choice elasticities and the intrinsic quality of occupations equal to 0.52 (SE=0.083), and the intrinsic quality of occupations still explains 27% of the variation in occupational choice elasticities, compared to 35% in the benchmark.[12]

2.4.3 NLSY

Our results are also robust to estimating occupational choice elasticities using data from the NLSY. Appendix A discusses the details of our treatment of this dataset. Figure 22 in Appendix D shows that estimates of occupational choice elasticities based on the PSID data correlate positively with those based on the NLSY. With respect to the correlation with the intrinsic quality of occupations, Figure 23 in Appendix D shows that our finding that the

as interactions between covariates, all allowed to vary by occupation, and found similar results.

[11]Formally, we estimate an alternative specific conditional logit model (McFadden, 1973), where we allow the probability of working in occupation j to also depend on occupation (alternative) specific characteristics, which in our case are potential earnings across all occupations. Figure 21a in Appendix D shows that the new occupational choice elasticities are highly correlated with the benchmark ones: the correlation coefficient is equal to 0.806 (SE=0.082).

[12]As shown in Figure 21b in Appendix D, the estimated elasticities correlate strongly with the benchmark ones: the correlation coefficient is equal to 0.799 (SE=0.083).

occupations that are more likely to be chosen if growing up rich are those with a higher intrinsic quality also holds in the NLSY data.

2.4.4 The Intrinsic Quality of Occupations, Occupation Classification, and Risk

Throughout our analysis we maintain the assumption that children of poor and rich parents evaluate the non-pecuniary aspects of occupations similarly. While the GSS data does not have information on the parental income of the respondents, we are able to verify that this is likely to be the case by applying our procedure for measuring the intrinsic quality of occupations to the sample of respondents with annual income below and above the median, separately. We find a large correlation coefficient between the indices of occupation quality estimated on the two samples, equal to 0.769 (SE=0.090).

Lastly, we also show that our results are robust with respect to the job characteristics included in our measure of the intrinsic quality of occupations, the occupation classification and accounting for the fact that some occupations are riskier than others. Figure 24 in Appendix D shows that our main empirical finding is robust to *(i)* an alternative measure of the intrinsic quality of occupations that only considers 5 of the 7 job characteristics listed in Table 1, and *(ii)* a finer occupation classification with 80 occupations, listed in Table 6. Table 10 in Appendix D shows that the intrinsic quality of occupations correlates positively with occupational choice elasticities and continues to explain a sizable share of their variation when controlling for how risky occupations are.[13]

3 Model

In this section, we construct a dynastic model of occupational choice and intergenerational mobility to rationalize the patterns uncovered in the data and study their implications.

3.1 Environment

3.1.1 Dynastic Occupational Labor Supply

The economy is populated by overlapping generations of agents who are altruistic toward their children. Each generation is comprised of a unit continuum of agents and lives for two periods: childhood and adulthood (parenthood).[14] An agent starts their adulthood in

[13]We proxy for the risk of occupations with measures of earnings dispersion using data from the Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS).

[14]Throughout, we focus our attention on the stationary equilibria of our model and therefore do not include the dependence of the variables on the period in our notation to simplify the expressions.

one occupation $j \in \{1, \cdots, J\}$ with total endowment of $y = b + e$, comprised of her own (lifetime) earnings e as well as a direct transfer b that she has received from her parent. She bears one child, and then chooses how to allocate her total endowment y between own market consumption c and the resources to offer her child, in the form either of a human capital investment h or a direct transfer $b \geq 0$.[15]

After the decisions on human capital investment and direct transfer are made, three components of uncertainty about the child's outcomes are resolved and the child chooses her own adulthood occupation j. First, the child receives an idiosyncratic talent shock u, drawn independently of other outcomes from a distribution $\mathbb{P}_u(\cdot)$. Second, the child receives an idiosyncratic human capital shock that leads to her observed schooling s based on a distribution $\mathbb{P}_s(\cdot|h)$ conditional on parental investment h. Third, the child draws a J-dimensional vector $\boldsymbol{\epsilon} \equiv (\epsilon_j)$ of taste shocks across different occupations, drawn as *i.i.d.* samples from a distribution $\mathbb{P}_\epsilon(\cdot)$.

The earnings of the child who works in occupation j in her adulthood depend on her occupation-specific ability A_j and the occupation-specific wage rate per efficiency units of ability w_j. We allow the occupation-specific abilities to be functions of schooling, talent, and the endowment of the parent as $e_j(s, u, y) = w_j A_j(s, u, y)$.[16] The dependency of occupation-specific ability on parental endowment y accounts for potential channels for the direct intergenerational persistence of income, including the persistence of ability.

A vector $\boldsymbol{\nu} \equiv (\nu_j)_{j=1}^J$ characterizes the mean intrinsic quality of different occupations. The child chooses her own adulthood occupation j, having observed her talent u, schooling attainment s, taste shocks $\boldsymbol{\epsilon}$, as well as the direct transfers b from the parent, in order to maximize her future adulthood utility[17]

$$V^+(s, u, \boldsymbol{\epsilon}, b, y) \equiv \max_j \; V\left(b + e_j(s, u, y)\right) + \zeta \, \nu_j + \rho \, \epsilon_j, \tag{2}$$

[15]The latter assumption rules out the possibility of intergenerational debt markets, and is in line with the assumption of credit constraints typically made in the standard theories of intergenerational mobility (Becker and Tomes, 1986). Early empirical work (see, e.g., Heckman and Mosso, 2014; Lee and Seshadri, 2019) questioned this assumption, but more recent work has reinforced the notion that credit constraints play an important role in shaping the patterns of educational attainment (Lochner and Monge-Naranjo, 2012, 2016; Hai and Heckman, 2017). We note that the key facts and mechanisms that are the focus of our interest in this paper involve the children's choice of occupation *conditional on the attained level of education*.

[16]We can offer an alternative rendition of our model by characterizing the conditional distribution of a multi-dimensional ability vector $\boldsymbol{a}_t \in \mathbb{R}^J$ that characterizes the ability of the child across J different occupations, given the endowment of the parent and the schooling attainment of the child. See footnote 28 below.

[17]We can motivate Equation (2) by assuming that each occupation j has a vector of qualities $\boldsymbol{x}_j$, which are valued by each child as $\boldsymbol{\xi}'\boldsymbol{x}_j$ where the vector of coefficients $\boldsymbol{\xi}$ is heterogeneous across children. We then consider a setting where the coefficients $\boldsymbol{\xi}$ are distributed such that $\zeta\nu_j \equiv \mathbb{E}\left[\boldsymbol{\xi}'\boldsymbol{x}_j\right]$. The idiosycratic taste shocks are then given by $\rho\epsilon_j \equiv \boldsymbol{\xi}'\boldsymbol{x}_j - \mathbb{E}\left[\boldsymbol{\xi}'\boldsymbol{x}_j\right]$.

where $V(\cdot)$ denotes the pecuniary component of utility as an adult parent. The last two terms in Equation (2) account for the non-pecuniary value derived from working in occupation j. The parameter ζ characterizes the weight of intrinsic qualities and the parameter ρ controls the dispersion of the zero-mean, occupation-specific taste shocks ϵ. We assume that the distribution $\mathbb{P}_\epsilon$ of idiosyncratic, occupation-specific taste shocks is a normal Type-I extreme-value distribution with zero-mean, that is,

$$\mathbb{P}_\epsilon(\epsilon) = \exp(-\exp\left(-\epsilon - \overline{\gamma}\right)), \tag{3}$$

where $\overline{\gamma} \equiv \int_{-\infty}^{\infty} u \exp(-u \exp(-u))du$ is the Euler-Mascheroni constant. Accordingly, we can analytically compute the expected value in Equation (4), as we will see below.

The welfare of the adult parent depends on the intrinsic quality ν_j of her own occupation, as well as on her market consumption and expected future dynastic utility (with a corresponding weight $\beta < 1$). More specifically, the pecuniary component of the utility of a parent with total endowment y in occupation j is given by

$$V\left(y\right) \equiv \max_{c,h,b} \log c + \beta\, \mathbb{E}_{s,u} \left[\mathbb{E}_{\epsilon} \left[V^{+}\left(s,u,\epsilon,b,y\right) | s,u \right] \middle| h \right], \tag{4}$$

$$y \geq c + \frac{b}{1+r} + \varphi\left(h\right), \tag{5}$$

where $\varphi(\cdot)$ is a function that characterizes the cost for different levels of human capital investment h, and r is the real rate of interest from one period to the next. The parent values the expected utility of the child $\mathbb{E}[V^{+}]$, defined by Equation (2), and accordingly decides on human capital investment h and direct transfer b depending on the available endowment y. Given our distributional assumption on the taste shocks ϵ, we can write the expected utility of a child with schooling s, talent u, and parental endowment y in Equation (4) as [18]

$$\overline{V}^{+}(s,u,y) \equiv \mathbb{E}_{\epsilon}\left[V^{+}|s,u,y\right] = \rho \log\left(\sum_{j=1}^{J} e^{\frac{\zeta \nu_j}{\rho}} \exp\left[\tfrac{1}{\rho} V\left(b^{*}\left(y\right) + e_j\left(s,u,y\right)\right)\right]\right). \tag{6}$$

Parents and children in a given period take the future paths of occupation-specific wages, interest rate, and schooling costs as given, and make decisions regarding consumption, transfers, schooling investments and occupational choice.[19]

[18] See Lemma 1 in Appendix B.

[19] Due to perfect altruism, we can show that the problem laid out above provides a recursive solution to a sequential formulation of the dynastic intertemporal problem. See Appendix B.

3.1.2 Production and Occupational Labor Demand

Next, we endogenize the vector of occupation-specific wages $\boldsymbol{w}$ by constructing the aggregate demand for occupation-specific labor. Competitive firms produce a final good using a Cobb-Douglas production function $X \equiv K^{\chi} L^{1-\chi}$ combining capital K and a composite aggregate L of different types of labor. The composite L is a CES aggregator of different occupations, given by[20]

$$L \equiv \left(\sum_{j=1}^{J} \Psi_j^{\frac{1}{\psi}} \left(Z_j L_j \right)^{\frac{1-\psi}{\psi}} \right)^{\frac{\psi}{1-\psi}}, \tag{7}$$

where the parameter ψ is the elasticity of substitution in occupational labor demand, Ψ_j is an occupational demand shifter, and where Z_j and L_j denote the productivity and the total efficiency units employed in occupation j. Capital depreciates at rate ξ and the next period capital is given by $K(1-\xi) + I$ where K is the current period stock of capital and I is the level of investment, denoted in units of final goods.

