Overeducation and childcare time

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Abstract

Purpose – Research shows that parental employment and education status affect the amount of parental childcare time, which is a fundamental determinant of children's outcomes. In this paper, the authors study whether being overeducated – working in a job that requires less education than the level of education acquired – is related to the time parents devote to their children.

Design/methodology/approach – The authors set two main hypotheses. First, overeducation might lead to more childcare time if being overeducated is the result of the individual prioritizing family over career. Second, overeducation might lead to less childcare time if overeducation is the result of lower ability. The authors estimate time use equations using the American Time Use Survey (ATUS) from 2004 to 2019.

Findings – The authors find that overeducated parents devote less time to childcare than matched parents, especially in the weekend sample. The authors' results suggest that overeducation is not a deliberate choice prioritizing family over career.

Originality/value – To the best of the authors' knowledge, this is the first study on the implications of being overeducated on childcare.

Keywords Parental time, Childcare time, Overeducation, Education-job mismatch, ATUS

Paper type Research paper

1. Introduction

This paper looks at how overeducation affects childcare time. Overeducation is a type of education-job mismatch, where individuals work in a job that requires a lower education level than the one acquired. We study how much time overeducated parents spend with their children, compared to their matched counterparts. On the one hand, research has shown that overeducation might be due to a lack of skills and that it causes frustration. This may give rise to worse parenting. On the other hand, some argue that overeducation may be the result of prioritizing family over career. Then, we should expect that overeducated parents do more childcare time (Dolton and Silles, 2001). Given that childcare time is a key input in the human capital production function of children and significant levels of overeducation have been widely documented across the industrialized world (Ghignoni and Verashchagina, 2014; McGuinness, 2006; Verhaest and van der Velden, 2013; Dolton and Vignoles, 2000; McGoldrick and Robst, 1996), it is important to understand the relation between overeducation and childcare time. To the best of our knowledge, we are the first ones to study it.

Overeducation has been found to have negative consequences for workers in terms of wages, wage growth and job satisfaction. Overeducated individuals earn generally lower

JEL Classification — D13, I24, I26, J13, J22, J24

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wages than if they were matched (Korpi and Tåhlin, 2009; Sattinger and Hartog, 2013; Sicherman, 1991; Castagnetti *et al.*, 2018; Gaeta *et al.*, 2022). Moreover, overeducation at the early career stages tends to leave permanent scarring effects on workers' wages later in life (Meroni and Vera-Toscano, 2017; Baert *et al.*, 2013). Additionally, most research on overeducation indicates lower job satisfaction among the affected workers (Verhaest and Omey, 2006; Verhaest and van der Velden, 2013). Although there is no agreement on what causes overeducation, it remains clear that it is a negative phenomenon for workers. In this paper, we ask whether it has an adverse effect on workers' families and their children. Specifically, we are interested in studying whether overeducated parents provide less childcare to their kids and thus "transmit" to them the negative effect of their overeducation, or whether conversely, they provide more childcare, which would suggest that overeducation is on average a result of prioritizing family over career (Dolton and Silles, 2001; Fleming and Kler, 2014).

Research on the parental investments in children finds parental time to be an essential input in the production of cognitive and non-cognitive skills of children (Monna and Gauthier, 2008; Del Boca *et al.*, 2014). Moreover, parental time depends strongly on the parental education level. Highly educated parents tend to devote more time to childcare than less educated parents (Hsin and Felfe, 2014). The type of activities also varies with education level. Highly educated parents spend more time reading and playing with children than less educated parents (Moro-Egido, 2012). How does being overeducated affect these results?

We propose several mechanisms that might relate overeducation to childcare. First, since overeducation comes with a wage penalty, the opportunity cost of spending time with a child is lower for overeducated individuals. Overeducated parents should then spend more time doing childcare than matched parents. Additionally, if overeducation resulted from giving up better career opportunities to gain better family life, overeducated individuals would be more likely to provide more childcare. Finally, a contrary argument would claim that if overeducation was due to lack of skills and involuntary as proposed by Sicherman and Galor (1990) and Sattinger and Hartog (2013), it could either create frustration or it could imply lower quality childcare, both of which lead to less childcare time.

In our empirical analysis, we estimate simultaneously the time devoted to different types of childcare time and work. If we find that overeducated parents do more childcare than their matched counterparts, the lower opportunity cost and/or stronger family orientation mechanisms are at work. Yet, if we find that parents devote less time to childcare when they are overeducated, the frustration and/or low-quality childcare mechanisms become relevant. In this case, we expect that childcare related to the education of the children will be more affected.

We use the American Time Use Survey (ATUS). Since the focus of our research is on overeducation, our sample includes only individuals that have studied at least some years in college regardless of whether they graduated. We do so because our computations show that individuals with fewer years of education are not overeducated in this sample. We distinguish between a weekday and a weekend day in our analysis. A limitation of these data is that we cannot analyze couples. The ATUS survey collects information on the time use of only one person in the household. We study men and women separately. The advantage of using US data is that we can use the US census data to obtain the required level of education in an occupation at a 3-digit level classification, which is then used to compute the years of overeducation.

We apply a propensity score matching estimation to make the matched and overeducated parents similar in terms of observed characteristics. Then, we estimate the effect of years of overeducation on the time devoted to different types of childcare time and work. We consider primary and supervisory childcare in a first estimation, where primary childcare refers to the respondent being engaged in a child-related activity, while supervisory childcare refers to the respondent being engaged in a non-child-related activity while children are present and under the respondent's supervision (Allard *et al.*, 2007). In the next step, we extend our analysis and

further differentiate within the primary child-related activities between basic (physical and medical care) and educational childcare (reading, playing, school-related activities).

All estimations reveal a significant and negative relationship between years of overeducation and the time spent caring for children as a primary activity. Hence, we find a negative correlation between overeducation and childcare time. The effects are stronger on the weekends and affect both basic and educational primary childcare. Moreover, overeducated fathers devote less time to supervisory childcare on the weekends, partly due to longer working hours. Results suggest that either overeducated parents are frustrated or have lower-quality time than the matched ones. These results show that overeducation is not a voluntary choice prioritizing family over career.

The rest of the paper is organized as follows. In section 2, we discuss the channels through which overeducation might affect childcare time. In section 3, we describe the data and the econometric specification used in the analysis. In section 4, we present and discuss the results. We estimate separately the SURE models for men and women and weekdays and weekend days. Section 5 concludes the paper.

