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ABSTRACT

Short- vs Long-Term Intergenerational Correlations of Employment and Self-Employment in Europe[*]

This paper analyzes the existence of short- and long-term intergenerational correlation of employment and self-employment in European countries, using data from the European Union Statistics on Income and Living Conditions. Using longitudinal data for the period 2003-2016, fixed effect estimates show a significant short-term correlation between the current employment status of parents and that of their children. However, short-term correlation of self-employment seems to be driven only by father-son correlations. Conversely, using the special module on Intergenerational Transmissions for the year 2011, estimates show a strong and significant correlation between respondents' self-employment status, and that of their parents when respondents were 14 years old. This suggests that self-employment decisions are not related to short-term family labor supply decisions, but to long-term intergenerational transmission.

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1. Introduction

The study of intergenerational transmission is especially important in several fields, including Economics, Industrial Relations, and Demography, as it investigates how and to what extent certain factors can be transmitted from parents to children. Those factors include income and poverty, education and skills, human development, occupational choices, and self-employment, among others. Attributes such as education and human, financial, and social capital have been found to be associated with employment and self-employment (Dunn and Holtz-Eakin, 2000; Fairlie and Robb, 2007). Prior research has shown that these values can be transmitted both horizontally (i.e., weak ties) and vertically (i.e., intergenerational transmission, or strong ties).

Furthermore, prior research has also identified the existence of intergenerational transmission of employment and self-employment, although the literature on employment is scarce and relatively novel (Galassi et al., 2019). Such transmissions are a particular case of intergenerational socio-economic mobility, whereby the status of individuals within households is assumed to be transmitted from one generation to the next. Transmission of employment and unemployment also suppose a particular case of intergenerational transmission of poverty, which has received significant attention in recent years. Unemployment is considered, indeed, one of the main labor-related issues of young workers in Europe (Mäder et al., 2015), especially since the recent economic crisis in the Mediterranean countries (with youth unemployment rates well above 20%). Given the importance of family background and parents' investments in the future socio-economic development of children (Del Boca et al., 2016; Chiappori, Salanié and Weiss 2017), it is important to study the intergenerational correlations of employment. The literature has demonstrated a positive correlation between young workers' employment and unemployment status, and that of their parents, in various countries (O'Neill and Sweetman, 1998; Corak et al., 2004; Bratberg et al., 2008; Ekhaugen, 2009; Macmillan, 2010; Gregg et al., 2012). Nevertheless, there is no consensus as to the channels, or the extent, of these transmissions, with results that differ significantly among countries and methods.

Entrepreneurship and self-employment are labor alternatives for those workers who cannot - or do not want to - find an employer; but they are also a complex phenomenon, and a model of life (Coduras et al., 2016). Further, they have traditionally been associated with development, innovation, and economic growth (e.g., Grimm and Paffhausen, 2015). Thus, several measures aimed at stimulating self-employment and entrepreneurial activity have been developed at both

national and international levels, with the ultimate objective of overcoming some of the negative effects of the recent economic crisis (Minniti and Naudé, 2010). In this sense, self-employment can be seen as an alternative for those workers who do not want to be employed or cannot find an employer, and it is a complex (social and academic) phenomenon (Coduras et al., 2016). Prior research has identified self-employment as a significant tool through which to balance work and family conflicts and responsibilities (e.g., Presser, 1989; Connelly, 1992; Lombard, 2001; Gimenez-Nadal et al., 2012).

Within this framework, this paper explores the short- and long-term intergenerational transmission of employment and self-employment in 12 European countries, empirically estimating the relationship between the labor status of children and that of their parents. Europe is a particularly important region in which to study these transmissions, given the large impact of the recent economic crisis on unemployment in European countries, and the moderating role of family background on that impact (Mascherini, 2019). In doing so, we use the EU-SILC data from two different sources. First, we investigate short-term correlations of employment and self-employment using the EU-SILC longitudinal data for the years 2003-2016, for Austria, Belgium, Denmark, Greece, Spain, Finland, France, Italy, Luxembourg, the Netherlands, Sweden, and the UK. Using fixed effects models, we estimate a positive and significant correlation between respondents' current employment status, and the current employment status of their parents. However, the self-employed status of parents appears to be correlated only with that of male workers. These results may, however, reveal family labor-supply decisions, suggesting that parents' employment is a strong predictor of the children's short-term decision.

We then analyze long-term intergenerational transmissions, using the 2011 special module on Intergenerational Transmissions of Disadvantages of the cross-sectional EU-SILC data. This special module, which is not available for the longitudinal data, allows us to estimate the current employment and self-employment status of respondents in terms of the labor status of their parents when respondents were 14 years old. Estimates show that the (employment) self-employment status of workers is strongly correlated with their parents being (employed) self-employed in the past. This suggests that there exists a significant channel of self-employment arising from intergenerational correlations that is not driven by short-term family labor-supply decisions, but instead from long-term transmission.

The contributions of the paper are twofold. First, we document the existence of a significant short- and long-term correlation of employment from parents to children, which may reveal both family labor-supply decisions and intergenerational transmissions. It is worth noting that most of the empirical research on intergenerational transmissions has focused on single countries, and international and cross-country analyses are quite limited. Second, results suggest that self-employment intergenerational correlation is especially significant in the long-term, but not in the short-term. Furthermore, the intergenerational correlation of self-employment is estimated to be somewhat smaller than in prior research. To the best of our knowledge, this paper represents the first empirical comparison of short- and long-term intergenerational correlation of employment and self-employment. Future research should focus on investigating the specific channels that drive these long-term transmissions.

The remainder of the paper is organized as follows. Section 2 includes a literature review, and Section 3 shows the data used throughout the analysis. Section 4 sets out the empirical strategy and the main results for the analysis of the short-term intergenerational correlation. Section 5 does the same for the long-term transmissions. Finally, Section 6 discusses the different results, and Section 7 concludes.

2. Literature review

Intergenerational transmissions have been widely studied in the literature, focusing on how socio-economic conditions and attitudes are transmitted from parents to children, beyond pure selection theories (Black et al., 2005). For instance, one of the factors that has been found to be transmitted from parents to children is human capital and education, as parents with higher education level have, in general terms, more formally-educated children than parents with lower education (Black et al., 2005). Other socio-economic factors found to be transmitted from parents to children are human development (Francesconi and Heckman, 2016), financial capital and poverty (Becker and Tomes, 1979), and occupational practices and economic outcome (e.g., Fernandez et al., 2004; and Doepke and Zilibotti, 2017). Dohmen et al. (2012) studied intergenerational transmission of risk attitudes, Fernandez (2007), Fernandez and Fogli (2009) studied transmissions of culture and fertility, and Binder (2018) and Olivetti et al. (2018) studied transmissions of gender roles. In turn, employment outcomes may be determined by all these

factors (e.g., Lazear, 2005). However, the most studied intergenerational employment outcome is (potential) earnings (see Black and Devereux, 2011), along with the intensive margin of labor supply, i.e., work hours (Altonji and Dunn, 2000).