We normalize the price of final goods to unity, implying $1 = \left(\frac{R}{\chi}\right)^{\chi} \left(\frac{W}{1-\chi}\right)^{1-\chi}$, where W is the price index corresponding to the CES aggregator in Equation (7). The labor demand for occupation-j in is then given by

$$w_j L_j = (1-\chi)\, X \frac{w_j L_j}{\sum_{j'} w_{j'} L_{j'}} = (1-\chi)\, X\, \Psi_j \left(\frac{w_j}{Z_j W} \right)^{1-\psi}. \tag{8}$$

We further assume an education sector, in which competitive institutions transform final goods to human capital investment services provided to a given individual according to the production function $h \equiv \varphi^{-1}(x)$. This implies the cost function for human capital investment $\varphi(\cdot)$ in Equation (5).

3.2 Equilibrium

In this section, we examine the stationary equilibrium of the model, along which wage rates $\boldsymbol{w} \equiv (w_j)$, interest rate r, and schooling costs $\varphi(\cdot)$ are constant.

3.2.1 Core Mechanism: Demanded Compensation and Compensating Differentials

The policy functions $b^*(\cdot)$ and $h^*(\cdot)$ that solve the Bellman equation (4) allow us to find the conditional occupational choices of the children. Relying on the properties of the extreme

[20] All the results of the paper, as well as the quantitative exercises presented, further extend to any specification of labor demand with a general aggregator of the form $L = \mathcal{L}\left(Z_1 L_1, \cdots, Z_J L_J\right)$.

value distribution, we can show that the probability that a child with schooling s, talent u, and of a parent with endowment y chooses occupation j is given by[21]

$$\mu_j(s,u,y) = \frac{e^{\zeta\nu_j/\rho}\exp\left[\frac{1}{\rho}V\left(b^*(y)+w_jA_j(s,u,y)\right)\right]}{\sum_{j'=1}^{J} e^{\zeta\nu_{j'}/\rho}\exp\left[\frac{1}{\rho}V\left(b^*(y)+w_{j'}A_{j'}(s,u,y)\right)\right]}. \tag{9}$$

Correspondingly, the probability that a child with schooling s and parental endowment y chooses occupation j is given by $\mathbb{E}_u[\mu_j(s,u,y)]$.

Parental Income and Occupational Choice To unpack the predictions of the model regarding the relationship between parental endowment and occupation choice, let us consider the occupational choice probabilities from Equation (9) for a child with parental endowment y, schooling attainment s, and talent u. Dropping the arguments (s,u,y) to simplify the expression, the log likelihood ratio of choosing two different occupations, a high-intrinsic quality occupation H and a low-intrinsic quality occupation L, satisfies

$$\rho\,\log\frac{\mu_H}{\mu_L} = \zeta\nu_H - \zeta\nu_L + V\left(b^*(y)+e_H\right) - V\left(b^*(y)+e_L\right). \tag{10}$$

Let $\Delta\nu \equiv \nu_H - \nu_L > 0$ denote the difference in intrinsic quality between the two occupations. In order for the child to be equally likely to choose the two occupations, the child demands some earnings compensation for the lower level of intrinsic quality she would enjoy in occupation L. Equation (10) suggests that this *demanded compensation* $d \equiv e_L - e_H$ satisfies

$$V\left(b^*(y)+e_H+d\right) - V\left(b^*(y)+e_H\right) = \zeta\,\Delta\nu. \tag{11}$$

Furthermore, Equation (11) implies that the derivative of the demanded compensation with respect to parental endowment is given by

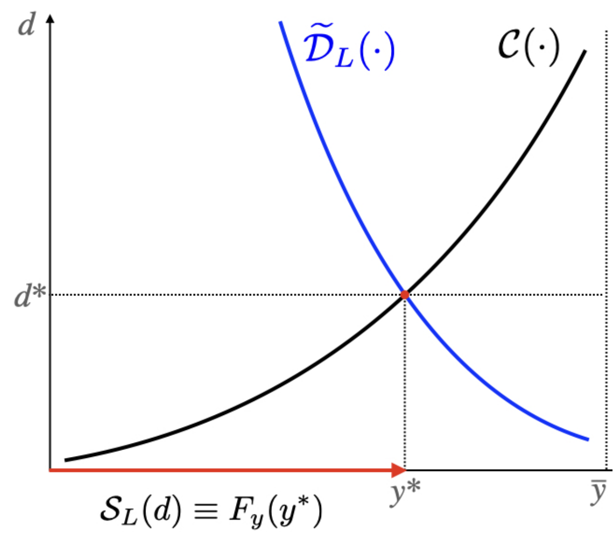
$$\frac{\partial d}{\partial y} = \left[\frac{V'\left(b^*(y)+e_H\right)}{V'\left(b^*(y)+e_H+d\right)} - 1\right]\left(b^*\right)'(y), \tag{12}$$

which is positive valued whenever the value function is concave and the transfer policy function is monotonically increasing. That is, the compensation required to make a child equally as likely to choose the occupation with a lower intrinsic quality rises in the endowment of the parent.

The intuition behind the result above is simple. Equation (2) shows the tradeoff faced

[21] See Lemma 2 in Appendix B.

Figure 4: Demanded Compensation and Compensating Differentials



Notes: The diagram represents the determination of equilibrium compensationg differentials in a special case of the model with $\rho \to 0$, where the only source of heterogeneity among workers is parental endowment. The curve $\mathcal{C}$ characterizes the demanded compensation as a function of parental endowment and the curve $\widetilde{\mathcal{D}}$ shows a monotonic transformation of relative occupational labor demand (see text for details). The equilibrium compensating differentials d^* intersects the two curves, and the supply of labor for the low-intrinsc quality occupation is given by the sorting condition $y < y^*$.

by the child between the earnings and the intrinsic quality she enjoys in her occupation. The marginal value of an extra dollar in earnings for the utility of the child is given by the derivative of the value function $V(\cdot)$, evaluated at the sum of the transfer from the parents b and her occupational earnings e_j. Since under standard assumptions this value function is concave, higher levels of parental transfers made by rich parents lower the marginal value of extra income. In other words, the value of an extra dollar of earnings is lower for a richer child. Thus, they demand a higher level of earnings in occupation L to compensate them for the loss $\Delta\nu$ in intrinsic quality compared to occupation H.[22]

Compensating Differentials and Occupational Sorting Figure 4 provides a visual representation of how the demanded compensation defined in Equation (11) and the occupa-

[22]To be precise, this last step of the argument relies on the additional assumption of separability between the monetary component and the taste for occupations in the utility function. Note that the mechanism highlighted here does not rely on the assumption in Equation (2) that the child utility is a linear function of intrinsic quality. To see why, consider an alternative specification to Equation (2), given by $V(b + e_j) + \zeta \log \nu_j + \rho\epsilon_j$, that is a concave function of intrinsic quality ν_j. Following the logic of the same comparison between occupations L and H laid out above, we only need to replace $\Delta\nu$ with $\log(\nu_H/\nu_L)$ in Equation (11) and reach the same conclusion as in Equation (12). In practice, we choose the linear specification for simplicity, as it implies that occupational choice is invariant to uniform shifts in all intrinsic qualities.

tional labor demand together determine equilibrium compensating differentials. To focus on the core mechanism, the figure considers a simplified setting with only two occupations $\{L, H\}$ where differences in parental endowment are the only relevant source of heterogeneity among workers, i.e., $A_j(s,u,y) \equiv A_j$ and $\rho = 0$. The curve $d = \mathcal{C}(y)$ shows the demanded compensation $d \equiv e_L - e_H = w_L A_L - w_H A_H$ to become indifferent between the two occupations as a function of parental endowment y. Assume wage rates (w_L, w_H) and a corresponding compensating differentials $d > 0$.[23] Agents with parental endowment $y < \mathcal{C}^{-1}(d)$ choose occupation L, implying the sorting of the children of poorer parents into occupation with the lower intrinsic quality.

Letting $F_y(\cdot)$ denote the cumulative distribution of parental endowment in equilibrium, the labor supply of occupation L is simply given by $\mathcal{S}_L(d) \equiv F_y(\mathcal{C}^{-1}(d))$. Accordingly, if we define a monotonic transformation $\widetilde{\mathcal{D}}_L(\cdot) \equiv F_y^{-1}\left(\mathcal{D}_L(\cdot)\right)$ of the labor demand $\mathcal{D}_L(\cdot)$ for occupation L, the equilibrium compensating differentials d^* is the intersection of the demanded compensation curve $\mathcal{C}$ and the transformed labor demand curve $\widetilde{\mathcal{D}}_L$.

The logic of sorting based on parental endowment presented in Section 3.2.1 continues to operate under the richer setting that includes heterogeneity in idiosyncratic occupational taste ($\rho > 0$), occupational ability (dependence of A_j on s, u, and y), and multiple occupations. Next, we discuss the determination of equilibrium wage rates $\boldsymbol{w} \equiv (w_j)$ in this more general case.

3.2.2 General Equilibrium and Intergenerational Mobility

The stationary equilibrium of the model features a stationary distribution of endowments for the adults in each generation $F_y(y)$, and a corresponding conditional distribution of child earnings $F_e(e|y)$ given parental endowment y. As we will discuss below, the first distribution determines the occupational labor supply function, while the latter accounts for the drivers of intergenerational persistence of earnings and income under the model.[24]

For a given vector of occupational wages $\boldsymbol{w} \equiv (w_j)$, the supply of occupation-specific efficiency units of labor satisfies

$$w_j L_j = \int_0^\infty \mathbb{E}_{s,u}\left[e_j(s,u,y)\,\mu_j(s,u,y)\,|\,h^*(y)\right]\,dF_y(y). \tag{13}$$

Equating the supply function above with the labor demand Equation (8) yields $J-1$ con-

[23]Here, the key assumption is that the labor market does not differentiate workers based on their parental endowment.

[24]Appendix B.1 characterizes these distributions and discusses the different channels for the persistence of earnings, income, and welfare in the model.

straints on the vector of wage rates $\boldsymbol{w}$. We assume that the interest rate r is exogenous to the model, pinning down the steady state rental price of capital as $R = r + \xi$, where ξ is the depreciation rate of capital. From the fact that final good is the numeraire, we find that the wage index is given by $W = (1-\chi)\left((r+\xi)/\chi\right)^{\chi}$, which yields an additional constraint on the vector of wage rates $\boldsymbol{w}$. Having determined the wage rate, we can find the aggregate labor supply L by summing Equation (13) across all occupations.[25]

Under this equilibrium, the model features three potential channels for the dependence of child earnings on parental income, captured by the distribution $F_e(e|y)$. First, an increasing human capital investment policy function $h^*(y)$ implies that the children of richer parents are expected to acquire higher levels of schooling and higher earnings if the ability function $A_j(s,u,y)$ is increasing in schooling attainment s. Second, the children of rich parents may be endowed by other social, cognitive, or non-cognitive skills that are not captured by schooling, or by networks and connections that help them succeed in given occupations. Such channels are captured by a potentially increasing dependence of the ability function $A_j(s,u,y)$ on parental endowment y, leading to positive associations between parental endowment and children earnings. The third and final channel stems from the patterns of occupational choice, as captured by the dependence of the occupational choice probabilities in Equation (9) on parental endowment y. This dependence may affect the sorting of children with different levels of schooling attainment and talent across occupations with varying returns to these characteristics, contributing to the dependence of earnings on parental endowment for otherwise similar children.