2. Theoretical background

We are interested in unraveling a possible effect of being overeducated on children. In doing so, we look at the childcare time of parents who are overeducated. In what follows, we provide several mechanisms that could relate overeducation to childcare time.

First, overeducated parents have a lower time opportunity cost than matched parents due to the wage penalty associated with overeducation. Therefore, ceteris paribus, they should allocate more time to household activities such as childcare. Second, overeducation gives rise to a host of negative effects, primarily lower wages but also lower job satisfaction and even regret of studies (Kucel and Vilalta-Bufi, 2013). This may lead to frustration among overeducated workers as they expected better job outcomes in terms of wage, job satisfaction and other job characteristics. The lower-than-expected education returns might decrease the incentives to invest in their children's human capital. As a result, they might assign less time to childcare. Similarly, overeducation literature has pointed out that individuals may become overeducated because they lack the skills required in matching jobs (Büchel and Mertens, 2004; Sicherman, 1991; Tsai, 2010). If overeducated parents indeed had lower skills, that could also imply worse quality childcare, which translates into lower returns to childcare and lower incentives to devote time to it. Finally, overeducation could be a choice for those individuals who prioritize family over career. In such a case, they will value more job aspects that allow them to spend more time with the family, such as more flexibility and/or lower stress rather than finding a good match with their education level. Then, we would find that overeducated individuals provide more childcare than their matched peers (Dolton and Silles, 2001).

We analyze men and women separately as the literature finds marked differences between genders in time devoted to family duties and work. Given the traditional gender roles with men being the breadwinners, women have usually been the ones to conciliate work with family chores (Goldin, 1997; Goldin and Mitchell, 2017; Offer and Schneider, 2011). Following this line, one would expect that women are more likely to prioritize family over career than men.

Our theoretical mechanisms presented above rest upon two major research strands. First, we draw on the findings of the overeducation literature. It finds that overeducated workers suffer a wage penalty compared to their peers with the same education but in matching jobs (McGuinness, 2006; Chevalier, 2003). Their wage penalty varies between 4 and 7% of their prospective wage if they were matched (Korpi and Tåhlin, 2009; Sattinger and Hartog, 2013; Sicherman, 1991). Even if only overeducated for a spell at the early career stage, workers suffer decreased wages later in their labor lives due to that incident (Sicherman and Galor,

1990). On top of that, overeducated workers are less satisfied with their jobs (McGuinness and Sloane, 2011).

Second, we draw on the literature on childcare time. It is well established that education increases childcare time (Bonke and Esping-Andersen, 2011; Gimenez-Nadal and Molina, 2013; Craig, 2006; Guryan *et al.*, 2008). This result could be driven by the education level itself or by the higher earnings of better-educated individuals. People with higher education might have parenting preferences that involve more childcare time. The latter argument is related to the hypothesis that workers may voluntarily choose to be overeducated to have more time for parenting (Büchel, 2001). Similarly, different education levels may indicate differences in the quality of childcare time, which gives incentives for educated parents to spend more time with their children (Moav, 2005). This hypothesis is supported by Gould *et al.* (2020). However, if overeducated parents suffered from lower quality of childcare due to their worse human capital, then it would be optimal for them to provide less childcare time.

At the same time, parents with higher education tend to earn a higher wage. Thus, their time opportunity cost is high, and, consequently, they should allocate more time to work and less to childcare than parents with lower human capital (substitution effect). However, the opposite is found in the empirical literature. Several papers propose explanations to reconcile that parents with more human capital spend more time with their children even if their opportunity cost is high (Guryan *et al.*, 2008). Since childcare is found to be a normal good, parents with more income, who have often higher education, want to spend more time with their kids (income effect). If the income effect dominates the substitution effect, then highly educated individuals devote more time to childcare. In the same vein, Zhu and Vural (2013) argue that time and goods investment in children are complementary. As higher-income parents invest more in goods, it is optimal for them to spend also more time with children. Other explanations advanced by Guryan *et al.* (2008) emphasize total time spent "around with children" which we denote here by "supervisory childcare."

What comes from the two aforementioned literature strands is a mixed view. On the one hand, overeducated parents should spend more time with their children as they have high education. On the other hand, since they may have lower skills, they may spend less time with their kids. At the same time, they may be more family-oriented than career-oriented, and thus, voluntarily accept overeducation if this allows them to devote more time to childcare. Conversely, they could be frustrated with their mismatched jobs and regret their education choices, which would lead to less childcare time.

Following the theoretical discussion about the relationship between overeducation and childcare time, we propose the following two hypotheses.

H1. Overeducated parents have a lower opportunity cost of their time, so they are more likely to devote more time to childcare than matched parents. They may also be more family-oriented and accept overeducation to have more time for family. Both mechanisms lead to the same outcome: more childcare time from overeducated parents.

H2. Overeducated parents are frustrated because they could not get a better job match, or they got overeducated because they had lower skills than matched parents. Both cases lead to lower childcare quality, which translates into lower investments in their children's education. This, in turn, implies less time devoted to childcare. This should affect, especially, educational childcare.

H1 implies a positive effect of overeducation on primary and supervisory childcare, while H2 implies a negative effect of overeducation on primary childcare and especially on educational childcare.

A limitation of our analysis is that we only have information on the time use of one parent. Therefore, we are not able to analyze family bargaining over childcare time. Several papers

analyze the family dynamics related to childcare with time use data from both spouses. Most papers find that even when both spouses are employed full time, women do most of the housework and childcare (Garcia-Román and Cortina, 2016; García-Román, 2021; Craig, 2006, 2007; Craig and Mullan, 2011).

3. Data and econometric specification

We use the 2003–2019 multi-year ATUS (Ruggles *et al.*, 2018). Respondents are randomly selected from a subset of households that have completed their final month in the Current Population Survey (CPS). Only one individual of the selected households completes the survey, which contains a single-day time-diary. Individuals report the activities from the previous day in detailed-time intervals. The activities are classified into more than 400 time-use categories that cover the whole 24 h. They also report who was with them during each activity. By the construction of ATUS, about half the sample reports information about a weekday and the other half about a weekend day [1].

Our sample is composed of full-time employed men and women [2] in the prime working age (between 25 and 54 years old) with at least one own child below 18 years living in the household. We remove the self-employed, workers without pay and farmers from our sample. Since there is no information on the supervisory childcare time devoted to own child in the household for 2003, we drop this year from the analysis. The sample consists of 10,648 women and 11,274 men. Unfortunately, we do not have information on how much time the spouse/partner spends with children as ATUS data does not provide such information. This limits our scope to only one member of the household and precludes studying family dynamics [3].