Understanding intergenerational transmission is of key relevance for planners and policy makers, as it may help in understanding the characteristics transmitted from generation to generation. For instance, policies aiming to reduce poverty and inequality of opportunity could be more efficiently implemented if the factors that determine such sources were known to be transmitted from parents to children. Hence, intergenerational transmissions are of special relevance for children, given that they may determine future socio-economic behaviors (Stith et al., 2000). In this context, transmission of employment and self-employment are of special importance in Europe, given that during the recent economic crisis the levels of unemployment have reached high thresholds. Furthermore, the largest impact has been on youth, with percentages of unemployment above 40% in Greece and Spain, and between 40% and 20% in Italy, France, Belgium and Finland, according to the Eurostat.

Some authors have analyzed the intergenerational transmission of employment and unemployment in different countries, trying to find both conditional correlations and causal links between the employment status of parents and children. However, despite the fact that prior studies have found a significant correlation, the evidence so far at the family level is scarce, inconclusive, and most of the existing research is limited to single-country cross-sectional studies (Mäder et al., 2015; Galassi et al., 2019).

In Europe, O'Neill and Sweetman (1998), Macmillan (2010), Gregg et al. (2012), and Zwysen (2015) studied intergenerational transmission of unemployment in the UK. O'Neill and Sweetman (1998) estimated a positive correlation between the unemployment histories of fathers and sons, where sons of unemployed fathers were found to be twice as likely to experience unemployment; and Zwysen (2015) found that non-working fathers had sons with less negative attitudes towards unemployment. However, Macmillan (2010) found no significant findings on intergenerational causality, in terms of "worklessness", and Gregg et al. (2012) established that fathers' job loss has a negative impact on children's educational attainment and is positively correlated to youth unemployment. On the other hand, Bratberg et al. (2008), Ekhaugen (2009) and Corak et al. (2004) have addressed transmission of unemployment in Scandinavian countries. Bratberg et al. (2008) found that worker displacement is negatively correlated to unemployment,

but has no impact on children's labor outcomes, in Norway. Conversely, Ekhaugen (2009) found a positive intergenerational correlation of unemployment in Norway, but no evidence of causal links; and Corak et al. (2004) found that parental unemployment is not correlated with unemployment insurance in Sweden. Mäder et al. (2015) analyzed conditional correlations for the case of Germany, using an IV approach, to find that not only is father's unemployment an important determinant of children's employment, but father's age and education play an important role in the relationship. Herault and Kalb (2016) found father-son and mother-daughter correlations in labor market outcomes, but not cross-transmission, and Galassi et al. (2019) studied the case of the US, finding that transmission of employment are stronger from mothers to daughters than to sons.

Transmissions of self-employment and entrepreneurship have been studied in the literature. Specifically, prior research has focused on horizontal transmission (i.e., through peer effects, or weak ties), and vertical transmission (i.e., intergenerational transmissions, or strong ties), providing mixed results (Brüderl and Preisendörfer, 1998; McPherson et al., 2001; Zhang et al., 2009; de Jong and Marsili, 2015). In that context, "first generation" self-employed and entrepreneurs, who have not been influenced by self-employed parents, may value different factors than do "second generation" self-employed workers. That is to say, the latter may be influenced by different paternity-driven factors that cannot affect the first generation self-employed, such as experience, social and work values, and concrete managerial skills (Gauly, 2017).

The question of whether individuals become entrepreneurs or are born that way has been directly addressed by prior studies, with mixed results. For instance, Nicolaou et al. (2008) and Nicolaou and Shane (2010) study the influence of genetic factors on self-employment intentions, documenting a stronger relevance of heritability and genetics, rather than that of the environment. Conversely, Lindquist et al. (2015) study the intergenerational association of entrepreneurship and self-employment in Sweden, with a focus on pre- and post-birth factors, and find that this association is mainly driven by post-birth factors and role models, and not by genetic factors. Gauly (2017) also studies the intergenerational correlation of attitudes between parents and children, with results pointing to the importance of attitudes, environmental factors, and assortative mating, as transmissions do not seem to be purely genetic. Matthews et al. (2011)

report that self-employment seems to depend on opportunity, personality, and skills, while there is no clear answer as to whether the self-employed are born or made.

Despite prior research suggesting the existence of intergenerational transmission of self-employment, results vary significantly across countries and methods, and the reasons behind these transmissions remain unclear (Colombier and Masclet, 2008). For instance, Dunn and Holtz-Eakin (2000) find that parents' financial and human capital are relevant in the transition into self- employment. Schmitt-Rodermund (2004) finds that authoritarian parenting is related to entrepreneurship in Germany. Wang and Wong (2004) find that family experience with business is crucial in determining entrepreneurial interests in Singapore. Similarly, Fairlie and Robb (2007) find that being a business owner is correlated with having a self-employed family member. Sorensen (2007) reports that parental roles are an important source of the transmission of self-employment in Denmark. Colombier and Masclet (2008) find that managerial skills transmitted by parents are important for the second-generation self-employed in France. Andersson and Hammarstedt (2010, 2011) indicate that the father is the strongest role model among self-employed immigrants. Laspita et al. (2012) indicate that transmissions of self-employment may vary across cultures. Levie and Autio (2013) find that parental aspirations may have a negative impact on entrepreneurship in the UK. Fritsch et al. (2015) highlight the importance of considering the self-employment status of parents when studying self-employment. Blumberg and Pfann (2016), using Dutch data, find different determinants of self-employment between first- and second-generation self-employed workers. Finally, Ferrando-Latorre et al. (2019) find a non-gender- or time-driven intergenerational correlation of self-employment in Spain.

3. Data and variables

We first use data from the longitudinal European Union Statistics on Income and Living Conditions (EU-SILC), for the years 2003-2016, and the following countries: Austria, Belgium, Denmark, Greece, Spain, Finland, France, Italy, Luxembourg, the Netherlands, Sweden, and the United Kingdom.[1] The EU-SILC data is conducted every year by Eurostat, and combines data

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[1] Access to the data has been granted by the Contract RPP 119/2018 for the period 01/01/2018-30/06/2023. The sample is restricted to countries with information on the variables of interest. Since developing economies have lower rates of female labor participation, different self-employment behaviors, more inequality in self-employment,

at the household and individual levels, for all working-age individuals of the interviewed households. The longitudinal EU-SILC is overlapped panel data, and households interviewed are followed for up to four years.