4 Model Estimation

In this section, we discuss our approach to estimating the parameters of the model and present the results. As we will see, the model yields a simple characterization of the data generating process and thus lends itself to a maximum likelihood estimation strategy.

4.1 Maximum-Likelihood Estimation

A period in the model corresponds to a generation, which we assume spans 30 years. Prior to the estimation, we first calibrate two parameters based on existing work: the exogenous interest rate r and the altruism parameter β. We set r equal to 2.21% per year, as in Kaplan

[25]It is straightforward to determine the other aggregate variables in the model. For instance, the aggregate capital to (efficiency units of) labor ratio as $K/L = (\chi/R)^{1/(1-\chi)}$. Note that we do not clear asset markets since the real interest rate across generations is exogenous here.

and Violante (2014). We assume that β is equal to 0.5, a value that is within the range of estimates in the literature.[26]

Our PSID sample is composed of $4,637$ parent-child observations. For each parent-child pair i, we observe the earnings e_i, occupation o_i and schooling s_i of the child, as well as parental endowment y_i.[27] The schooling in the data takes one of the five potential values: no high-school degree, high-school degree, some college, college degree, graduate degree. Correspondingly, we will set these values to take values $s_i \in \{0, \cdots, 4\}$. The occupations in the data are the 54 groups listed in Table 5 in Appendix A.

Functional Form Assumptions We assume a log-linear specification for the ability function A_j that leads to the following form for the earnings function:

$$\log e_j(s,u,y) \equiv \log \left[w_j A_j(s,u,y) \right] = \alpha_j + \kappa_j s + \theta_j u + \delta_j \log y. \tag{14}$$

The constant term α_j absorbs the logarithm of wage rate per efficiency unit of occupational ability , as well as a constant occupation-specific shifter for the logarithm of occupation-specific ability function A_j. Thus, this term is an endogenous variable. Exogenous parameters κ_j and θ_j capture the returns to education and talent in occupation-specific ability, respectively. Finally, the exogenous parameter δ_j accounts for all potential mechanisms through which parental endowment may impact occupation-specific ability.[28]

As for the remainder of the model, we assume that the underlying distribution of talent is standard normal $\mathbb{P}(u) = \mathcal{N}(0;1)$ and that schooling attainment conditional on human capital investment is drawn from a truncated and discretized Gaussian distribution

$$\mathbb{P}_{s|h}(s|h) \equiv \frac{\exp\left(-\frac{1}{2}\left(\frac{s-h}{\vartheta}\right)^2\right)}{\sum_{s'=0}^{4} \exp\left(-\frac{1}{2}\left(\frac{s'-h}{\vartheta}\right)^2\right)}. \tag{15}$$

[26] For example, the altruism parameter is 0.04 in Kaplan (2012), 0.2 in Boar (2020), 0.51 in Nishiyama (2002) and 0.69 in Barczyk and Kredler (2017).

[27] See Section 2.1, as well as Appendix A for a discussion of the construction of each variable.

[28] Our model is isomorphic to the following Roy model. Each child i receives a vector of occupational abilities $(a_{ij})_{j=1}^{J}$ such that the log earnings of the child is given by $\log e_j(s_i, a_{ij}) = \alpha_j + \kappa_j s_i + a_{ij}$. We assume that the vector of abilities has a multivariate Gaussian distribution with the following conditional expected value and covariances:

$$\mathbb{E}\left[a_{ij}|y_i\right] = \delta_j y_i, \qquad \forall j \in \{1, \cdots, J\},$$
$$\mathbb{C}\left[a_{ij}, a_{ij'}|y_i\right] = \theta_j \theta_{j'}, \qquad \forall j, j' \in \{1, \cdots, J\}.$$

For the human capital investment cost function $\varphi(h)$, we assume a continuous and piecewise linear function defined over $h \in [0,4]$. We parameterize the cost function with a vector $\boldsymbol{\varphi} \equiv (\varphi_1, \cdots, \varphi_4)$, such that φ_k corresponds to the slope of the function between $k-1$ and k.

Let $\boldsymbol{\varsigma} \equiv (\rho, \zeta, \vartheta, \boldsymbol{\varphi}, \boldsymbol{\alpha}, \boldsymbol{\kappa}, \boldsymbol{\delta}, \boldsymbol{\theta})$ denote all the model parameters to be estimated, and let $\boldsymbol{d} \equiv (e_i, o_i, s_i, y_i)_{i=1}^{N}$ denote the data described above. Using Equation (14), we can infer the unobserved talent of the individual given the model parameters according to

$$u_i = \mathcal{U}\left(e_i, o_i, s_i, y_i; \boldsymbol{\varsigma}\right) \equiv \frac{1}{\theta_{o_i}}\left[\log e_i - \left(\alpha_{o_i} + \kappa_{o_i} s_i + \delta_{o_i} \log y_i\right)\right]. \qquad (16)$$

This observation allows us to write down the joint probability of data $\boldsymbol{d}$ conditional on parental income. Appendix C.1 provides the full expression for the log-likelihood function and Appendix C.2 presents the details of the algorithm that we use to solve the corresponding maximization problem.

In addition to our benchmark model, we also re-estimate the model without intrinsic qualities, i.e., setting $\nu_j \equiv 0$ for all occupations. We will use the resulting estimates in some of the experiments below to contrast the predictions of the benchmark model against the same model without variations in intrinsic qualities.

4.2 Estimation Results

Table 2a reports the estimated preference parameters ζ and ρ, representing the weights on the intrinsic occupation quality and the dispersion of the idiosyncratic occupation taste shock, respectively. The estimated weight ζ on the intrinsic quality of occupations is positive, suggesting that agents value the non-material aspect of occupations. The parameter ρ is informative about how strongly occupational choice responds to wage differentials, rather than simply reflecting the realization of idiosyncratic taste shocks. A small estimated value for this parameter implies a large average elasticity of occupational choice to earnings, suggesting that the model accounts for the sensitivity of agents to the variations in earnings across occupation. The table also presents the parameters characterizing the human capital investment cost function, and the standard deviation of the distribution of schooling attainment conditional on human capital investment ϑ. The education cost parameters imply a convex form for the monetary costs of parental investment in their children's human capital. This is a reflection of the fact that in the data children from rich families have, on average, higher levels of educational attainment. However, the data shows substantial heterogeneity in terms of schooling as a function of parental endowment, reflected in the sizable estimate for the standard deviation of the distribution of schooling conditional on human capital in-

Table 2: Estimation Results

(a) Preference and Education Parameters

Parameter		Value
weight on occ. intrinsic quality	ζ	0.025 (0.015)
dispersion in occ. taste shocks	ρ	0.053 (0.011)
education cost	φ_1	92.6 (4.552)
	φ_2	2113.6 (138.864)
	φ_3	908.2 (66.565)
	φ_4	1730.5 (129.137)
dispersion in schooling shocks	ϑ	1.627 (0.168)

Notes: Table entries show the estimated model parameters. Standard errors for each parameter, computed based on re-estimating the model for 25 bootstrapped samples, are in the parentheses.

(b) Estimated Earnings Function

	ν	α	κ	δ	θ
ν	1				
α	-0.75 (0.09)	1			
κ	0.91 (0.06)	-0.81 (0.08)	1		
δ	-0.70 (0.10)	0.26 (0.13)	-0.68 (0.10)	1	
θ	0.47 (0.12)	-0.61 (0.11)	0.50 (0.12)	-0.33 (0.13)	1

Notes: Table entries are correlation coefficients between occupation specific parameters of the earnings function and the intrinsic quality of occupations. Standard errors of the correlation coefficient are in parentheses.

vestment ϑ.

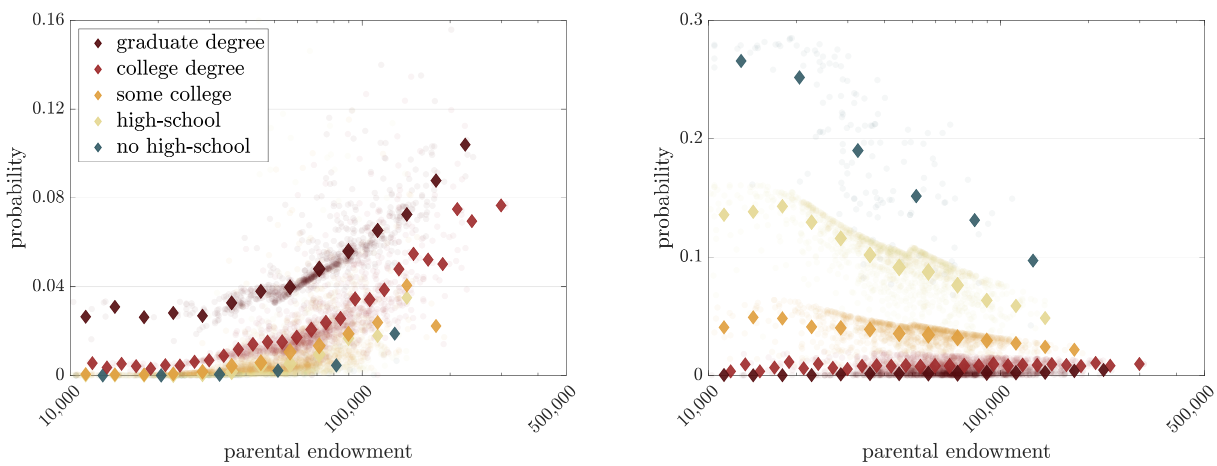
Table 2b reports correlations between the estimated parameters of the earnings function and the intrinsic quality of occupations introduced in Section 2.2.[29] These patterns of correlation suggest that *(i)* occupations with higher intrinsic qualities display a lower fixed component of earnings and a lower return to parental endowment, but a higher return to schooling and talent, *(ii)* occupations with a lower fixed component of earnings exhibit higher returns to schooling and talent, implying a tradeoff between occupations with high fixed component of earnings and with high returns, and *(iii)* occupations in which the return to education is high also exhibit a high return to talent.