We use aggregate categories of time use. Time devoted to work includes working hours and work-related activities alongside income-generating activities, job search and interview activities. As a first step, we study primary and supervisory childcare. Primary childcare time refers to those activities where children are the focus of attention. Primary childcare activities include physical care for children, interactive activities such as reading, playing and talking to children, activities related to children's education (homework, meetings at school . . .) and activities related to children's health. In contrast, supervisory childcare activities refer to doing a non-child-related activity in the presence of own children under 13 under "your care" [4].

In a further analysis, we disaggregate the primary childcare activities into two subgroups: basic childcare, which includes physical and medical care for children as well as any waiting or transport time; and educational childcare, which refers to reading, talking, listening to children, doing homework and other school-related activities with children, as well as doing sports or arts and crafts with them.

We compute the years of overeducation for each employed individual in the ATUS as their attained years of education minus the required years of education in their occupation in the survey year. We use the realized matches approach to compute the required levels of education, also called the statistical approach (Capsada-Munsech, 2019). It consists of using the distribution of education within each occupation to calculate a required level of education. We use the three-digit occupations in the American Community Survey (ACS) Public Use Microdata Sample (PUMS) [5]. We consider three different measures: one standard deviation above the mean, the mode and the 75th-percentile of the distribution of years of education for each year-occupation. The latter two measures are less affected by outliers than the mean-based measure. By computing the required level of education each year, we allow for changes in the educational requirement over time. We drop those occupation-years that have less than 10 observations to minimize measurement errors due to the small sample size (Bauer, 2002). Once we have computed the three measures of required education per occupation-year, we

impute them to each individual according to their occupation and survey year. The variable of interest that we use in the analysis is "years of overeducation". It is computed as the difference between attained years of education and the imputed required years of education if the individual is overeducated, and it takes value 0 if the individual is not overeducated. The three measures are generally highly correlated. The correlation between the mean-based and the mode-based measures is 0.42 and 0.41 for female and male samples respectively, the correlation between the mean-based and the 75 percentile-based measures is 0.74 and 0.66 for female and male samples, and the correlation between mode-based and 75 percentile-based measures is 0.50 and 0.59 for female and male samples.

Table 1 reports the descriptive statistics of the three measures of years of overeducation alongside the incidence of overeducation [6]. The incidence of overeducation is 15.4, 43.2, and 16.2% of the female sample when the measure is mean-based, mode-based, or 75 percentile-based, respectively. The incidence numbers for the male sample are 17.5, 46.0 and 22.9% [7]. Overeducated mothers have on average between two-thirds of a year and more than two years above their job-required level of education depending on the measure used. Overeducated fathers have similar numbers.

Table 2 presents the descriptive statistics for the variables used in the analysis. We report the weekday and the weekend sample separately for each gender, distinguishing between matched and overeducated individuals in each subgroup and use the weights provided by ATUS [8]. Women devote more time to childcare than men in all dimensions except for educational childcare activities and men work on average longer hours than women. Both samples show marked differences between the weekdays and the weekends concerning the time devoted to the different activities. Working time is longer on a weekday, while more time is devoted to supervisory childcare on the weekend. The total amount of basic childcare time is similar across the week, while educational activities take more time on the weekend. The comparison between matched and overeducated parents reveals that overeducated and matched parents are similar in many characteristics. They differ, in that overeducated parents are older and have on average around one or two extra years of education more than the matched parents. At the same time, overeducated parents work more than matched

Female sample	Mean	Std. dev.	Min	Max
Incidence of overeducation				
Mean-based measure	0.154	0.361	0	1
Mode-based measure	0.432	0.495	0	1
75 percentile-based measure	0.162	0.369	0	1
Years of overeducation (if > 0)				
Mean-based measure	0.691	0.671	0.001	5.049
Mode-based measure	2.251	1.126	1	7
75 percentile-based measure	1.534	0.682	1	7
Male sample	**Mean**	**Std. Dev.**	**Min**	**Max**
Incidence of overeducation				
Mean-based measure	0.175	0.380	0	1
Mode-based measure	0.460	0.498	0	1
75 percentile-based measure	0.229	0.420	0	1
Years of overeducation (if > 0)				
Mean-based measure	0.767	0.730	0.001	4.576
Mode-based measure	2.191	1.124	1	7
75 percentile-based measure	1.550	0.753	1	7

Source(s): Author's own creation

Table 1. Measures of overeducation

Table 2.
Descriptive statistics for overeducated/ matched by gender and day type

Female sample

	Weekday								Weekend							
	Matched				Overeducated				Matched				Overeducated			
Variable	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max
Primary childcare time	77.299	89.762	0	1,030	79.764	100.855	0	1,020	85.355	118.357	0	920	80.274	110.744	0	711
Supervisory childcare time	178.429	194.419	0	1,090	155.729	176.369	0	960	388.137	306.128	0	1,260	399.558	302.504	0	960
Basic childcare time	51.973	70.387	0	759	53.640	85.500	0	1,020	52.188	83.921	0	918	49.055	79.932	0	711
Educational childcare time	25.326	44.895	0	490	26.124	47.349	0	600	33.167	70.042	0	640	31.218	63.093	0	410
Work time	461.263	218.252	0	1,160	467.313	203.046	0	1,115	78.134	186.821	0	1,280	88.405	185.024	0	995
Age	38.551*	7.117	25	54	39.841	7.099	25	54	38.550*	7.038	25	54	39.903	6.906	25	54
Hispanic	0.119	0.323	0	1	0.101	0.301	0	1	0.115*	0.319	0	1	0.082	0.274	0	1
Black	0.129	0.336	0	1	0.151	0.358	0	1	0.130	0.337	0	1	0.118	0.323	0	1
Years of education	15.352*	1.358	14	19	16.783	1.125	14	19	15.338*	1.337	14	19	16.879	1.142	14	19
Household size	3.787	0.993	2	7	3.703	0.979	2	7	3.787	1.001	2	7	3.807	0.956	2	7
Age of the youngest child	7.621	5.188	0	17	7.672	5.332	0	17	7.519	5.262	0	17	7.413	5.175	0	17
Number of children in the household	1.706	0.769	1	4	1.627	0.698	1	4	1.714	0.765	1	4	1.707	0.742	1	4
Married	0.787	0.409	0	1	0.787	0.410	0	1	0.785*	0.411	0	1	0.848	0.359	0	1
Northeast	0.172	0.377	0	1	0.178	0.383	0	1	0.174	0.379	0	1	0.186	0.390	0	1
Midwest	0.253	0.435	0	1	0.237	0.426	0	1	0.268	0.443	0	1	0.246	0.431	0	1
South	0.379	0.485	0	1	0.379	0.485	0	1	0.369	0.482	0	1	0.340	0.474	0	1
West	0.195	0.397	0	1	0.206	0.404	0	1	0.189*	0.392	0	1	0.228	0.420	0	1
Observations	4,409				791				4,603				845			

(*continued*)

Table 2.