The sample is restricted to individuals between 16 and 65 years old for whom there is information for both of their parents. Individuals for whom there is information only for the father or the mother are studied separately. Furthermore, those individuals for whom information about either of their parents does not include labor characteristics (i.e., retired, early retired, and disabled or other inactive parents) are omitted from the analysis.[2] The main units of analysis are, then, working age respondents of interviewed households who cohabit with both of their (working) parents.[3] Consequently, sample sizes and the number of individuals and observations will refer to working-age children as the main unit.

The employment status of individuals and their mothers and fathers appears in terms of the (self-defined) current economic status of interviewees in the EU-SILC questionnaire. All household members (aged 16 and over) are asked what is their "labour information/basic labour information on current activity and on current job". The possible categories identified are: 1) Employee (full-time). 2) Employee (part-time). 3) Self-employed worker (full-time, including family workers). 4) Self-employed worker (part-time, including family workers). 5) Unemployed. 6) Pupil, student, training or in unpaid work experience. 7) In retirement, early retirement or given up business. 8) Permanently disabled or unfit to work. 9) In compulsory military service or community service. 10) Fulfilling domestic tasks and care responsibilities. 11) Other inactive person. With these classifications, we define employees from categories (1) and (2), and self-employed workers from categories (3) and (4). This identification of employees and self-employed workers holds for both mothers and fathers. Students, pupils, individuals in training or in unpaid work experience, individuals in retirement, early retirement or having given up

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and different gender and identity roles, we have left the study of Eastern Europe for future research (Mondragón-Vélez and Peña, 2010; Terjesen and Amorós, 2010).

[2] The longitudinal EU-SILC data does not include information about the previous labor status of individuals. Therefore, it could be that individuals whose parents were self-employed in the past are omitted from the longitudinal sample, or not considered as self-employed parents. Hence, a source of bias (sample selection bias and measurement error) must be acknowledged.

[3] For simplicity, these main units of analysis will be denoted as "children". One limitation of the study is that the data does not allow identification of which individuals are foster children, which limits the analysis, as there may be genetic factors explaining employment and self-employment decisions.

business, disabled or unfit to work individuals, and individuals in compulsory military and community service are omitted from the sample. This leaves unemployed workers, individuals fulfilling domestic and care tasks, and other inactive persons as "non-working" individuals.

Restrictions leave a total sample of 36,119 observations, corresponding to 9,235 individuals, for whom there is information for the mother and the father simultaneously. Among these observations, 7,490 are for non-working individuals, 11,393 are for self-employed workers, and 17,236 are for employees. (See Table 1 for a summary of sample sizes, by country, showing both the number of observations and the number of individuals. In addition, 3,997 individuals report living with only one of their parents.

The EU-SILC data allows us to define the following control variables. The gender of individuals, measured with a dummy variable ("being male") that takes value 1 for males, 0 for females. The age of respondents, measured in years (and age squared, defined as $age^2/10$). The marital status of individuals, measured with a dummy that identifies those individuals who have never been married over their life cycle (value 1, 0 otherwise). The maximum level of education achieved by individuals is measured using the International Standard Classification of Education. Form this information, we define two educational dummy variables: "secondary education", which takes value 1 for those individuals who have achieved a secondary but non-compulsory level of formal education (0 otherwise); and "University education", which takes value 1 if individuals have achieved University education. We define some variables at the household level, including the total household disposable income (measured in Euros per year), the type of dwelling (including two dummies for those who live in a house, or in an apartment or flat), and the presence of a car in the household, in order to control for wealth effects. We also compute the number of children present in the household to control for household structure, which may be an important determinant of self-employment. To avoid computing the analyzed individual as household child, we identify the number of children under 4 years (inclusive), and the number of children between 5 and 15 years (inclusive). See Table A1 in Appendix A for descriptive statistics of variables.

Additionally, we use data from the Intergenerational Transmissions of Disadvantages special module, a cross-sectional dataset for the year 2011 that includes the following countries: Austria, Belgium, France, Greece, Luxembourg, the Netherlands, Spain, Sweden, and the UK. Information for Denmark, Finland, and Italy is not available in the special module, so these

countries are omitted from the cross-sectional sample. Unfortunately, despite the fact that longitudinal and cross-sectional samples of the EU-SILC include analogous variables, the longitudinal and cross-section samples are not linkable at the micro level, as the surveyed individuals are different. Therefore, information from the 2011 special module on transmissions cannot be matched with the 2003-2016 longitudinal sample.

This special module includes information for all the individuals of the interviewed households aged between 24 and 60 years old (i.e., born between 1951 and 1985, inclusive). The main purpose of the special module was to collect information about household and parents' characteristics when respondents were 14 years old. Fathers (mothers) refer to the person that the respondent considered their father (mother), which in general referred to the biological father (mother). However, if respondents considered someone else to be the father (mother), answers should refer to that person. Unfortunately, as happened in the longitudinal sample, there is no information about whether or not information refers to the biological father (mother).[4]

The 2011 sample is restricted to individuals who completed the special module (between 25 and 59 years old), for whom there is information for both of their parents through the special module, i.e., information about the parents when the respondent was 14 years old. Individuals for whom there is information only for the father or the mother in the special module are studied in Appendix B. We eliminate from the sample respondents who report being, at the date of the 2011 interview, students, pupils, individuals in training or in unpaid work experience, individuals in retirement, early retirement or having given up business, disabled or unfit to work individuals, and individuals in compulsory military and community service. The classification of individuals according to their economic status is, then, analogous to the classification followed for the longitudinal sample. The sociodemographic information and employment status of respondents is also defined in an equivalent way, identifying employees, self-employed workers, and non-working individuals analogously. Restrictions leave a total sample of 59,342 individuals, for whom there is information for the mother and the father. Among these observations, 9,006 correspond to self-employed workers, and 46,761 to employees. See Table 1 for a summary of sample sizes, by country.

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[4] An additional advantage of the 2011 special module, compared to the 2003-2016 longitudinal sample, is that we do not need to restrict the sample to children of households who cohabit with the parents, thus avoiding a source of potential sample selection bias.