Our maximum likelihood estimation strategy aims to fit the joint distribution of the observed data. Appendix C.4.1 shows that the estimated model provides a reasonable quantitative account of a number of untargeted moments capturing the observed patterns of educational attainment and occupational choice. In the remainder of this section, we examine the success of the model in accounting for the most important untargeted moments of interest: first, the relationship between intrinsic occupation quality and the occupational choice

[29] See Table 7 in Appendix C.3 for a full list of the estimated parameters of the earnings function.

Figure 5: Occupational Choice and Parental Endowment

(a) High Intrinsic Quality Occupations (b) Low Intrinsic Quality Occupations



Notes: Panel (a) shows the cumulative probability that the child chooses one of the three occupations with the highest intrinsic quality, by educational attainment. Panel (b) shows the cumulative probability that the child chooses one of the three occupations with the lowest intrinsic quality, by educational attainment.

of rich and poor children, as discussed in the motivating facts in Section 2.3, and second, the observed persistence of earnings in the data.

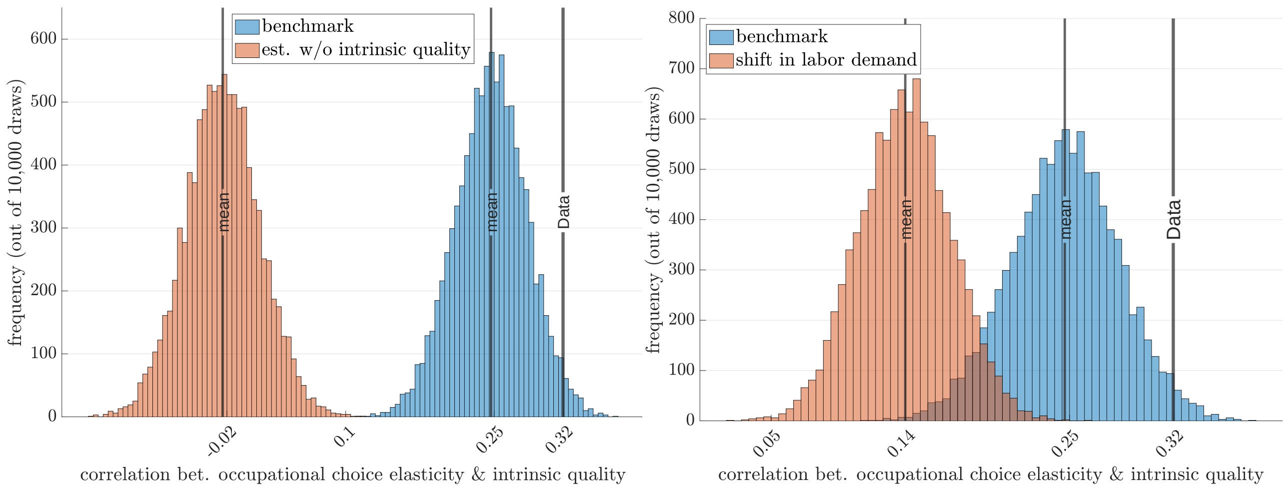
4.3 Parental Endowment and Occupational Choice

Figure 5 shows the relationship between children's occupational choice and parental endowment as predicted by the model. Panel (a) displays the probability of choosing one of the three occupations with the highest intrinsic quality (post-secondary teachers, librarians, archivists, curators, and architects) as a function of parental endowment and by education group. Panel (b), in turn, displays the probability of choosing one of the three occupations with the lowest intrinsic quality (freight, stock and material handlers, mail distributors, motor vehicle operators). Echoing the argument in Section 3.2.1 and the findings in the PSID data, the probability of choosing an occupation with a high intrinsic quality is increasing in parental endowment. Additionally, the figure also shows that the probability of working in high (low) intrinsic quality occupations increases (decreases) in the level of schooling.

Next, we revisit the correlation between occupational choice elasticities and the intrinsic quality that we saw in Section 2.3 in the context of the estimated model. We take the following strategy. For each observed parent-child pair i in the data, we take the parental endowment y_i as given and draw a talent u_i for the child from the distribution $\mathbb{P}(u_i) = \mathcal{N}(0,1)$. We then re-draw educational attainment s_i, occupational choice o_i, and earnings e_i for each

Figure 6: Occupational Choice Elasticties and Intrinsic Quality

(a) Estimation w/o Intrinsic Quality (b) Shift in Labor Demand



Notes: Panel (a) shows the histograms of the correlation values between occupational choice elasticities and the intrinsic quality of occupation across 10,000 re-sampled datasets under the benchmark model (blue) and the model estimated with no variations in intrinsic qualities (red). Panel (b) compares similar histograms under the benchmark (blue) and the environment reflecting trends in occupational labor demand (red).

child in the data based on the conditional distribution implied by the model. We generate 10,000 instances of such re-sampled datasets both for the benchmark estimated model and the other estimated model featuring no variations in intrinsic quality. For each re-sampled dataset, we run a linear regression of occupational choice $\mathbb{I}\{o_i = j\}$ for each occupation j on log parental endowment $\log y_i$ and educational attainment s_i. We then compute the correlation between the coefficients on parental endowment and the intrinsic qualities ν_j.

Figure 6a shows the distributions of the resulting correlations across the 10,000 re-sampled datasets, corresponding to the benchmark model and the model without variations in intrinsic qualities. The mean value of these correlations across all re-sampled datasets falls from 0.25 ($SE = 0.04$) under the benchmark model to -0.02 ($SE = 0.04$) under the model estimated with no intrinsic qualities. Thus, the presence of intrinsic occupation quality allows us to explain the systematic relationship observed in the data between occupational choice elasticities and intrinsic qualities.

4.4 Intergenerational Mobility in the Estimated Model

Next, we examine the degree of intergenerational persistence of earnings and income under the estimated model. Table 3 contrasts the measures of intergenerational mobility in our PSID sample against their respective average in 10,000 re-sampled datasets based on our

Table 3: Intergenerational Mobility

	Data	Model
Intergenerational elasticity	0.339	0.272 (0.005)
Rank-rank slope	0.356	0.258 (0.005)
Share at higher decile than parents	0.432	0.439 (0.003)
Covariance log e and log y	0.119	0.095 (0.002)

Notes: The model moments are averages over 10,000 samples generated from the model. The standard deviation of each measured in across the samples are reported in the parentheses. In each sample we redraw schooling attainment, occupational choice and earnings for each child.

estimated model following the procedure discussed in Section 4.3. We calculate four such measures. The first is the intergenerational elasticity between parental endowment and the child's earnings, and is defined as the slope coefficient of a regression of log-child earnings on log-parental endowment (Black and Devereux, 2011). The second is the rank-rank slope between parental endowment and child earnings. Letting $r_{y,i} \in [0,1]$ denote the parent i's rank in the distribution of parental endowment and $r_{e,i} \in [0,1]$ denote their child's rank in the distribution of children earnings, the rank-rank slope is defined as the slope coefficient of a regression of $r_{e,i}$ on $r_{y,i}$. The third is the share of children who are in a higher decile of the child earnings distribution than their parents are in the parental endowment distribution. The fourth is the covariance between log-child earnings on log-parental endowment. As the table shows, the model, despite its parsimony, is able to reproduce between 72 and 100% of the intergenerational persistence in the data. In Appendix C.5, we discuss the drivers of persistence of earnings under the model and provide a decomposition of the persistence into the different channels discussed in Section 3.2.2.

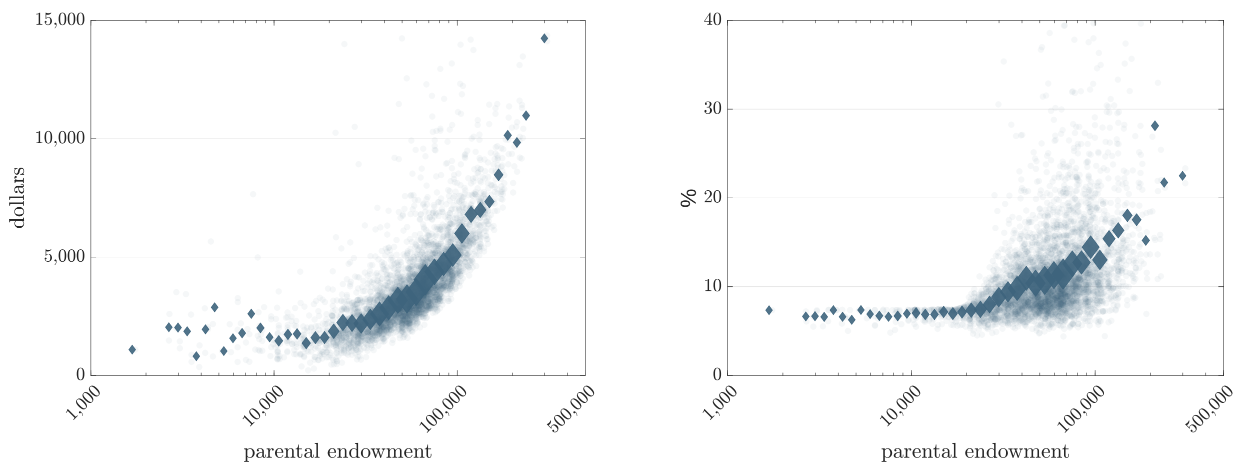
4.5 Demanded Compensation and Compensating Differentials

In Section 3.2.1, we discussed how our mechanism for the occupational sorting of the children depends on the demanded compensation, the amount needed to convince each child to switch to occupations with lower intrinsic quality, and the prevailing equilibrium compensating differentials across occupations. We now turn to examining both these objects in the context of the estimated model.

To illustrate the core prediction prediction in Equation (12) in the context of the estimated

Figure 7: Earnings Compensation and Parental Endowment

(a) Compensation in Dollars (b) Compensation as Share of Earnings



Notes: The figure shows the compensation required to make children indifferent between remaining in their current occupation and an occupation with an intrinsic quality that is $\Delta\nu$ lower, as function of the parental endowment. The compensation is expressed in 1996 US dollars in Panel (a) and as a percentage of earnings in the current occupation in Panel (b). $\Delta\nu$ is equal to the difference between the 75^{th} and the 25^{th} percentile of the distribution of intrinsic qualities.

model, we compute for each child i in the PSID data the compensation d_i required to render the child indifferent between remaining in their current occupation and moving to an occupation that carries an intrinsic quality that is $\Delta\nu$ lower than the intrinsic quality of the current occupation. Specifically, d_i is such that

$$V\left(b^*\left(y_i\right)+e_i+d_i\right)-V\left(b^*\left(y_i\right)+e_i\right)=\zeta\Delta\nu, \tag{17}$$

where $\Delta\nu$ is set to equal the difference between the 75^{th} and the 25^{th} percentile of the distribution of intrinsic qualities.[30] Figure 7 displays this compensation, expressed in 1996 US dollars in Panel (a) and as a share of earnings e_i in Panel (b). Consistent with the prediction of the theory, this compensation is increasing in parental endowment. It represents, on average 10% of earnings in the region of the parental endowment space where the most mass is, but can be as high as 25%, on average, for children of rich parents.