Male sample

	Weekday								Weekend							
	Matched				Overeducated				Matched				Overeducated			
Variable	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max
Primary childcare time	56.221*	77.825	0	985	49.300	69.445	0	504	72.739	109.614	0	790	72.835	107.305	0	800
Supervisory childcare time	145.330	177.124	0	1,080	130.034	162.704	0	930	388.528	303.869	0	1,140	365.433	297.637	0	975
Basic childcare time	30.995	53.853	0	985	26.474	44.609	0	340	37.530	71.860	0	750	37.382	71.388	0	559
Educational childcare time	25.226	50.667	0	780	22.826	45.763	0	490	35.209	75.015	0	760	35.453	73.691	0	690
Work time	529.549	220.791	0	1,390	540.887	219.219	0	1,365	114.837	227.761	0	1,365	137.033	244.229	0	1,315
Age	39.674*	7.125	25	54	41.198	6.802	25	54	39.592*	7.105	25	54	40.926	6.731	26	54
Hispanic	0.091	0.288	0	1	0.092	0.289	0	1	0.101	0.302	0	1	0.098	0.297	0	1
Black	0.073	0.260	0	1	0.078	0.268	0	1	0.073	0.260	0	1	0.069	0.254	0	1
Years of education	15.391*	1.393	14	19	16.925	1.184	14	19	15.373*	1.392	14	19	16.942	1.261	14	19
Household size	4.053	0.940	2	7	4.052	0.896	2	7	3.992	0.919	2	7	4.031	0.915	2	7
Age of the youngest child	6.395	5.160	0	17	6.794	5.243	0	17	6.509	5.176	0	17	6.730	5.121	0	17
Number of children in the household	1.891	0.814	1	4	1.879	0.796	1	4	1.834	0.813	1	4	1.857	0.813	1	4
Married	0.961	0.193	0	1	0.963	0.188	0	1	0.952	0.213	0	1	0.968	0.176	0	1
Northeast	0.174	0.379	0	1	0.207	0.406	0	1	0.172	0.377	0	1	0.199	0.400	0	1
Midwest	0.260	0.439	0	1	0.247	0.431	0	1	0.262	0.440	0	1	0.248	0.432	0	1
South	0.342	0.474	0	1	0.323	0.468	0	1	0.337	0.473	0	1	0.342	0.475	0	1
West	0.224	0.417	0	1	0.222	0.416	0	1	0.230	0.421	0	1	0.210	0.408	0	1
Observations	4,725				985				4,753				951			

Source(s): Author's own creation. We use the weights provided by ATUS. * Significant mean value difference between matched/overeducated samples at the 5% confidence level

parents on the weekend. A direct estimation could be biased as we compare overeducated to matched parents, as the former tend to have more years of education. We apply a propensity score matching estimation to make the two sub-samples (matched and overeducated) similar in terms of observed characteristics.

Time use research uses two main estimation methodologies (Foster and Kalenkoski, 2013; Stewart, 2013). The traditional strategy is to treat time variables as limited dependent variables, where zeroes are the result of time spent being nonnegative (left-censored at zero). In this case, the Tobit estimation is used. Alternatively, zeroes can be interpreted as a measurement problem caused by observing just one day of a time diary. A zero in the observed day may not represent the true participation of an individual in one activity. Then the OLS estimation is preferred as it is more robust to measurement errors. We report the estimation of a SURE model with a Tobit specification in the paper. Results using the OLS estimation are available on request. The effects of overeducation on childcare time are very similar in both estimation types. We pool all the years together and cluster the standard errors accordingly. The dependent variables are primary childcare time (*PCC*), supervisory childcare time (*SCC*) and work time (*Work*).

The variable of interest is years of overeducation. We control for individual and household characteristics (X_i): age (and its squared component), married or cohabiting with partner, race, years of education, number of children in the household, the age of the youngest child and household size [9]. We include region (R_i) and year of the survey (Y_i) fixed effects. The three-equation system to be estimated is the following:

$$PCC_i = \alpha_P + \beta_P overeducation_i + X_i^{'}\gamma_P + \delta_P R_i + \tau_P Y_i + u_{iP},$$

$$SCC_i = \alpha_S + \beta_S overeducation_i + X_i^{'}\gamma_S + \delta_S R_i + \tau_S Y_i + u_{iS},$$

$$Work_i = \alpha_W + \beta_W overeducation_i + X_i{'}\gamma_W + \delta_W R_i + \tau_W Y_i + u_{iW}.$$

We assume that the unobserved components u_{iP}, u_{iS}, u_{iW} are distributed as follows:

$$\begin{bmatrix} u_{iP} \\ u_{iS} \\ u_{iW} \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_P^2 & \rho_{PS}\sigma_P\sigma_S & \rho_{PW}\sigma_P\sigma_W \\ \rho_{PS}\sigma_P\sigma_S & \sigma_S^2 & \rho_{SW}\sigma_S\sigma_W \\ \rho_{PW}\sigma_P\sigma_W & \rho_{SW}\sigma_S\sigma_W & \sigma_W^2 \end{bmatrix} \right)$$

We consider that these distributions are gender and day-type specific. Therefore, we perform the analysis over four sub-samples separating gender and type of day (weekday or weekend). We use the cmp STATA command (Roodman, 2009). For each sub-sample, we correct the sample weights using a propensity score matching between matched and overeducated parents. To do so, we predict the propensity scores using the following controls: age, race, education level (whether college graduate or not), number and age of children and household size. By using the nearest neighbor propensity scores, we reduce the mean bias between the two groups by around 60–80%, depending on the overeducation measure.

In the next step, we generate the propensity scores and multiply them by the weights of the ATUS survey to correct for the bias between the overeducated and matched groups in the main analysis (Ridgeway *et al.*, 2015).

The estimated coefficients reveal whether there exists the assumed linear relationship between each explanatory variable and the latent variable in the Tobit estimation. To learn the effect of an explanatory variable on the observed time use, we compute the marginal effects of this variable.