The information available in the special module about parents, including their age, education level, and employment status, refers to the year in which the respondent was 14 years old. The number of children in the household is also taken from the special module. The maximum level of education of parents is defined in a four-scale rank, including: 0) "Father could neither read nor write in any language"; 1) "Low level (pre-primary, primary education or lower secondary education)"; 2) "Medium level (upper secondary education and post-secondary non-tertiary education)"; and 3) "High level (first and second stage of tertiary education)". We then define three dummies for the father, and three dummies for the mother: basic education (categories 0 and 1); secondary education (category 2); and University education (category 3). This results in aclassification for education level analogous to that of the longitudinal survey. Finally, the employment status of the parents when the respondent was 14 years old includes the following categories: 1) "Employed", 2) "Self-employed (including family worker)", 3) "Unemployed", 4) " In retirement or in early retirement or had given up business", 5) "Fulfilling domestic tasks and care responsibilities", and 6) "Other inactive person". Thus, we can straightforwardly identify those respondents whose parent was an employee (category 1) or a self-employed worker (category 2). The remaining control variables defined from the 2011 cross-section EU-SILC data are analogous to those defined in the longitudinal data. See Table A2 in Appendix A for descriptive statistics of variables.

3.1 Descriptive results

Figure 1 (Panel A) shows preliminary results for intergenerational transmission of employment, by country, of the longitudinal sample, showing the percentage of employed workers who have an employed mother (Y-axis) or father (X-axis). The size of the bubbles indicates the relative sample size of each country. This figure suggests a strong intergenerational correlation of employment, which appears stronger among fathers than among mothers. The largest percentage of employed workers with an employed mother (father) is found in Denmark, where 92.08% (95.17%) of the employed workers have an employed mother (father). Conversely, the lowest percentages are found in Greece, Italy, and Spain, in terms of mothers' employment status, and in Greece, Italy, Luxembourg, and Spain, in terms of the fathers'. Furthermore, the figure shows an increasing linear trend, suggesting that the magnitudes represented on both axes are positively correlated. Figure 1 (Panel B) shows an analogous picture for self-employment,

using the longitudinal sample. These percentages are well below the analogous percentages for the general employment status, but the linear trend suggests, again, a positive correlation between the magnitudes represented on the axis. Almost all the percentages are below 10% for both mothers and fathers. The only exceptions are Greece (12.02% of the self-employed have a self-employed mother, and 12.96 have a self-employed father), and the UK (12.00% and 20.80%, respectively). This descriptive evidence suggests the existence of cross-country differences, with two main clusters: Denmark, the Netherlands, Belgium, Austria, France and Sweden show the lowest percentages of transmission, followed by Italy, Spain, Finland, and Luxembourg. Greece and the UK appear to be outliers, reporting the largest percentages of self-employed individuals with self-employed parents.

Figure 2 shows similar results, for the case of the 2011 sample from the special module. Panel A shows, by country, the percentage of employed workers who had an employed mother (Y-axis) or father (X-axis) when they were 14 years old. Analogously, Panel B shows the percentage of self-employed worker with self-employed parents when they were 14 years old. We can observe that the trends are quite different in Panel A, suggesting that labor attributes of parents at the date of the interview and labor attributes of parents when respondents were young may be different. Specifically, between 95.6% and 98.8% of the employed respondents had an employed parent when they were 14 years old, while the percentage of employed mothers lies between 25.1% found in France and 91.1% in Greece. However, no clear trends can be found in this figure. On the other hand, Panel B shows a positive relationship between the probability of self-employed respondents having a self-employed mother and father when they were young, as was also found in Figure 1. The UK, Spain, and Sweden report the lowest percentages of self-employed who had a self-employed mother (about 10%) and father (between 25% and 30%). Luxembourg and France also show low percentages of self-employed workers with a self-employed mother (about 15%), while about 40% of these respondents had a self-employed father. The third cluster that can be found is formed by Austria, Belgium, and the Netherlands, where about 40% (30%) of the respondents had a self-employed father (mother). Finally, Greece seems to be the only country in which there is a larger proportion of self-employed respondents with a mother who was self-employed (45%), than a father (38%).

Given that this descriptive analysis does not allow us to control for other factors that may be affecting these intergenerational transmissions of employment and self-employment, Figures

1 and 2 present only a first descriptive picture. In the following sections, we study these intergenerational transmissions, net of other observable factors.

4. Short-term correlations

4.1 Empirical strategy

The first objective of the empirical analysis is to analyze whether or not the current employment status of individuals is significantly influenced by their parents' current employment status.[5] The econometric strategy relies on fixed effects models, which assume that differences across individuals can be captured by differences in the constant term, which is time-invariant and individual-specific. Thus, this constant term represents time-invariant individual heterogeneity not captured by the included regressors.

The econometric model is as follows. Assume that i represents the reference individual of household j, and that M and F refer to the mother and the father of individuals. Given the existence of assortative mating mechanisms in the marriage market (Chiappori, 2017), it is important to control for both parents' characteristics, and not only for mothers' or fathers', as is the usual practice (Galassi et al., 2019). The pair ij characterizes individuals in the sample, whereas kj characterizes mothers ($k = M$) and fathers ($k = F$). If t represents the time index, the following equation will be estimated using the fixed effects panel data estimator:

$$Y_{ijt} = \alpha_{ij} + \beta_{1M}SE_{Mjt} + \beta_{2M}E_{Mjt} + \beta_{1F}SE_{Fjt} + \beta_{2F}E_{Fjt} +$$

$$+\beta_C X_{ijt} + \beta_H X_{jt} + \beta_M X_{Mjt} + \beta_F X_{Fjt} + u_{ijt} \qquad (1)$$

where Y_{ijt} is a dummy variable indicating whether individuals are employed (value 1; 0 otherwise) at time t.[6] E_{kjt} and SE_{kjt} are dummy variables indicating whether parents are employees or self-employed, respectively (value 1; 0 otherwise), at time t, for $k = M, F$. X_{ijt}, X_{jt}, and X_{kjt} represent socio-demographics of household j, the individual ij, or the parent kj, for $k = M, F$,

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[5] The objective of the analysis is not to follow the epidemiological approach (Fernandez, 2007, 2008), since the EU-SILC data does not include the required information.