Uncovering Compensating Differentials We take two distinct strategies to provide proxies for the equilibrium compensating differentials through the lens of the estimated model.

[30]Recall from Equation (12) that this requires the policy function $b^*(y)$ to be increasing in parental endowment y. As expected, appendix C.4.2 shows that the policy function in the estimated model indeed satisfies this condition.

First, we construct a micro-level proxy for compensating differentials that corresponds to the tradeoffs faced by individuals making occupational choice decisions. For each individual in the data, we consider the top two most likely occupations predicted by the model, and compare the difference in log earnings between the two occupations against the difference between the intrinsic quality of the two occupations. Figure 8a shows the scatter plot of these differences. The linear fit implies that in the tradeoff between top two choices faced by each individual, a standard deviation gain in intrinsic quality is, on average, associated with a fall of over 17% in earnings.

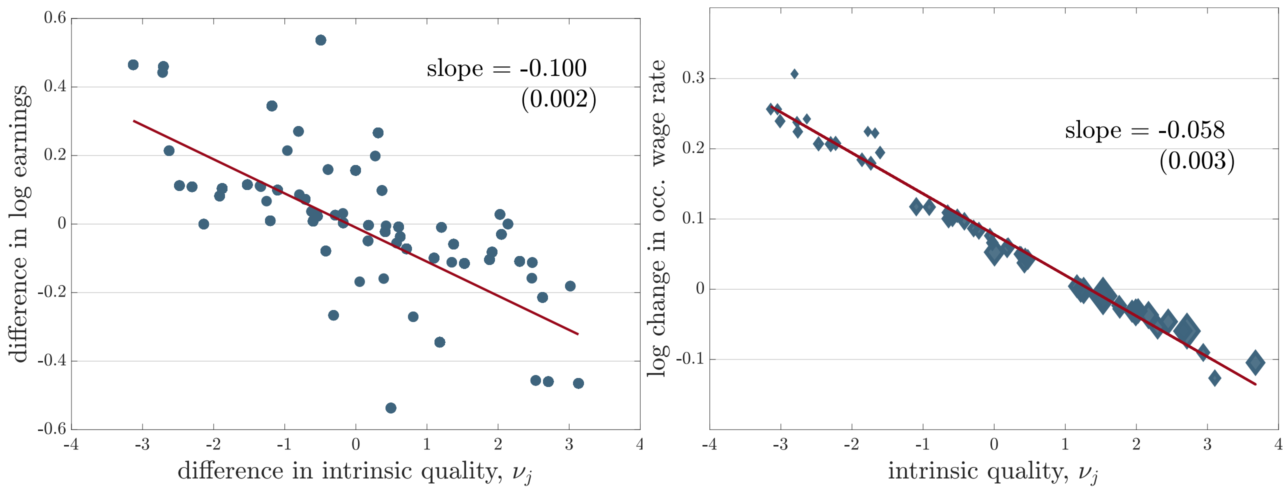
In our second approach, we take a macro view and answer the following question. Suppose we were to remove variations in the intrinsic quality of occupations. How much do we have to increase the wage rate for occupations with higher benchmark intrinsic quality to recover the original supply of labor for these occupations? Let τ denote such a variation in the environment faced by agents, when compared to the benchmark set of parameters uncovered in Section 4. To solve for general equilibrium response to this variation, we jointly solve for the new vector of fixed components of the earnings function $\boldsymbol{\alpha}^{\tau}$, the corresponding value function V^{τ}, and stationary distribution of endowments F_y^{τ} that satisfy conditions in Equation (13) for the same original levels of occupational wage bill. In this case, the variation in the environment consists of removing all differences across occupations in their intrinsic valuations, that is, setting $\nu_j \equiv 0$, which we will denote as $\tau \equiv n$.

In the environment with removed variations in intrinsic quality, the idiosyncratic taste shocks for occupations still provide a source of heterogeneity for the non-monetary dimension of working across different occupations. However, these idiosyncratic shocks average to zero across the population and only lead to a finite elasticity of occupational labor supply. The only difference between the new environment and our benchmark is the absence of intrinsic qualities. Thus, we may think of the resulting changes in the log occupational wage rates (given by $\boldsymbol{\alpha} - \boldsymbol{\alpha}^{n}$) as a proxy for the *general equilibrium compensating differentials* that satisfy the constraints imposed by the original levels of occupational wage bill under the benchmark model.

Figure 8b shows that the response of occupational wages is indeed strongly correlated with intrinsic quality: compared to the model with no intrinsic qualities, the benchmark economy reduces the (per efficiency unit) wage rate in occupations that compensate workers through higher intrinsic qualities under the benchmark model. We find that a linear fit captures most of the variations in the occupational wages, providing us an alternative characterization of the trade-off between intrinsic quality and earnings: one standard deviation rise in the intrinsic quality is accompanied by an average fall of around 11.4% in the (per efficiency unit) wage rate.

Figure 8: Compensating Differentials

(a) Micro: Across Individuals   (b) Macro: Across Occupations



Notes: Panel (a) displays the differences in log earnings between the top two most likely occupations for each individual in the data as predicted by the model (y-axis) and the corresponding differences in intrinsic qualities (x-axis). Panel (b) plots the change in the log occupational wage rates $\alpha_j - \alpha_j^n$ against occupational intrinsic qualities ν_j, where α^n represents the shifter of occupational earnings corresponding to the counterfactual experiment of eliminating differences in intrinsic occupation qualities while maintaining the benchmark occupational wage bills. The area of each diamond is proportional to the total wage bill for that occupation. The lines show linear fits.

5 Mobility and the Intrinsic Quality of Occupations

In this section, we study the patterns of mobility of welfare in the data in light of our estimated model.

5.1 Welfare and Compensated Earnings

The most comprehensive measure of welfare of a child in the model is V^+ in Equation (2), which accounts for both the pecuniary and non-pecuniary components of welfare. However, we need to transform a cardinal proxy such as V^+ for welfare to a money metric in order to compare the corresponding measure of mobility and inequality of welfare with standard measures in terms of earnings and income. Here, we face an additional challenge in that we also do not observe the idiosyncratic occupation-specific shock in Equation (2).

To tackle the latter challenge, we take two alternative strategies. Our first strategy relies on the observation that, given parental endowment y, talent u, schooling s, and occupation j of children, the conditional cumulative distribution function of V^+ is independent of the ex-post occupation of the child, and is given by[31]

$$F_v\left(v^+|s,u,y\right) \equiv \mathbb{P}\left(V^+ < v^+|s,u,y,j\right) = \exp\left[-\exp\left(-\frac{v^+ - \overline{V}^+(s,u,y)}{\rho} - \overline{\gamma}\right)\right], \quad (18)$$

where the Euler-Mascheroni constant $\overline{\gamma}$ is defined as in Equation (3) and where $\overline{V}^+(s,u,y)$ satisfies Equation (6) and gives the conditional expectation of V^+. This result implies that, conditional on the tuple (s,u,y) for a given agent, the residual inequality of welfare generated by heterogeneity in idiosyncratic occupation-specific taste shocks is the same regardless of the ex-post occupation. In other words, if we know the tuple (s,u,y) for a given agent in the model, we can characterize the welfare of the individual subject to an additional shock that has the same distribution for everyone. Now, recall from Equation (16) that we can infer the talent of each child in the data given their observed earnings, schooling, parental endowment, and occupational choice. Thus, we can infer the expected welfare $\overline{V}_i^+ \equiv \mathbb{E}_\epsilon\left[V^+|e_i,o_i,s_i,y_i\right]$ of each child i observed in our data by substituting for unobserved talent u_i from Equation (16) into the expression from Equation (6).

In our second approach, we simply abstract away from the idiosyncratic shock component of welfare V^+ and evaluate the two components corresponding to the market consumption and the intrinsic quality of occupation[32]

$$\widetilde{V}_i^+ \equiv V\left(b^*(y_i) + e_i\right) + \zeta\, \nu_{o_i}. \quad (19)$$

Noting that $\overline{V}_i^+ - \widetilde{V}_i^+ \equiv \rho\mathbb{E}_\epsilon\left[\epsilon_{o_i}|e_i,o_i,s_i,y_i\right]$, the two measures above allow us to separate the contribution of intrinsic qualities and taste shocks in forming our welfare proxy.

In order to compare the intergenerational mobility of income with the corresponding mobility in terms of these measures of welfare, we rely on the concept of *compensating variation*. The issue is that we observe the earnings of children across distinct occupations, which in turn generate varying degrees of intrinsic quality for them. We therefore perform a hypothetical exercise in which each child i is moved from their observed occupation o_i to a common benchmark occupation, which we choose to be the one with the lowest intrinsic quality $\underline{\nu}$. We then compute the corresponding compensating variation that makes each child indifferent between remaining in their original occupation o_i and moving to this benchmark occupation.

[31]See Lemma 3 in Appendix B. Appendix B.1 uses this result to derive the distribution of child welfare conditional on parental endowment, characterizing the persistence of welfare in the model.

[32]Figure 25 in Appendix D shows that the two measures are highly correlated in our data. A regression of $\widetilde{V}_i^+$ on $\overline{V}_i^+$ in our sample leads to a coefficient of 0.9995 ($SE = 0.001$).

Consider the expected utility measure $\overline{V}_i^+$ defined above. The corresponding compensation $\overline{d}_i$ for this measure satisfies

$$V\left(b^*\left(y_i\right)+e_i+\overline{d}_i\right)+\zeta\underline{\nu}=\overline{V}_i^+, \tag{20}$$

where in the left hand side of the equation we have used the fact that the expected taste shock for the child under the benchmark occupation is zero. Similarly, for the second measure $\widetilde{V}_i^+$ defined in Equation (19), we can define the compensation $\widetilde{d}_i$ such that it satisfies

$$V\left(b^*\left(y_i\right)+e_i+\widetilde{d}_i\right)-V\left(b^*\left(y_i\right)+e_i\right)=\zeta\left(\nu_{o_i}-\underline{\nu}\right). \tag{21}$$

We then define two measures of *compensated earnings* $\overline{ce}_i$ and $\widetilde{ce}_i$ as

$$\overline{ce}_i\equiv e_i+\overline{d}_i, \qquad \widetilde{ce}_i\equiv e_i+\widetilde{d}_i, \tag{22}$$

to be the measures of earnings that account for the contribution of intrinsic occupational quality to the welfare of the worker.