In a second estimation, we disaggregate the primary childcare time into basic and educational childcare, as described before. Then we estimate the four equations using Tobit as before.

$$BasicCC_i = \alpha_B + \beta_B overeducation_i + X_i^{'}\gamma_B + \delta_B R_i + \tau_B Y_i + u_{iB},$$

$$EducCC_i = \alpha_E + \beta_E overeducation_i + X_i^{'}\gamma_E + \delta_E R_i + \tau_E Y_i + u_{iE},$$

$$SCC_i = \alpha_S + \beta_S overeducation_i + X_i^{'}\gamma_S + \delta_S R_i + \tau_S Y_i + u_{iS},$$

$$Work_i = \alpha_W + \beta_W overeducation_i + X_i{}'\gamma_W + \delta_W R_i + \tau_W Y_i + u_{iW}.$$

In all estimations, we are interested in the effect of years of overeducation in comparison with the effect of years of education on childcare time. Therefore, we report the marginal effects for these variables only.

4. Results

Table 3 presents the results of the Tobit estimations of the three-equation system for the female sample with the weights corrected by the propensity score. The dependent variables are primary childcare time, supervisory childcare time and work time. Columns (1) to (3) report the results for the weekday sample and columns (4) to (6) report the results for the weekend sample. We provide marginal effects of years of overeducation and years of education, as they are the variables of interest. The upper segment of the table uses the mean-based measure of years of overeducation, the middle segment uses the mode-based measure and the bottom segment uses the 75 percentile-based measure. As explained in the previous section, there are several controls included, although not reported.

We start our analysis with women. Results reveal that the variable "years of overeducation" has a negative relationship with the amount of primary childcare of mothers. The coefficient is significant in all cases, except for the weekday sample when we use the 75 percentile-based measure. The marginal effects are clearly larger on the weekends. A one-year-overeducated mother spends daily between 1.2 and 5 min less doing primary childcare than a matched mother during a weekday and between 3 and 13 min less of these activities on the weekend day. We find no significant effect of overeducation on the time devoted to supervisory childcare or work. These results point toward the low skill and frustration hypotheses, where overeducated mothers invest less time in primary childcare than matched mothers.

In line with previous literature, we find that each extra year of education increases primary childcare in all cases. Each year of education increases the primary childcare time between 3 and 8 min daily. Moreover, those with more years of education tend to do more supervisory childcare time and work longer on the weekends.

Next, we check the magnitude of the effect of one year of overeducation on childcare compared to the one-year education premium on childcare. We test the null hypothesis that each year of overeducation cancels out the effect that one year of education has on primary childcare using a Wald test. In other words, we test that the sum of the marginal effects of years of education and years of overeducation is equal to zero in the primary childcare equation. Results are reported in Table 3. For the mean-based and 75 percentile-based measures, the tests confirm that one year of overeducation cancels out the effect of one year of education both on a weekday and on a weekend day. For the mode-based measure, a year of overeducation cancels around half of the effect of a year of education. Therefore, we conclude that each year of overeducation cancels at least by half the premium of one year of education on primary childcare. Hence, even if the marginal effects of years of overeducation do not seem large, they have a considerable impact compared to the education childcare premium for women.

Table 4 presents the results of the three-equation estimation for the male sample. Results are sharper than in the female sample. Overeducation has a significant negative relationship with the time devoted to primary childcare in all cases, with larger values for the weekend

Table 3.
Marginal effects of years of overeducation and years of education in a SURE Tobit estimation of the three-equation system. Female sample

Female sample		Weekday (1) PCC	(2) SCC	(3) Work	Weekend (4) PCC	(5) SCC	(6) Work
Mean-based measure	β_0: Years of overeducation	−5.010**	−3.914	1.642	−12.60***	−9.546	6.756
		(2.033)	(5.636)	(10.28)	(2.671)	(11.96)	(5.101)
	β_1: Years of education	4.564**	3.271	6.476	7.105***	7.504*	9.770***
		(1.924)	(2.857)	(4.613)	(2.034)	(3.934)	(2.991)
Chi-2	$H_0 : \beta_0 = -\beta_1$	0.03	0.02	0.83	3.22	0.03	11.63
	Prob > Chi-2	0.8571	0.8978	0.3621	0.0726	0.8538	0.0007
Log pseudolikelihood			−84646.6			−68360.44	
AIC			169323.2			136752.9	
BIC			169421.5			136858.5	
Mode-based measure	β_0: Years of overeducation	−1.196*	1.305	−1.362	−3.274***	0.214	2.311
		(0.669)	(1.475)	(2.724)	(0.650)	(1.724)	(2.482)
	β_1: Years of education	3.445***	2.396	1.133	6.753***	8.956***	5.474***
		(0.912)	(1.650)	(3.172)	(0.832)	(2.439)	(2.059)
Chi-2	$H_0 : \beta_0 = -\beta_1$	3.81	3.56	0.00	10.18	10.66	7.47
	Prob > Chi-2	0.0509	0.0592	0.9513	0.0014	0.0011	0.0063
Log pseudolikelihood			−83038.6			−65253.25	
AIC			166107.2			130536.5	
BIC			166205.5			130635.5	
75 percentile-based measure	β_0: Years of overeducation	−1.196	−4.137	2.453	−9.850***	−9.570	5.656
		(1.345)	(3.295)	(5.249)	(1.760)	(6.215)	(4.313)
	β_1: Years of education	3.840***	3.301	3.541	7.754***	9.681***	6.505**
		(1.216)	(2.068)	(3.313)	(1.490)	(2.773)	(2.749)
Chi-2	$H_0 : \beta_0 = -\beta_1$	2.04	0.07	1.49	1.02	0.00	9.69
	Prob > Chi-2	0.1533	0.7925	0.2230	0.3115	0.9838	0.0019
Log pseudolikelihood			−84388.79			−68079.59	
AIC			168809.6			136189.2	
BIC			168914.5			136288.2	
N			5,200			5,448	

Source(s): Author's own creation. PCC: Primary childcare time; SCC: Supervisory childcare time; Work: work time. Marginal effects at mean. Control variables: age (and its squared), married or cohabiting with partner, race, number of children in the household, the age of the youngest kid, and household size, as well as region and year of the survey fixed effects. Clustered standard errors in parentheses. ATUS weights corrected by Propensity Score. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Table 4. Marginal effects of years of overeducation and years of education in a SURE Tobit estimation of the three-equation system. Male sample