[6] Additional models, available upon request, were estimated, including an interaction between parents' employment status, but those interactions were not significant.

at time t.[7] Finally, u_{ijt} represents the error term, and α_{ij} represents individual fixed effects. Equation (1) will be estimated separately for men and women; all estimates include year as a linear trend, and time-invariant sample weights at the individual level. Standard errors are clustered at the country level, to partially deal with the degree of heterogeneity among European countries. Estimates also include two additional controls. The first is the average nest-leaving age of the analyzed countries, given that there may be cultural differences associated with nest-leaving behavior across countries (Giuliano, 2007), and such differences may condition results, as information for parents is available only if they live with the interviewed individuals in the same household. Thus, estimates including nest-leaving may partially amend selection biases arising from the sample of individuals living with their parents. We define the nest-leaving, by year and country, from the Eurostat databases, as the "share of young adults aged 18-34 living with their parents, by age and sex". The second control is the unemployment rate of the active population, by country and year, also taken from Eurostat, to control for the current macroeconomic context and partially deal with cross-country heterogeneity arising from the difficulty of finding a job in the analyzed countries. (Estimates excluding these controls are robust, and available upon request.)

The second objective of the paper is to analyze the existence of intergenerational correlations of self-employment vs paid employment, that is to say, whether the self-employment status of individuals is significantly correlated with the parents' self-employment status. To do so, we run a similar empirical approach, where non-working individuals are omitted, and the following equation is estimated, by gender, using the fixed effects estimator:

$$Y_{ijt} = \alpha_{ij} + \beta_{1M}SE_{Mjt} + \beta_{1F}SE_{Fjt} +$$

$$+\beta_C X_{ijt} + \beta_H X_{jt} + \beta_M X_{Mjt} + \beta_F X_{Fjt} + \alpha_t + u_{ijt} \tag{2}$$

where Y_{ijt} is now a dummy variable indicating whether individuals are self-employed (value 1; 0 if employees) at time t, and the remainder is analogous and represents the same variables as in Equation (1). Estimates include year as a linear trend, sample weights at the individual level, and

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[7] Individual controls include gender (being male), age, age squared, marital status, and education. Household controls include household income, dwelling type, and having a car. Parents' variables include age, age squared, and education.

occupation fixed effects, given that the sample is now restricted to employed workers, for whom there is information about their current occupation.[8]

As we are including individual-specific intercept terms in Equations (1) and (2), the coefficients associated with the intergenerational correlations of employment and self-employment are identified from changes in parents' employment status at the date of the interviews. This is, in consequence, a short-term intergenerational correlation, which may reflect short-term household labor supply decisions.

4.2 Results

The main results of estimating Equation (1) are shown in Columns (1) and (2) of Table 2, for male and female individuals of the sample, respectively. Additional estimates are shown in Table A3 in Appendix A. Estimates show a positive correlation between mothers' and fathers' current self-employment and employee status, and the employment status of children. This suggests that employed parents tend to have employed children and, as a consequence, non-working parents tend to have non-working children, consistent with prior research. Furthermore, among male workers, the correlation with the father seems stronger than the correlation with the mother, both among self-employed parents (p-value of 0.002, according to a t-type test) and among employees (p = 0.039). However, these correlations do not differ between employees and self-employed, nor between fathers (p = 0.814) and mothers (p = 0.294).

Among female workers, general trends are similar, with the largest difference being found for the self-employed status of mothers, relative to that correlation for males, which is not significant at standard levels (p = 0.240). The remaining coefficients show no statistical differences with the corresponding coefficients of males, according to t-type tests. Besides that, the correlations with the father appear greater than the correlations with the mother between the self-employed and employees, but the difference is only significant at standard levels for the self-employed (p = 0.026, p = 0.136, respectively). Similarly, transmissions do not differ at

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[8] The EU-SILC defines the occupation of workers in terms of the ISCO-08, including: 1) Managers; 2) Professionals; 3) Technicians and associate professionals; 4) Clerical support workers; 5) Services and sales workers; 6) Skilled agricultural, forestry and fishery workers; 7) Craft and related trades workers; 8) Plant and machine operators and assemblers; and 9) Elementary occupations.

standard levels, comparing employees and self-employed fathers ($p = 0.830$) and mothers ($p = 0.842$).

Columns (1) and (2) of Table 2 suggest that working parents tend to have working children, regardless of whether they are employees or self-employed workers. To disentangle these relationships, we estimate Equation (2) in Columns (3) and (4) of Table 2, to determine whether self-employed parents have self-employed children, or whether it is only the employment status (but not the employee/self-employed status) that is important in determining children's employment. Results indicate that the self-employment status of both the mother and the father shows a positive correlation with the self-employment status of male workers, relative to employees. Furthermore, the transmission appears to be stronger from fathers to sons, than from mothers to sons, according to t-type tests ($p = 0.059$). On the other hand, the self-employment status of mothers and fathers is positive and negatively correlated with that of daughters, but coefficients are not significant at standard levels. These results suggest that intergenerational correlation of self-employment is stronger among males than among females, mainly driven by fathers' impact on sons' self-employment status.

We have conducted certain robustness checks. First, we study whether the educational level of parents has any moderating effect on the transmission of employment and self-employment, as parents' education is a significant determinant of parents' investments in children's human capital (Heckman, 2006; Del Bono et al., 2016). Second, we split the sample into two groups: those individuals who are reported as children of the reference individuals of interviewed households, and reference individuals who cohabit with their parents. Thus, we can isolate those cultural values that cause adults to live with their parents. Results, shown in Tables A4 and A5 in Appendix A, are robust to the general case. Results for single-parent individuals are shown in Appendix B.

5. Long-term correlations

5.1 Empirical strategy

Equations (1) and (2) include individual-specific intercept terms, so the estimated transmissions of employment and self-employment are identified from changes in parents' employment status at the date of the interviews, leading to short-term correlations that could reflect short-term

household labor-supply decisions. However, intergenerational transmissions are often identified from long-term correlations, or effects, from parents to children (e.g., Solon, 1992, 2002).

To overcome this issue, we use the cross-sectional information provided by the 2011 special module on Intergenerational Transmissions of the EU-SILC data, to study the current employment status of respondents, in terms of their parents' employment status when respondents were 14 years old. Assume that i represents the reference individual of household j, and that M and F refer to the mother and the father. The following equation is estimated using OLS:

$$Y_{ij} = \beta_0 + \beta_{1M}SE_{Mj}^{sm} + \beta_{2M}E_{Mj}^{sm} + \beta_{1F}SE_{Fj}^{sm} + \beta_{2F}E_{Fj}^{sm} +$$

$$+\beta_C X_{ij} + \beta_H X_j + \beta_M X_{Mj}^{sm} + \beta_F X_{Fj}^{sm} + \varepsilon_{ij} \qquad (3)$$

where Y_{ij} is a dummy variable indicating whether individuals are employed (value 1; 0 otherwise) at the time of the interview (i.e., the year 2011). E_{kj}^{sm} and SE_{kj}^{sm} are dummy variables indicating whether parents were employees or self-employed in the past, for $k = M, F$. X_{ij} and X_j represent current socio-demographics of household j and individual ij, while X_{kj}^{sm} represents parents' past sociodemographics, for $k = M, F$. Finally, ε_{ij} represents the error term.