5.2 Mobility and Compensation of Earnings

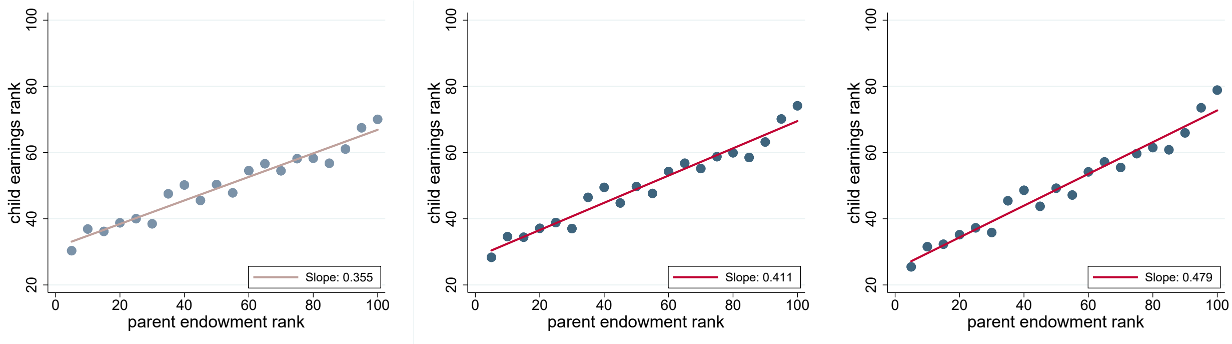
The procedure discussed in Section 5.1 allows us to compute the compensated earnings for each child in the data, given uncompensated (observed) earnings, schooling attainment, occupational choice, and parental endowment. We find the ranks $r_{\overline{ce},i}$ and $r_{\widetilde{ce},i}\in[0,1]$ of the child in the respective distributions of compensated earnings for the two measures of compensated earnings defined in Equations (22). To examine the implications of the model regarding the intergenerational mobility of income versus welfare, we compare rank-rank slopes between parental endowment and the realized and compensated earnings of the child.

Figure 9a depicts the relationship between the parent's rank r_y in the distribution of parental endowment and the child's rank r_e in the distribution of child earnings. Figures 9b and 9c show the relationship between the parent's endowment rank r_y and the child's ranks $r_{\widetilde{ce}}$ and $r_{\overline{ce}}$ in the respective distributions of compensated earnings. The figure reveals that accounting for the intrinsic quality of occupations lowers intergenerational mobility relative to what is predicted by earnings alone. Specifically, the rank-rank slope between parental endowment and compensated earnings $\widetilde{ce}$ ($\overline{ce}$) of the child is 16% (35%) larger than that between parental endowment and the realized earnings of the child.[33]

[33] If, instead, we consider the hypothetical exercise of moving each child i from their observed occupation o_i to a common benchmark occupation that is the one at the 25^{th} percentile of the intrinsic quality distribution

Figure 9: Intergenerational Mobility of Compensated Earnings in the Data

(a) Realized Earnings (b) Compensated Earnings, $\widetilde{ce}$ (c) Compensated Earnings, $\overline{ce}$



Notes: Panel (a) shows the relationship between the parent's rank r_y in the distribution of parental endowment and the child's rank r_e in the distribution of child earnings. Panels (b) and (c) show the relationship between the parent's rank r_y in the distribution of parental endowment and the child's ranks $r_{\widetilde{ce}}$ and $r_{\overline{ce}}$, respectively, in the distribution of compensated earnings.

The fact that the measure of compensated earnings that accounts for both the intrinsic quality of occupations and for the idiosyncratic shocks ($\overline{ce}$) implies lower levels of mobility than the measure of compensated earnings that only accounts for the intrinsic quality of occupations ($\widetilde{ce}$) has an important implication. In particular, we learn that richer children not only benefit from choosing occupations with higher intrinsic quality, but *they also benefit from being able to choose occupations that better reflect their idiosyncratic taste.*

Overall, these results suggest that failing to account for differences in the quality of work-life across occupations leads us to overestimate the degree of intergenerational mobility of opportunity and welfare.

Expected Mobility under the Model In the next section, we will study changes in the environment of the model that affect wages and parental investments. In the exercise above, we focused on evaluating the degree of intergenerational persistence for the individuals in the PSID sample, taking the observed earnings and occupational choice as given in the data. However, in order to evaluate the effects of these changes on mobility, we need to compare the *expected* degrees of persistence given the conditional distributions of earnings and occupational choice predicted by the model. To build measures of expected persistence as a benchmark for these comparisons, we follow the strategy introduced in Sections 4.3 and 4.4 and re-sample 10,000 datasets, re-drawing the occupation and earnings for each individual conditional on their observed parental endowment. We do this separately under

we obtain $r_{\widetilde{ce}}$=0.39 and $r_{\overline{ce}}$=0.47, so that the intergenerational mobility of compensated earnings is, respectively, 11% and 18% lower than the intergenerational mobility of realized earnings.

Table 4: Mobility of Uncompensated and Compensated Earnings under the Model

Rank-rank slope of endowment y and	Earnings	Compensated earnings, $\widetilde{ce}$	Compensated earnings, $\overline{ce}$
Benchmark	0.260 (0.005)	0.332 (0.005)	0.442 (0.005)
Estimated w/o Intrinsic Qualities	0.279 (0.006)	0.279 (0.006)	0.428 (0.005)
Benchmark w. Removed Intrinsic Qualities	0.269 (0.006)	0.269 (0.006)	0.396 (0.005)
Shifts in Labor Demand	0.210 (0.006)	0.267 (0.006)	0.362 (0.005)

the benchmark model, as well as *(i)* under the model estimated without intrinsic qualities, and *(ii)* the benchmark model with removed intrinsic qualities.

Table 4 presents the results for the three models in the first three rows. In line with the results we saw in the case of observed data, the benchmark model predicts that the mobility is on average the highest in terms of uncompensated earnings, and the lowest in terms of the compensated measure accounting for both intrinsic qualities and taste shocks. Under the two cases with no variations in intrinsic qualities, the mobility of uncompensated earnings is slightly lower than that in the data.[34] More importantly, the mobility in terms of the compensated measure $\widetilde{ce}$, which accounts for the intrinsic quality of occupations, falls under the benchmark model relative to the mobility of the uncompensated earnings. The two models without intrinsic qualities, mechanically, lead to the same predictions about mobility for the uncompensated earnings and this measure of uncompensated earnings. Finally, in all models, the mobility is lower in terms of the compensated measure $\overline{ce}$, that additionally accounts for idiosyncratic taste shocks, compared to the mobility of the uncompensated earnings.

6 Trends in Occupational Labor Demand

A large literature in economics has documented substantial shifts in the occupational composition of the labor force in the US, including an expansion of occupations that require non-routine, abstract and social skills, and a shrinkage of those that are intensive in routine tasks (Autor et al., 2006, Acemoglu and Autor, 2011, Jaimovich and Siu, 2012, Autor and Dorn, 2013). Following the common approach in this literature, we use data from the

[34]See Appendix C.5 for a discussion of the drivers of the change in the mobility of uncompensated earnings compared to the benchmark.

Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS) to calculate, for each occupation, the change in the wage bill share over three decades. We restrict attention to workers between 16 and 64 and we calculate, for each occupation, the average wage bill share between 1980 and 1985 and between 2010 and 2015.[35]

Based on these data, Figure 10a shows a substantial rise in the share of occupations with high intrinsic quality: the slope of the linear fit suggests that an increase of one standard deviation in the intrinsic quality of occupations has been associated with a rise in the wage bill of around 40%. In this section, we examine the implications of this fact for the welfare of workers, in terms of intergenerational mobility, inequality, and earnings growth.

Figure 11 provides an intuitive account of the rise in the compensating differentials as a result of the shift in labor demand, following the same assumptions as those of Figure 4 in Section 3.2.1. The shift in labor demand shifts the transformed demand curve $\widetilde{\mathcal{D}}_L$ to the left, since the demand for low-intrinsic quality occupations falls. In the absence of any supply response, we would expect this to lead to a fall in the compensating differentials, and a modest expansion of the labor supply of the high intrinsic-quality occupations toward the children of relatively poorer parents.

However, the core mechanism of the model implies an additional general equilibrium response in the long-run occupational labor supply as well. Recall from Equation (11) that the shape of the demanded compensation curve $\mathcal{C}(\cdot)$ is driven by the dependence of the marginal value function on the sum of parental transfers $b^*(y)$ and earnings e. Since in the long-run the shift in the demand curve $\widetilde{\mathcal{D}}_L$ leads to a response in occupational earnings, we need to account for the full general equilibrium structure to determine the predictions of the model with regard to compensating differentials and occupational choice.

To account for these general equilibrium effects, we consider moving from the benchmark environment to one with occupational wage bill shares corresponding to the changes observed in the CPS data from 1980s to 2010s. In addition, we assume a change in total wage bill $\sum_j w_j L_j$ corresponding to the 17.2% growth over the same period, as reported by the Bureau of Labor Statistics (BLS).[36] The exercise closely follows that in Section 4.3 for the comparison between the benchmark model and the model without intrinsic qualities. We let $\tau \equiv d$ denote this variation in the environment that corresponds to the new vector of occupational wage bills $w_j L_j$ that characterize the shifted occupational labor demand.[37]

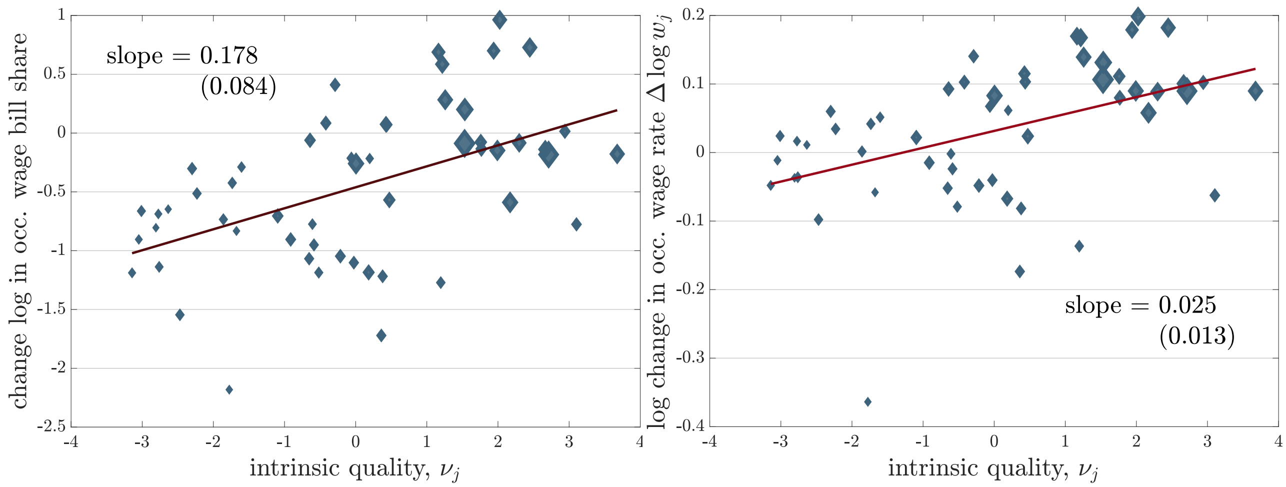
[35]Our measure of wages is workers' annual pre-tax wage and salary income from the previous calendar year. We drop observations with topcoded wage and salary income.