Male sample		Weekday (1) PCC	(2) SCC	(3) Work	Weekend (4) PCC	(5) SCC	(6) Work
Mean-based measure	β_0: Years of overeducation	−4.919***	−3.284	1.210	−9.589***	−31.97***	16.65***
		(1.705)	(3.981)	(6.169)	(2.403)	(10.09)	(4.440)
	β_1: Years of education	2.130**	−1.525	6.377**	5.929***	3.782	1.122
		(1.035)	(1.433)	(3.230)	(1.135)	(3.624)	(2.272)
Chi-2	$H_0 : \beta_0 = -\beta_1$	3.34	1.23	1.97	2.46	9.56	20.47
	Prob > Chi-2	0.0678	0.2672	0.1603	0.1165	0.002	0.000
Log pseudolikelihood			−88016.34			−71686.05	
AIC			176062.7			143402.1	
BIC			176162.4			143501.5	
Mode-based measure	β_0: Years of overeducation	−1.466***	−2.178*	−1.142	−3.198***	−10.36***	6.362**
		(0.508)	(1.205)	(2.480)	(0.914)	(3.073)	(2.597)
	β_1: Years of education	1.347***	−1.794	9.526***	5.689***	6.625***	−4.045***
		(0.432)	(1.164)	(1.573)	(0.561)	(2.038)	(0.988)
Chi-2	$H_0 : \beta_0 = -\beta_1$	0.05	4.57	9.22	5.29	0.9	0.77
	Prob > Chi-2	0.8293	0.0325	0.0024	0.0214	0.3430	0.3815
Log pseudolikelihood			−87451.74			−70108.63	
AIC			174933.5			140249.3	
BIC			175033.2			140355.2	
75 percentile-based measure	β_0: Years of overeducation	−3.117***	−3.329	1.266	−5.630***	−23.57***	11.21***
		(1.131)	(2.232)	(2.737)	(1.449)	(5.293)	(2.410)
	β_1: Years of education	1.968***	−1.260	8.693***	6.238***	8.212***	−4.283***
		(0.537)	(1.124)	(1.749)	(0.613)	(2.079)	(1.206)
Chi-2	$H_0 : \beta_0 = -\beta_1$	1.24	3.36	11.8	0.00	13.09	18.79
	Prob > Chi-2	0.2654	0.0667	0.0006	0.9511	0.0003	0.0000
Log pseudolikelihood			−87966.36			−71145.32	
AIC			175962.7			142320.6	
BIC			176062.5			142420	
N			5,710			5,564	

Source(s): Author's own creation. PCC: Primary childcare time; SCC: Supervisory childcare time; Work: work time. Marginal effects at mean. Control variables: age (and its squared), married or cohabiting with partner, race, number of children in the household, the age of the youngest kid and household size, as well as region and year of the survey fixed effects. Clustered standard errors in parentheses. ATUS weights corrected by Propensity Score. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

days. A one-year-overeducated father devotes daily between 2 and 10 min less to primary childcare than a matched father. Unlike the female sample, overeducation of men has also a large negative effect on the supervisory childcare activities and a positive effect on working time on the weekend. Being an overeducated father reduces the investments in terms of childcare time. Years of education have, as predicted by other papers, a positive effect on primary childcare in all samples. More educated fathers devote more time to primary childcare and work longer on a weekday and less on the weekend.

Next, we test the null hypothesis that one year of overeducation cancels out the effect of one year of education for primary childcare in the male sample using a Wald test. Results are reported in Table 4. We can only reject the null hypothesis on the weekend sample estimation using the mode-based measure. In this case, the effect of a year of overeducation cancels around half the effect of a year of education. In all other estimations, we cannot reject the hypothesis that one year of overeducation cancels out one year of education.

With regards to supervisory childcare on the weekend, we obtain that the reduction in time spent in these activities due to a year of overeducation is quantitatively much larger than the increase in this type of childcare due to an additional year of education. Tests confirm that this difference is statistically significant in the mean-based and 75 percentile-based measures, and it is at canceling out in the mode-based measure. Therefore, a year of overeducation cancels out the effect of an additional year of education on supervisory childcare time on the weekends. Note that on the weekends, the fathers' reduction of time devoted to childcare is partly due to the increased working time of overeducated fathers, but only partially. The sum of the decrease of primary and supervisory childcare time is at least twice the increase in working time.

Next, we estimate a four-equation system, where we split the primary childcare activities between basic childcare (those related to physical and health care of children) and educational childcare (those interactive activities such as reading, playing and talking to children and activities related to children's education (homework, meetings at school . . .)). The marginal effects from the estimation are reported in Tables 5 and 6 for the female and male samples, respectively. Columns (1) to (4) report the results for the weekday samples and columns (5) to (8) report results for the weekend samples. Again, as before, we only provide the marginal effects of the two variables of interest: years of overeducation and years of education. The upper panel of the table uses the mean-based measure of years of overeducation, the middle panel uses the mode-based measure, and the bottom panel uses the 75 percentile-based measure.

Table 5 shows that a year of overeducation reduces the time that mothers devote to both types of primary childcare, basic and educational childcare, especially on the weekends. Results are only statistically significant for the weekend sample. As for the weekdays, we only find a negative and significant marginal effect of years of overeducation in the basic childcare during the weekdays for the mean-based measure. All other measures of years of overeducation remain insignificant. With regards to years of education, we observe a positive effect on both basic and educational childcare for any day of the week.

We test the null hypothesis that one year of overeducation offsets the effect of one year of education on basic and educational childcare during weekend days. While we cannot reject the null hypothesis in the mean-based and 75 percentile-based measures, the effect of one year of overeducation is around half the effect of one year of education only in the mode-based measure. Overall, we can conclude that overeducated mothers devote less time to both types of primary childcare as compared to matched mothers. Moreover, as being overeducated reduces the mother's investment in educational childcare, the low skill and/or frustration explanations could be relevant. Mothers who have been to college and did not find adequate, matching jobs may consider themselves unsuccessful in education and, perhaps, frustrated with their ill-invested efforts. This frustration may lead to lower investments in the education of their children.