We next restrict the sample to employed workers, and study whether or not the current self-employment status of respondents is correlated with the past self-employment status of their parents. Following the same specification as in Equation (3), we estimate by OLS the following equation:

$$Y_{ij} = \beta_0 + \beta_{1M}SE_{Mj}^{sm} + \beta_{1F}SE_{Fj}^{sm} + \beta_C X_{ij} + \beta_H X_j + \beta_M X_{Mj}^{sm} + \beta_F X_{Fj}^{sm} + \varepsilon_{ij} \qquad (4)$$

where Y_{ij} is now a dummy variable that indicates whether individuals are self-employed (value 1; 0 if employees) at the date of the interview. Equations (3) and (4) are estimated separately for men and women, and all estimates include country fixed effects, nest-leaving, and unemployment level controls, and specific sample weights at the individual level provided for the special module on Intergenerational Transmissions. Standard errors are clustered at the country level, to partially deal with the degree of heterogeneity among European countries. Equation (4) also includes occupation fixed effects.

5.2 Results

The main estimates of Equations (3) and (4) are shown in Table 3. Columns (1) and (2) show results of estimating Equation (3) for male and female respondents of the 2011 EU-SILC special module, respectively, where we analyze whether the employment status of fathers and mothers when respondents were 14 years old had any impact on their current labor participation. Additional estimates are shown in Table A6 in Appendix A, while results for single-parent individuals are shown in Appendix B.

Estimates show a negative, small, and not significant correlation between mothers' past self-employment status and the current employment status of male workers. However, if the mother was an employee in the past, the probability of the male worker being employed (either self-employed or an employee) increases by about 1.1 percentage points, with that increase being significant at standard levels. On the other hand, if the father was self-employed when the male worker was 14 years old, the probability of him being employed at the date of the interview increases by 1.7 percentage points, and if the father was an employee in the past, that probability increases by 3.0 percentage points, with both magnitudes being statistically significant. This suggests that there exists an intergenerational transmission of employment status in the long-term for male workers, although such transmission is mainly driven by fathers. For instance, the employee status of the father seems to have a stronger impact than his self-employment status, but not at a statistically significant level ($p = 0.255$, according to a t-type test), while it is stronger than the impact of the employee status of the mother ($p = 0.039$).

Regarding female workers, estimates show that fathers' past employment status is not correlated with the current employment status of their daughters in a statistically significant way. However, the mother having been self-employed in the past increases the probability of the female worker being employed by about 2.8 percentage points, vs an increase of 3.8 percentage points if the mother was an employee when the female worker was 14 years old. The difference between these two coefficients is, nonetheless, not significant at standard levels ($p = 0.529$). This suggests that mothers appear to be more important for daughters in the long term, while fathers are more important for male workers, as happened in the case of the short-term correlations. Nevertheless, fathers were slightly important for female workers in the short term, while the long-term transmission appears not to be significant.

Columns (3) and (4) of Table 3 show analogous estimates of Equation (4) for male and female workers, respectively, with the sample restricted to employed workers only. That is to say, non-working individuals are omitted from the sample used to estimate Columns (3) and (4). Contrary to the case of the short-term correlations between the current self-employment status of parents and children, estimates show a strong and significant intergenerational transmission of self-employment in the long term. Specifically, focusing on male workers, if the mother was self-employed when the respondent was 14 years old, then the probability of he being self-employed at the current date increases by 7.3 percentage points, with this increase being significant at standard levels. Similarly, if the father was self-employed in the past, this probability increases by 15.0 percentage points, with this coefficient being highly significant, and larger than the mothers' at standard levels ($p = 0.010$). For female workers, estimates show that the self-employment status of both the father and the mother when respondents were 14 years old have a highly significant impact on their current self-employment status. For instance, if the mother was self-employed, the probability of the female worker being self-employed at the date of the interview increases by 7.5 percentage points. This impact is no different than that of mothers on sons, according to t-type tests ($p = 0.943$). Furthermore, if the father was self-employed, then the probability of the female respondent being self-employed at the current date increases by 3.7 percentage points. This coefficient, despite the fact of being lower than the correspondent coefficient for the male counterparts ($p < 0.001$), and also lower than the coefficient associated with the mother ($p = 0.012$), is still significant at standard levels.

6. Discussion of results

The analysis of the short-term correlation indicates that the children of parents who are employed at the current date have a higher probability of being currently employed. On the other hand, mothers' current self-employment status has an influence on their male and female children, which seems to be slightly larger for sons than for daughters, but not at standard levels. However, fathers strongly influence their sons, while the influence on their daughters is smaller and not significant at standard levels. Therefore, results suggest that there is a significant intergenerational correlation of the current employment status within families, despite the existence of gender differences. Nevertheless, as the intergenerational correlations estimated in

Table 2 are identified from changes in the current employment status of parents, these estimates may be reflecting short-term household labor-supply decisions.

Despite the fact that a direct comparison between the short- and long-term correlation analysis is not available, given the different samples and methods used, estimates show that short-term household labor-supply decisions seem more relevant in general terms, when studying employment vs non-working, than long-term intergenerational transmissions. That could be due to different phenomena, such as household financial constraints. The results of the long-term intergenerational correlations reveal, however, a significant channel of self-employment arising from long-term intergenerational transmission. While short-term correlations seem to operate only for male workers, parents' self-employment status when female workers were young has a significant impact on the probability of their being self-employed when they grow. If anything, the analysis of long-term correlations indicates that past self-employment of parents has a highly significant impact on the current self-employment status of their children, relative to employees, regardless of the gender of children. These long-term correlations could be due to different intrahousehold or intergenerational processes, such as transmissions of culture towards work during workers childhood and adolescence (Vollebergh, Iedema and Raaijmakers, 2001; Levine and Hoffner, 2006), but also transmissions of entrepreneurial spirit and role models (Sorensen, 2007; Kirkwood, 200; Lindwuist, Sol and van Praag, 2015), or specific human capital and managerial abilities (Bae et al., 2014; Huber, Sloof and van Praag, 2014;). Despite that, the estimated correlations are smaller than transmissions reported by prior research, where studies found that the self-employment status of parents increased the probability of children becoming self-employed, by between 30 and up to 300 percentage points (see Lindquist et al., 2015).