[36]Note that the sum of aggregate earnings $\sum_j w_j L_j$ in the model maps to average earnings in the data since the aggregate population is normalized to unity under the model.

[37]We refer to this change in the environment as a shift in occupational labor demand but in our model such a shift can be rationalized as a combination of shifts in occupational technologies Z_{jt} or demand shifters Ψ_{jt} in the aggregator (7).

Figure 10: Shifts in Occupational Labor Demand

(a) Shifts in Occupational Labor Demand (b) Response in Occupational Wage Rate



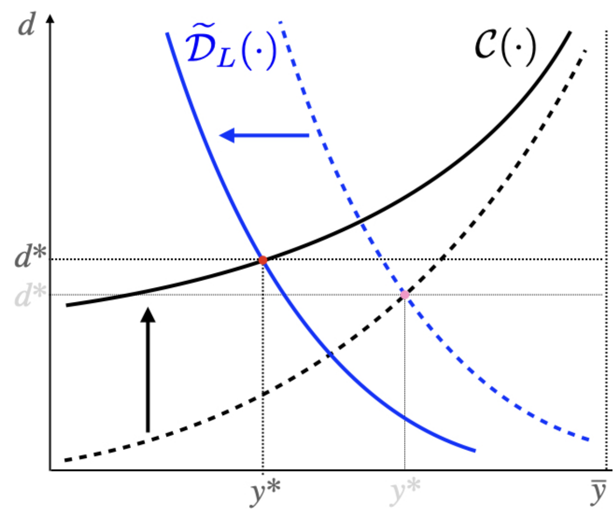
Notes: Panel (a) shows the change in the log occupational labor demand from the 1980–1985 average to the 2010–2015 average, as a function of the occupational intrinsic qualities ν_j. Panel (b) plots the predictions of models with and without variations in the intrinsic qualit for the change in the log occupational wage rates $\alpha_j^d - \alpha_j$, where d represents the environment reflecting the trends in occupational labor demand. The area of each diamond is proportional to the total wage bill for that occupation, and the two lines show a linear fit.

Equalizing occupational labor supply and demand in Equation (13) then allow us to solve for fixed components of the earnings function $\boldsymbol{\alpha}^d$ that characterize the new occupational wage rates w_j, as well as the corresponding value function V^d and stationary distribution of endowments F_y^d.[38]

To study the effects on the long-run labor supply, Figure 12a shows the response in the compensation required to make children indifferent between two occupations at the 25th and 75th percentile of the intrinsic quality distribution, defined by Equation (17), as a function of parental endowment. The figure shows the change in the mean logarithm of the demanded compensation in the model with shifted labor demand relative to the benchmark, across 10,000 re-sampled datasets from each model. We find that the shifts in labor demand lead to a rise of approximately 4% in the demanded compensation. The rise is simply due to the overall rise in the earnings of the children, who now focus relatively more on the intrinsic quality of occupations. As we can see in Equation (17), the rise in earnings e_i has a stronger effect for the children of poorer parents who receive a lower transfer $b^*(y_i)$. In line with this logic, the rise in demanded compensation in Figure 12a is stronger among the

[38]For comparison, we also compute the effects of the same change in labor demand under a model that does not include variations across occupations in intrinsic qualities, i.e., when we set $\nu_j \equiv 0$ for all j. We indicate this latter variation, corresponding to both no variations in intrinsic qualities and the shifts in labor demand, with $\tau \equiv nd$.

Figure 11: Demanded Compensation and Compensating Differentials



Notes: The diagram represents the change in equilibrium compensating differentials in moving from the benchmark to the model with shifts in labor demand, following the same assumptions as in Figure 4.

children of poorer parents.

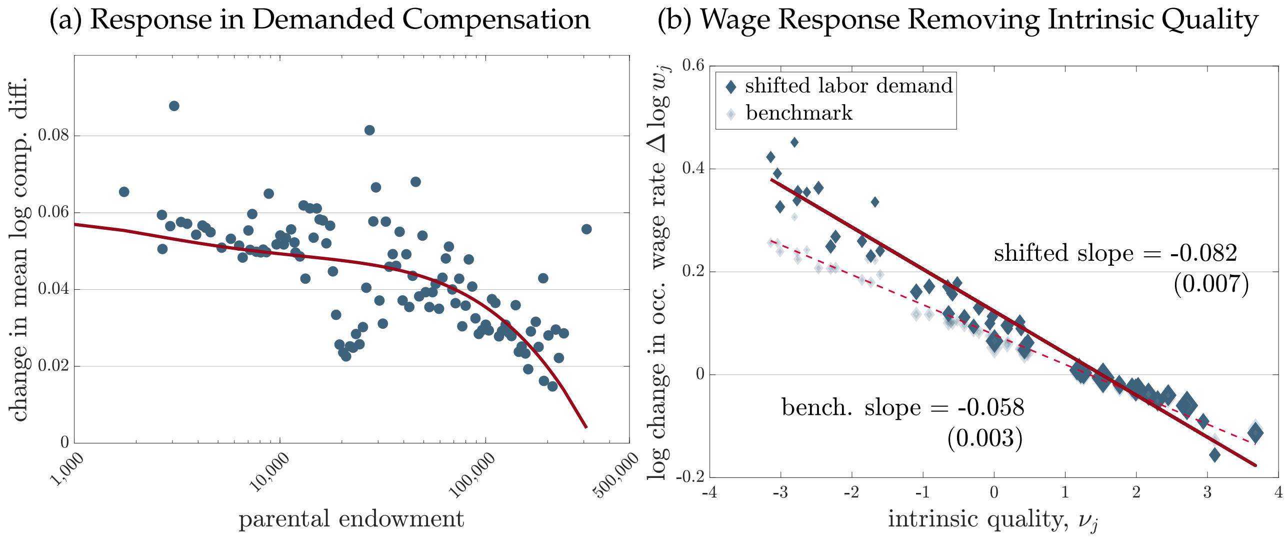
In terms of the stylized diagram in Figure 11, so far we found that the demanded compensation curve $\mathcal{C}(\cdot)$ shifts upward, especially for the children of the poorer parents. Figure Figure 11 shows that if this upward shift is strong enough, the equilibrium compensating differentials may in fact grow. Figure 12b shows that this is indeed the case in our quantitative exercise. The figure repeats the exercise we already saw for the benchmark model in Figure 8b, but now comparing the response of occupational wages if we remove the variations in intrinsic qualities under the model with shifted labor demand. Again, we interpret the relationship between the response in occupational wages in Figure 12b and intrinsic qualities as equilibrium compensating differentials. We find this relationship to become stronger.[39]

6.1 Response in Earnings, Occupational Choice, and Mobility

Combining the changes in both supply and demand in general equilibrium, Figure 10b shows the response of occupational wages to the shifts in occupational labor demand. The model predicts that rise in demand for occupations with high intrinsic quality translates into

[39]The linear fit implies that one standard deviation rise in the intrinsic quality is now accompanied by a fall of around 14.2% in the wage rate (from a baseline of 10.3%), corresponding to a rise of over 38% in terms of this proxy for compensating differentials

Figure 12: Compensating Differentials with Shifts in Occupational Labor Demand



Notes: Panel (a) shows the binscatter plot of the change in the mean logarithm of the compensation required to make the child indifferent between two occupations at the 25th and 75th of instrinsic values, from Equation (17), in the model with shifted labor demand relative to the benchmark, across 10,000 resampled datasets from each model. Panel (b) plots the change in the log occupational wage rates $\alpha_j^d - \alpha_j^{nd}$ against occupational intrinsic qualities ν_j, where nd represents the counterfactual experiment of eliminating differences in intrinsic occupation values under the model with shifted labor demand, and d represents the model with shifted demand.

higher earnings for occupations with higher intrinsic quality.[40] Note, in addition, that the mean occupational wage rate also rises by approximately 2.5%, to account for the component of the shift in labor demand capturing the growth in average earnings.

Next, we examine the of the shifts in occupational labor demand on the relationship between parental endowment and the likelihood of choosing occupations with high intrinsic qualities. We follow the same strategy as in Section 4.3 and re-sample datasets based on the conditional distributions implied by the benchmark model and the model with shifts in occupational labor demand. We then perform linear regressions of occupational choice on parental endowment and educational attainment, and compute the correlation between the coefficient on parental endowment and the intrinsic quality of occupations. Figure 6b shows the distributions of the resulting correlations across the 10,000 re-sampled datasets from the two models. The mean value of these correlations across all re-sampled datasets falls from 0.253 ($SE = 0.036$) under the benchmark model to 0.140 ($SE = 0.031$) under the model that features the shifts in occupational labor demand.

[40] In particular, the linear fit in the figure implies that a standard deviation increase in the intrinsic quality of occupation is predicted to lead to a rise in wage rates of around 4.7%.

Shifting to intergenerational mobility, the last row of Table 4 shows the mean persistence of earnings under the model with shifted labor demand, as proxied by the rank-rank slope of a child's earnings on parental endowment across the re-sampled datasets. We find that the persistence in terms of realized earnings falls compared to the benchmark model. The main driver of this rise in mobility of earnings is the rise in the expected returns to schooling as the children of poorer parents switch to occupations with high intrinsic qualities that also offer higher returns to schooling κ.[41]

The table makes the same comparison using instead the compensated earnings measures $\widetilde{ce}_i$ and $\overline{ce}_i$ defined by Equations (21) and (22). The mobility in terms of these measure of welfare also rises. Two distinct forces work together to shape the contribution of intrinsic quality compensation $\widetilde{d}_i$ from Equation (21) to the mobility in terms of this measure of compensated earnings: *(i)* the dependence of occupational intrinsic qualities ν_{o_i} on parental endowment y_i and *(ii)* the dependence of own endowment $b^*(y_i) + e_i$ on parental endowment y_i. Both components in fact show the weakening of the intergenerational link: the former as seen in Figure 6b and the latter as seen in Table 4. Together, these two forces lead to a rise in the mobility of welfare: the children of poor parents shift to occupations with higher intrinsic quality and also the value that these children attribute to this intrinsic quality rises as they become relatively richer. The overall effect is a fall in the correlation between compensation $\widetilde{d}_i$ and parental endowment y_i, which in turn leads to the patterns in Table 4.