Table 5. Marginal effects of years of overeducation and years of education in a SURE Tobit estimation of the five-equation system. Female sample

Female sample		Weekday (1) BCC	(2) ECC	(3) SCC	(4) Work	Weekend (5) BCC	(6) ECC	(7) SCC	(8) Work
Mean-based measure	β_0: Years of overeducation	−4.160**	−0.323	−3.851	1.471	−7.688***	−6.108***	−9.694	6.818
		(1.690)	(1.552)	(5.619)	(10.32)	(2.395)	(1.433)	(12.01)	(5.111)
	β_1: Years of education	2.739**	1.497**	3.267	6.521	4.447***	3.816***	7.477*	9.768***
		(1.261)	(0.755)	(2.858)	(4.607)	(1.231)	(1.258)	(3.964)	(3.006)
Chi-2	$H_0 : \beta_0 = -\beta_1$	0.82	0.55	0.01	0.79	1.69	3.24	0.04	11.75
	Prob > Chi-2	0.3647	0.4585	0.9071	0.3727	0.1936	0.0720	0.8420	0.0006
Log Pseudolikelihood				−97572.74				−80214.16	
AIC				195175.5				160458.3	
BIC				195273.8				160557.4	
Mode-based measure	β_0: Years of overeducation	−0.706	−0.447	1.306	−1.379	−1.722***	−1.946***	0.176	2.210
		(0.541)	(0.293)	(1.477)	(2.721)	(0.631)	(0.327)	(1.734)	(2.496)
	β_1: Years of education	2.065***	1.601***	2.393	1.146	3.998***	3.989***	8.974***	5.461***
		(0.696)	(0.310)	(1.655)	(3.172)	(0.480)	(0.667)	(2.446)	(2.068)
Chi-2	$H_0 : \beta_0 = -\beta_1$	1.87	8.94	3.55	0.00	8.60	6.82	10.54	7.21
	Prob > Chi-2	0.1712	0.0028	0.0595	0.9503	0.0034	0.0090	0.0012	0.0072
Log Pseudolikelihood				−95012.89				−75134.54	
AIC				190055.8				150299.1	
BIC				190154.1				150398.1	
75 percentile-based measure	β_0: Years of overeducation	−1.078	−0.0566	−4.112	2.372	−6.410***	−4.391***	−9.632	5.703
		(0.949)	(0.751)	(3.291)	(5.268)	(1.505)	(1.042)	(6.239)	(4.356)
	β_1: Years of education	2.229***	1.520***	3.300	3.566	4.762***	4.225***	9.675***	6.496**
		(0.828)	(0.435)	(2.071)	(3.314)	(0.890)	(0.947)	(2.795)	(2.756)
Chi-2	$H_0 : \beta_0 = -\beta_1$	0.86	3.57	0.07	1.45	1.30	0.02	0.00	9.67
	Prob > Chi-2	0.3550	0.0590	0.7981	0.2284	0.2543	0.8801	0.9937	0.0019
Log Pseudolikelihood				−97126.95				−79642.65	
AIC				194283.9				159317.3	
BIC				194382.2				159423	
	N			5,200				5,448	

Source(s): Author's own creation. BCC: Basic childcare time (primary); ECC: educational childcare time (primary); SCC: Supervisory childcare time; Work: work time. Marginal effects at mean. Control variables: age (and its squared), married or cohabiting with partner, race, number of children in the household, the age of the youngest kid and household size, as well as region and year of the survey fixed effects. Clustered standard errors in parentheses. ATUS weights corrected by Propensity Score. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 6. Marginal effects of years of overeducation and years of education in a SURE Tobit estimation of the five-equation system. Male Sample

Male sample		Weekday (1) BCC	(2) ECC	(3) SCC	(4) Work	Weekend (5) BCC	(6) ECC	(7) SCC	(8) Work
Mean-based measure	β_0: Years of overeducation	−2.376*	−3.073**	−3.326	1.178	−7.193***	−3.638*	−31.96***	16.56***
		(1.235)	(1.256)	(3.961)	(6.154)	(1.788)	(2.023)	(10.08)	(4.427)
	β_1: Years of education	1.552*	1.156**	−1.524	6.400**	3.704***	3.437***	3.759	1.129
		(0.835)	(0.513)	(1.423)	(3.227)	(1.006)	(0.833)	(3.625)	(2.270)
Chi-2	$H_0 : \beta_0 = -\beta_1$	0.62	2.44	1.26	1.97	3.81	0.01	9.59	20.21
	Prob > Chi-2	0.4312	0.1181	0.2616	0.1605	0.0509	0.9112	0.0020	0.0000
Log Pseudolikelihood				−99051.85				−82277.62	
AIC				198133.7				164585.2	
BIC				198233.5				164684.6	
Mode-based measure	β_0: Years of overeducation	−0.663	−1.026***	−2.180*	−1.149	−2.200***	−1.764**	−10.36***	6.266**
		(0.444)	(0.320)	(1.203)	(2.483)	(0.567)	(0.726)	(3.065)	(2.605)
	β_1: Years of education	0.992***	0.970***	−1.800	9.541***	3.535***	3.642***	6.632***	−4.004***
		(0.303)	(0.231)	(1.165)	(1.573)	(0.483)	(0.532)	(2.042)	(1.005)
Chi-2	$H_0 : \beta_0 = -\beta_1$	0.63	0.02	4.61	9.19	2.49	5.25	0.90	0.72
	Prob > Chi-2	0.4284	0.9002	0.0318	0.0024	0.1143	0.0219	0.3438	0.3960
Log Pseudolikelihood				−97900.19				−79131.75	
AIC				195830.4				158293.5	
BIC				195930.1				158392.9	
75 percentile-based measure	β_0: Years of overeducation	−1.464*	−1.883***	−3.360	1.258	−4.198***	−2.389**	−23.55***	11.14***
		(0.811)	(0.620)	(2.214)	(2.737)	(1.063)	(1.089)	(5.280)	(2.398)
	β_1: Years of education	1.314***	1.255***	−1.261	8.710***	3.953***	3.704***	8.206***	−4.240***
		(0.421)	(0.244)	(1.121)	(1.751)	(0.553)	(0.479)	(2.085)	(1.217)
Chi-2	$H_0 : \beta_0 = -\beta_1$	0.05	0.99	3.41	11.73	0.05	2.03	7.69	7.21
	Prob > Chi-2	0.8304	0.3203	0.0648	0.0006	0.8299	0.1547	0.0055	0.0073
Log Pseudolikelihood				−98806.14				−81044.19	
AIC				197642.3				162120.4	
BIC				197742				162226.4	
	N			5,710				5,564	

Source(s): Author's own creation. BCC: Basic childcare time (primary); ECC: educational childcare time (primary); SCC: Supervisory childcare time; Work: work time. Marginal effects at mean. Control variables: age (and its squared), married or cohabiting with partner, race, number of children in the household, the age of the youngest kid and household size, as well as region and year of the survey fixed effects. Clustered standard errors in parentheses. ATUS weights corrected by Propensity Score. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Table 6 reports the marginal effects of the 4-equation estimation for the male sample. A year of overeducation has a negative and significant effect on basic and educational childcare activities in nearly all cases. The Wald tests show that the effect of an additional year of overeducation cancels out the positive effect of an additional year of education. The only exceptions are for the basic childcare time during the weekend when using the mean-based measure (where the effect of an overeducation year outweighs the effect of an additional year of education), and for the educational childcare time during the weekend day when using the mode-based measure (where the effect of an overeducation year cancels out only half of the effect of one year of education). The results on supervisory childcare and working time do not change from the three-equation system.