A potential explanation for the results found in this study is the investment in the children's human capital by parents (Chiappori, Salanié and Weiss 2017). In that scenario, self-employed parents with certain managerial skills can have incentives to transfer such skills to their children during their childhood, hence increasing the probability of them becoming self-employed when entering the labor market. Conversely, while employee parents also invest in their children's education, they do not invest in the specifics of managerial human capital. Another (complementary) explanation for the results found in this study is the well-known intergenerational transmission of wealth and inequality (see Barbieri, Bloise and Raitano, 2019;

Gleb, Borisov and Pissarides, 2019, for two recent contributions). According to this literature, there is a degree of intergenerational persistence in earnings, affecting financial constraints, which is a strong predictor of becoming self-employed (Fairlie and Krashinsky, 2012; Fairlie, 2013). However, the current self-employment status of parents should also influence household finances. Again, sample selection issues may condition these short-term results. A third explanation may be based on the transmission of the so-called "entrepreneurial spirit" (Blanchflower, Oswald and Stutzer, 2001), which is related to certain social norms, culture, and labor attributes that are transmitted vertically. Becoming self-employed may be related to this unobservable and inherent phenomenon, where workers become entrepreneurs because they have a latent desire for running their own business. In this sense, children can develop a strong entrepreneurial spirit during their childhood if there is a parental role in their household that induces such feeling. However, given these examples, results should show similar trends in the short term. That is to say, if the parents were self-employed in the past, and transmitted certain skills to their children, why is parents' current self-employment status not correlated with the current self-employment status of children? A potential explanation for the absence of such short-term significant correlation arises from the strong constraints imposed on the sample, i.e., parents may have been self-employed in the past, but are not self-employed at the current date (e.g., they may have retired by the date of the interview). Unfortunately, given that we cannot compare both samples, we cannot provide a clear conclusion, which is left for future research.

7. Conclusions

This paper empirically studies intergenerational correlations of employment and self-employment in Europe, using harmonized and homogeneous data from the EU-SILC. We investigate the short-term correlations for the years 2003-2016, which may reflect household labor-supply decisions. In doing so, we determine whether the current employment and self-employment status of mothers and fathers is significantly correlated with the employment and self-employment status of their children. We next analyze long-term intergenerational transmissions using data for the year 2011, which included a special module with information about parents' labor status when the respondent was 14 years old.

Results point to the existence of significant correlations between the employment status of parents and children in two-parent households. Furthermore, these transmissions appear stronger from fathers than from mothers, regardless of whether parents are employees or self-employed workers. However, only the current self-employment status of male workers seems to be determined by the current self-employment status of parents, while these correlations are not significant for female workers. Results also show that the self-employment status of workers is strongly correlated with their parents being self-employed in the past (when respondents were 14 years old). This result suggests that there exists a significant intergenerational transmission of self-employment, which is not driven by short-term family labor-supply decisions. Overall, results support the existence of intergenerational socio-economic mobility, as the employment status of parents appears to be transmitted vertically to their children, while the impact of the self-employment status of parents on their children is also positive and significant, but quantitatively lower than that found by prior research.

The analysis has certain limitations. First, results do not allow us to talk about causal effects, given measurement errors and potential endogeneity. (Despite various IV checks, we could not find a proper instrumentation for the empirical analysis.) Second, the analysis may suffer from potential sample selection bias, as individuals who do not cohabit with their parents are systematically omitted from the longitudinal sample (since there is no information about the parents, regardless of whether they are self-employed or not); and from measurement error, as parents of studied individuals could have been self-employed in the past, but not at the date of the interview, or at the date of the special module. Finally, the data used throughout the analysis do not allow us to run an accurate analysis of cross-country or cross-occupation differences, given the limited sample size in some of the countries considered for analysis.

The ultimate objective of this work is to record the significance of intergenerational transmission as a channel of employment and self-employment in European countries. The results may be important for planners and policy makers, as they may help to anticipate which workers may be employed and become self-employed in the future, in terms of their parents economic and sociodemographic characteristics. For instance, recent efforts have been made by institutions to promote self-employment and entrepreneurship, as a way of overcoming the devastating effects of the recent economic crisis. Results suggest that transmissions of employment are mainly driven by short-term family labor-supply decisions, while

intergenerational transmissions of self-employment may be determined by long-term transmissions when workers were young. Further research should focus on studying the different channels that drive these transmissions, such as culture, social norms, or the transmission of certain managerial skills, entrepreneurial spirit, and human capital related to self-employment.

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Figure 1. Parents' and children's employment, by country - longitudinal sample

A) EMPLOYMENT

B) SELF-EMPLOYMENT
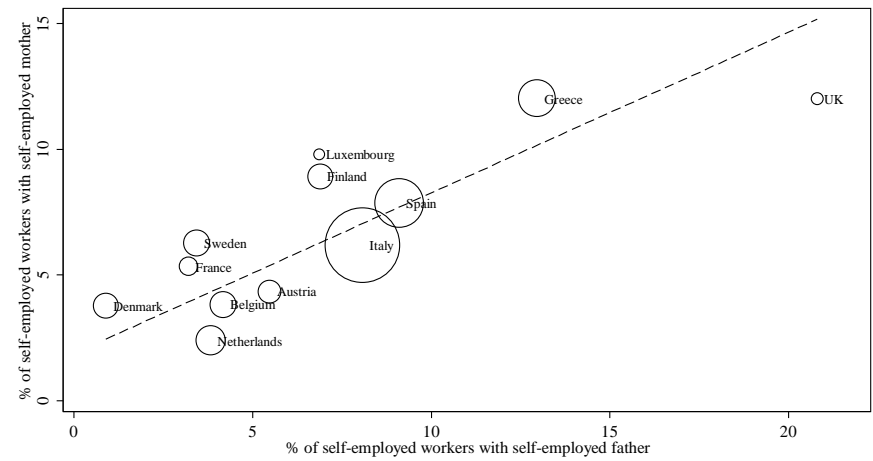
Note: The sample (longitudinal EU-SILC 2013-2016) is restricted to working-age children of interviewed households who are employed or self-employed.