6.2 Growth in Compensated Earnings

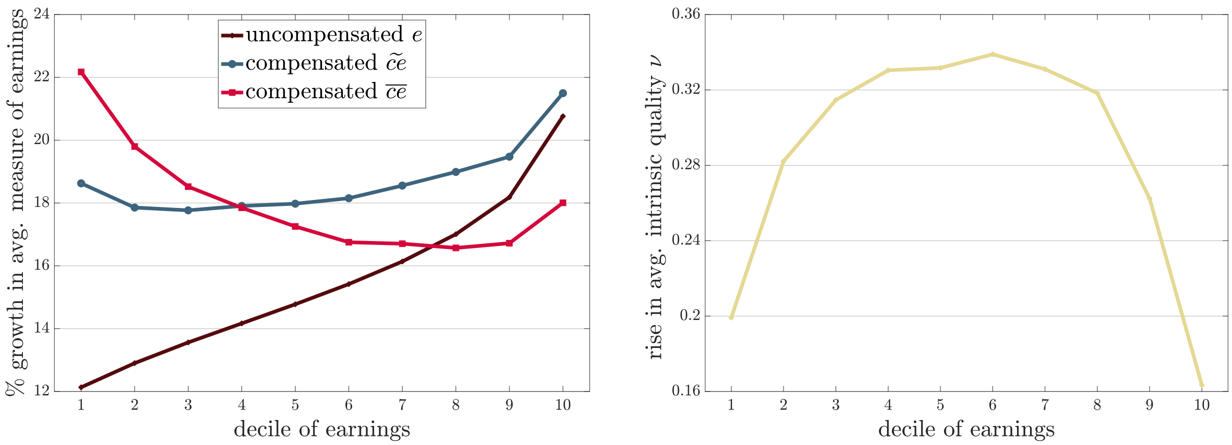
As we saw, the trends in labor demand over the past three decades have shifted the composition of the labor force toward occupations with higher intrinsic quality. Since workers value this rise in the intrinsic occupational quality in ways that are not reflected in their earnings, the observed rise in workers' earnings does not fully capture all welfare-relevant aspects of their job market outcomes.

In this section, we use our model to calculate the growth in our measures of compensated earnings, which account for the contribution of intrinsic quality and idiosyncratic taste for occupation to worker welfare. Recall that given the normalization of the total population to unity, the growth in average earnings in the model corresponds to the change in the value of $\mathbb{E}[e] \equiv \sum_j w_j L_j$ given by Equation (13) in moving from the benchmark to the shifted labor demand. We can define a measure of average compensated earnings corresponding to each

[41] See Table 2b for the correlations between different parameters of the earnings function and the intrinsic qualities across occupations. See Appendix C.5 for a discussion of the drivers of the change in the mobility of uncompensated earnings compared to the benchmark.

Figure 13: Change in Welfare Across Deciles of Earnings

(a) Growth in Mean Earnings (b) Rise in Average Intrinsic Quality



Notes: Panel (a) shows the growth in mean uncompensated and compensated earnings across occupations in response to the growth in occupational labor demand over the period across different deciles of earnings. Panel (b) plots the change in mean intrinsic quality of the occupation for people in each decile of earnings when moving from the benchmark to the model with shifted labor demand.

of the two measures introduced in Section 5.1. In particular, we define

$$\mathbb{E}\left[ce\right] \equiv \sum_j \int_0^\infty \mathbb{E}_{s,u}\left[\left(e_j\left(s,u,y\right) + d_j\left(s,u,y\right)\right)\mu_j\left(s,u,y\right) \mid h^*(y)\right] dF_y\left(y\right), \tag{23}$$

where $d_j(s,u,y)$ either satisfies Equation (21) where $y_i = y$, $o_i = j$, and $e_i = e_{o_i}(s,u,y)$, or Equation (20) where $s_i = s$, $y_i = y$, and $e_i = e_{o_i}(s,u,y)$. As before, the first case compensates agents only for the intrinsic quality of their respective occupation, and the second for the additional value of their conditional expected idiosyncratic taste shock.

The growth in the average earnings in moving from the benchmark model to the one with shifted labor demand is 17.1%. The corresponding growth in the measures $\mathbb{E}[\widetilde{ce}]$ and $\mathbb{E}[\overline{ce}]$ defined in Equation (23) are 19.2% and 17.7%, respectively. Thus, accounting for the role of taste for occupation in our measurement of earnings this exercise *raises* our estimates of growth by 0.6 to 2.1 percentage points over a baseline of around 17 percentage points, or around 4-12 percent of the measured growth. The intuition for this upward correction is straightforward: the economy has shifted labor toward occupations that the workers enjoy more. Therefore, a larger share of worker compensation comes from the intrinsic qualities of worker occupations, leading to an underestimation of growth in worker welfare if we merely rely on observed earnings.

Figure 13a shows how the growth in uncompensated and compensated earnings varies across different deciles of earnings. First, note that uncompensated earnings growth is larger for higher deciles. Thus, the model captures the observed rise in the inequality of uncompensated earnings based on the compositional shifts in labor demand across occupations. While the shifts in labor demand *raise the mobility* in uncompensated earnings, as we discussed in Section 6.1, they also *increase the inequality* in uncompensated earnings.

Next, we find that the contribution of non-monetary components of work is larger for the median (compared to the average) worker: the growth in earnings and the two measures of compensated earnings $\widetilde{ce}$ and $\overline{ce}$ in Equation (23) are 14.8%, 18.0%, and 17.3%, respectively, implying an additional contribution of around 2.5-3.2 percentage points.

Moreover, Figure 13a shows distinct patterns for our two measures. First, we observe that accounting only for the intrinsic quality of occupations, using our measure $\widetilde{ce}$, most additional gains are disproportionately accrued to workers in the lower deciles of earnings. This result is driven by a combination of two factors: *(i)* the change in the intrinsic quality of the occupations chosen by individuals in each decile, and *(ii)* the change in the value attributed to these changes in intrinsic qualities. Figure 13b examines the first factor, showing that the expected intrinsic quality of the occupations chosen by the workers in the middle deciles of earnings sees the highest gains. Comparing Figure 13a and Figure 13b, we infer that workers in the lowest deciles of earnings witness only modest increases in the mean intrinsic quality of their occupations, but they attribute substantially larger monetary values to these gains compared to workers with higher earnings.[42] Overall, this measure of compensated earnings suggests that the welfare improvements stemming from the shifts in occupational labor demand have been more equally distributed across workers than is suggested by the uncompensated earnings measures.

Figure 13a further shows that using the compensated measure $\overline{ce}$ tilts the balance even further in favor of the workers in the lowest deciles of earnings. Recall that this measure additionally accounts for the value of the conditional expectation of the occupation-specific idiosyncratic taste shocks. The growth in terms of this measure for the workers in the highest deciles are even lower than that measured using uncompensated earnings. These workers earn the highest earnings working in occupations with the highest intrinsic qualities. As a result, they become less likely to be swayed by their idiosyncratic tastes toward occupations with lower earnings and intrinsic qualities. In contrast, the overall growth in the earnings among workers in the lowest earnings deciles allows them to additionally become more responsive to their idiosyncratic taste, compared to all other workers. Thus, they gain more

[42]Note that the individual's own earnings plays a similar role in determining the demanded compensation in Equation (11) as does the transfers from their parents. Since the individuals in the lowest deciles typically receive very little in the way of transfers from their parents, the growth in their uncompensated earnings leads to an upward shift in their demanded compensation. In other words, they attribute a higher compensation to the same level of intrinsic quality that they receive from their occupation.

in terms of this bundle of compensated earnings.[43]

7 Conclusion

In this paper, we use micro data from the Panel Study of Income Dynamics (PSID), the National Longitudinal Survey of Youth 1997 (NLSY) and the General Social Survey (GSS) to document that children of rich parents are more likely to choose occupations with a higher intrinsic quality. The intrinsic quality of an occupation captures welfare-relevant aspects of the occupation that go beyond earnings. We proxy this by the first principal component of a bundle of job amenities that the average worker values and that are implicitly priced in the market in the form of compensating differentials. We characterize the effect of growing up in a rich family on occupational choice in the form of an occupational choice elasticity that captures the change in the likelihood of choosing a given occupation as parental income increases. We find a positive correlation between occupational choice elasticities and intrinsic occupation quality that is robust across datasets, occupation classifications and measures of intrinsic occupation quality.

We then construct and estimate a quantitative model of intergenerational mobility and occupational choice to explain this fact and to study its implications. Under standard assumptions on utility, in the model the marginal value of earnings is lower for children of rich parents, as these parents are able to make larger monetary transfers. Consequently, rich children demand a higher earnings compensation than poor children for working in low intrinsic quality occupations.

We use to model to asign a monetary value to the non-pecuniary compensation that each individual receives from their choice of occupation and revisit standard measures of intergenerational mobility. We find that accounting for the additional compensation due to occupational intrinsic quality generates substantially higher persistence of earnings across generations, leading us to conclude that relying on observed earnings alone overestimates the degree of intergenerational mobility of opportunity and welfare.

We also examine the impact of changes in occupational labor demand over the past three decades on earnings and welfare growth, as well as on the intergenerational mobility and in-

[43] Figure 26 in Appendix D shows how the growth in mean uncompensated and compensated earnings vary across occupations with different levels of mean earnings under the benchmark model. That shifts in labor demand have a convex form in terms of occupational earnings, growing particularly among the occupations with the highest initial levels of mean earnings. The growth in mean uncompensated mean earnings inherits this convex pattern, reaching to over 30 percent among the highest paying occupations. Compensation for the taste for occupations leads to a U-shape pattern for measured growth. Except among the initially highest paying occupations, accounting for the value of taste for occupations raises our measured growth in welfare of workers in different occupations.

equality of earnings and welfare. We find that the observed earnings growth is accompanied by an even higher growth in welfare as a larger share of worker compensation reflects the intrinsic quality of occupations. Additionally, the intergenerational mobility of earnings and welfare rises and the growth in welfare over the period is more equally distributed across workers than the observed gains in earnings.

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