All our estimations corroborate that overeducated parents provide less childcare than matched parents. Being overeducated reduces the childcare time that both genders devote to basic and educational childcare, having a potential long-term negative impact on the future outcome of their offspring. As mentioned before, at least two mechanisms could explain this result. First, overeducated parents might be frustrated for not getting a matched job. This may cause a lower effort on the education of their children. Second, being overeducated might be the result of having lower skills, which might imply lower childcare time quality. Then, it would be optimal to assign less time to childcare. We cannot distinguish between these two mechanisms, despite the fact that educational childcare, apart from the basic childcare, is clearly harmed by overeducation. However, we can rule out that parents voluntarily decide to be overeducated to devote more time to their children.

Let us now quantify the impact of overeducation on childcare time for an average mother and father. The quantitative results are similar across the different measures of overeducation used. Let us discuss here the results with the estimation that uses the mean-based measure of years of overeducation as it is more often used. Overeducated women in our sample have on average around 8 months of overeducation (see Table 1). This translates into around 4 min less of primary childcare on a weekday and around 9 min less of primary childcare on a weekend day than if they were not overeducated. In particular, overeducated women spend on average around 5 min less in basic childcare activities and around 4 min less in educational activities with their children on a weekend day. For the average years of overeducation plus one standard deviation, around 1.4 years of overeducation, the reduction in childcare time nearly doubles. That is, a woman with 1.4 years of overeducation devotes around 7 min less to primary childcare during a weekday and 17 min less of primary childcare each weekend day. Are these numbers large? For the average level of overeducation, they do not seem large, but they are not trivial as years of overeducation increase.

It is relevant to point out that one year of overeducation offsets the premium in childcare to one year of education, thus results might be qualitatively relevant. The education premium for childcare time disappears, at least partially, for overeducated mothers. These results change the paradigm of the college premium effect on childcare. It may no longer be the case that children of college-educated mothers have an advantage by getting more time to their care. The parental job comes into question and defines whether their college premium applies or not depending on their job match.

We obtain similar results for men. The average overeducated man has nine months of education above the required level in his job. This causes around 4 and 7 min less of primary childcare during the weekday and the weekend day, respectively. The main difference to women's results is that in addition to the reduction in primary childcare time, an average overeducated man devotes 25 min less of supervisory childcare on the weekend days than a matched father. As with women, the reduction in childcare time doubles for men with the average level of overeducation plus one standard deviation. It represents around 7 and 14 min less of primary childcare on a weekday and a weekend day, respectively, and around 48 min less of supervisory childcare on a weekend day.

Are these differences in childcare time consequential for the child's future outcomes? If we accounted for the accumulated loss of childcare across several years for overeducated women and men, the effects might be substantial, although we acknowledge that the daily difference might be too small to make a difference. Some papers find a determinant influence of parental time investment in childcare on the children's future outcomes (Del Boca *et al.*, 2014; Zhu and Vural, 2013; Brilli, 2022), but more research is needed to unravel if our quantitatively small results matter further on in children's lives. What our results teach us, however, is that overeducated parents do not prioritize family over career.

5. Conclusions

We show that overeducated parents devote less time to primary childcare than their matched counterparts. Such results are important if you consider that in most estimations each year of overeducation offsets the effects of one year of education on childcare time. Quantitatively, though, it represents small changes in the time devoted to childcare, unless one considers extreme overeducation. To our best knowledge, our results are the first to draw attention to a possible effect of having overeducated parents on children.

Our results suggest that being overeducated is not a deliberate choice to prioritize family over career since that would be contradictory to overeducated parents devoting less time to childcare. Overeducation is rather a product of their lower skills and/or frustration with their mismatch that makes them do less childcare time. The former is consistent with the results found in the overeducation literature that overeducated individuals have lower skills (Tsai, 2010; Obiols-Homs and Sánchez-Marcos, 2018). Our results complement the well-established findings that highly educated parents devote more time to childcare. Given that years of overeducation cancel out years of education in most of our estimation results, we conclude that not only does education level matter for childcare but so does the education-job match in the labor market. Whether parents are matched or overeducated alters the traditional result that more educated parents devote more time to their children.

From our results, it comes that education expansion is not enough to improve the productivity and well-being of society. The existence of involuntary overeducation hinders the returns to education and has potentially adverse effects on the next generation's human capital.

A limitation of the analysis is that ATUS does not provide time use information of spouses. Other data that includes such information could be used to further explore the family dynamics regarding overeducation and childcare time.

Notes

1. ATUS provides information on holidays time apart from weekday and weekend reports. We do not use these days in our analysis as holiday times have different dynamics than normal working period.
2. Full-time refers to at least 35 h of work weekly.
3. There is information about the spouses' education, age and employment in ATUS. We decided to use single and married individuals in our analysis together with a dummy control distinguishing between the two. Therefore, we do not use the extended spouse variables in our analysis. Results are robust to excluding single individuals from the analysis. Results are available upon request.
4. Supervisory childcare is provided by ATUS directly.
5. The variable years of education is imputed from the education level, which has 15 categories (less than 1st grade; 1st to 4th grade; 5th or 6th grade; 7th or 8th grade; 9th grade; 10th grade; 11th grade; 12th grade-no diploma; High school graduate – diploma or equivalent (GED); some college; Associate degree; Bachelor's degree; Master's degree; Professional school degree; Doctoral degree). We compute the required years of education in each occupation including both genders.

6. The incidence of overeducation measures the percentage of individuals that are overeducated to some degree.
7. The literature finds that the incidence of overeducation when using mode-based measures is larger than when using mean-based measures (Tsai, 2010; McGoldrick and Robst, 1996).
8. We use the mean-based measure of overeducation to distinguish among them in the descriptive statistics table. The use of the mode-based or 75 percentile-based measures would give similar patterns.
9. Having years of overeducation and years of education as regressors is not a problem as they are not too strongly correlated. The correlation of years of education with the mean-, mode- and 75 percentile-based is 0.359, −0.045 and 0.257 respectively for the female sample and 0.363, −0.027 and 0.324 respectively for the male sample.

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