Figure 2. Parents' and children's employment, by country - 2011 special module
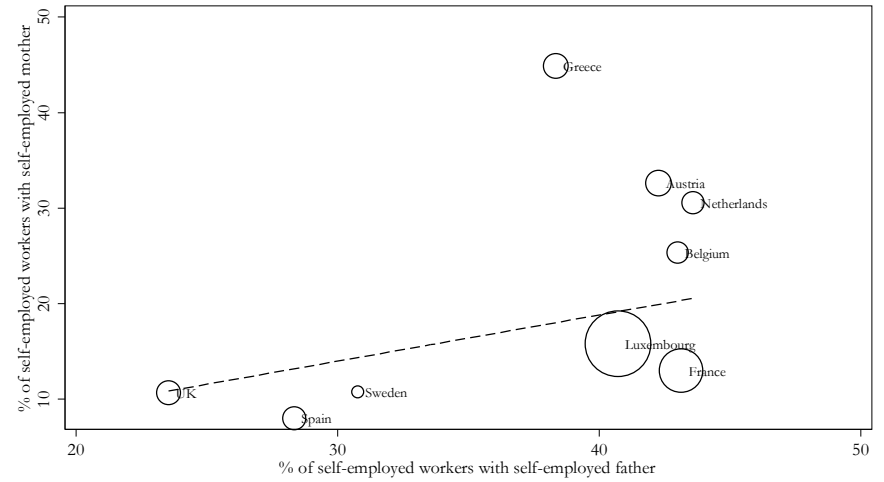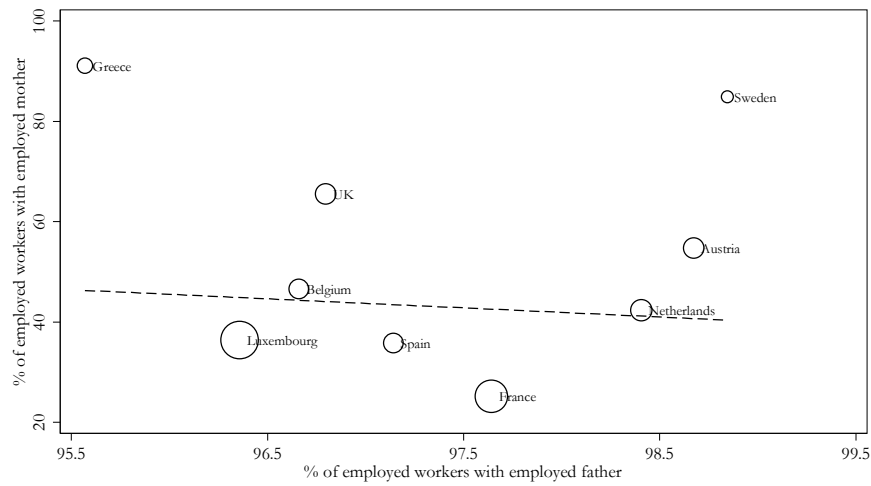
A) EMPLOYMENT

B) SELF-EMPLOYMENT

Note: The sample (cross-sectional EU-SILC 2011) is restricted to working-age children of interviewed households who are employed or self-employed.

Table 1. Sample sizes, by country

COUNTRY	EU-SILC 2013-2016		EU-SILC 2011
	Observations	Individuals	Individuals
Austria	1,867	478	5,012
Belgium	1,389	361	4,599
Denmark	1,105	278	-
Finland	1,119	285	-
France	557	160	12,758
Greece	4,171	1,056	2,876
Italy	14,516	3,699	-
Luxembourg	799	209	17,897
Netherlands	2,289	573	5,392
Spain	6,531	1,685	4,597
Sweden	1,080	276	1,572
UK	696	175	4,639
Total	36,119	9,235	59,342

Note: The longitudinal EU-SILC 2013-2016 is restricted to working-age children of interviewed two-parent households who are not students, retired, or disabled. The cross-sectional EU-SILC 2011 is restricted to working-age individuals who filled-in the Special Module on Intergenerational Transmissions, of interviewed two-parent households who are not students, retired, or disabled.

Table 2. Fixed effect estimates

VARIABLES	EMPLOYED VS NON-WORKING		SELF-EMPLOYED VS EMPLOYEE	
	Males	Females	Males	Females
	(1)	(2)	(3)	(4)
Self-employed:				
Mother	0.123***	0.156***	0.037**	0.022
	(0.018)	(0.021)	(0.016)	(0.015)
Father	0.213***	0.216***	0.093***	-0.017
	(0.022)	(0.017)	(0.025)	(0.020)
Employee:				
Mother	0.157***	0.163***	-	-
	(0.027)	(0.028)		
Father	0.219***	0.211***	-	-
	(0.013)	(0.016)		
Constant	0.924	0.939	2.158***	-0.982
	(1.029)	(1.294)	(0.651)	(0.708)
Nest-leaving	Yes	Yes	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes
Individual variables	Yes	Yes	Yes	Yes
Household variables	Yes	Yes	Yes	Yes
Parent variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Occupation FE	No	No	Yes	Yes
Parents' occupation FE	No	No	Yes	Yes
Observations	21,964	14,155	17,482	11,147
Individuals	5,614	3,632	5,266	3,364

Note: Robust standard errors clustered at the country level in parentheses. The sample (EU-SILC 2013-2016) is restricted to working-age individuals of interviewed households who are not students, retired, or disabled and report living with their parents. Estimates include sample weights. Columns (3) and (4) are restricted to employed workers. The dependent variable is the dummy "employed" in Columns (1) and (2), and the dummy "self-employed" in Columns (3) and (4). *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3. Estimates - Special Module

| VARIABLES | EMPLOYED VS NON-WORKING | | SELF-EMPLOYED VS EMPLOYEE | |
| | Males | Females | Males | Females |
	(1)	(2)	(3)	(4)
Self-employed:				
Mother	-0.007	0.028***	0.073**	0.075***
	(0.014)	(0.008)	(0.024)	(0.015)
Father	0.017**	0.043	0.150***	0.037***
	(0.007)	(0.029)	(0.018)	(0.002)
Employee:				
Mother	0.011***	0.038**	-	-
	(0.002)	(0.014)		
Father	0.030***	0.052	-	-
	(0.009)	(0.029)		
Constant	0.682***	0.035	-0.341	0.168
	(0.087)	(0.221)	(0.229)	(0.217)
Nest-leaving	Yes	Yes	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes
Individual variables	Yes	Yes	Yes	Yes
Parent variables	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Occupation FE	No	No	Yes	Yes
Parents occupation FE	No	No	Yes	Yes
Observations	28,533	30,809	27,722	28,045

Note: Robust standard errors clustered at the country level in parentheses. The sample (EU-SILC 2011) is restricted to working-age individuals who filled-in the Special Module on Intergenerational Transmissions, of interviewed two-parent households who are not students, retired, or disabled. Estimates include specific sample weights of the 2011 special module on Intergenerational Transmissions. Columns (3) and (4) are restricted to employed workers. The dependent variable is the dummy "employed" in Columns (1) and (2), and the dummy "self-employed" in Columns (3) and (4). Parents' variables represent parents' labor and sociodemographic attributes when the respondent was 14 years old. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.